

DRAFT ENVIRONMENTAL IMPACT REPORT - Volume 2

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR

PLANNING DEPARTMENT
CASE NO. 2013.0208E

STATE CLEARINGHOUSE NO. 2013122024

	Draft EIR Publication Date:	April 26, 2017
	Draft EIR Public Hearing Date:	June 1, 2017
	Draft EIR Public Comment Period:	April 26, 2017 through June 12, 2017

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:
Tania Sheyner, AICP, LEED AP | 1650 Mission Street, Suite 400 | San Francisco, CA 94103 or tania.sheyner@sfgov.org

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List of Acronyms and Abbreviations

AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ALS	Advanced Life Support
AMI	area median income
APEZ	Air Pollutant Exposure Zone
AWSS	Auxiliary Water Supply System
BAAQMD	Bay Area Air Quality Management District
Basin Plan	Water Quality Control Plan
Bay	San Francisco Bay
Bay Area	San Francisco Bay Area
Bay Plan	San Francisco Bay Plan
BCDC	Bay Conservation and Development Commission
BLIP	Branch Library Improvement Program
BMPs	best management practices
BRWL	blue-rich white light lamps
C&D	Construction and demolition
CAAQS	California Ambient Air Quality Standards
Cal/OSHA	California Division of Occupational Safety and Health
CalEMA	California Emergency Management Agency
CALGreen Code	California Green Building Standards Code
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CBIA v. BAAQMD	California Building Industry Association vs. Bay Area Air Quality Management District
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH_4	methane

CII	Commercial, Industrial, and Institutional
CIP	capital improvement program
City	City and County of San Francisco
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO_2	carbon dioxide
CO_2e	carbon dioxide-equivalent" measures
CPUC	California Public Utilities Commission
CWA	Clean Water Act
DDT	dichlorodiphenyltrichloroethane
Delta	Sacramento River–San Joaquin River Delta
Design Controls	Development Controls and Design Guidelines
DHS	Department of Health Services
DO	dissolved oxygen
DOE	Department of Energy
DPR	California Department of Parks and Recreation
DPR	Department of Parks and Recreation
DPS	distinct population segment
Draft EIR	Draft Environmental Impact Report
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
East Bay	AC Transit
EE	environmental evaluation
EFH	essential fish habitat
Embarcadero Historic District	Port of San Francisco Embarcadero National Register Historic District
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERO	Environmental Review Officer
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
FARR	Final Archaeological Resources Report
FEMA	Federal Emergency Management Agency

FHWG	Fisheries Hydroacoustic Working Group
FIRM	Flood Insurance Rate Map
General Plan	City and County of San Francisco General Plan
GHG	greenhouse gas
GPCD	gallons of water consumed per person per day
gsf	gross square feet
H&H	H&H Shipping Service Company, Inc.
HCD	Housing and Community Development
HDMT	Healthy Development Measurement Tool
HRE	Historic Resource Evaluation, Seawall Lot 337 and Pier 48 Mixed-Use Development Project, San Francisco, California
HZ	Height Zone
I-280	Interstate 280
I-80	Interstate 80
IBC	International Building Code
IESNA	Illuminating Engineering Society of North American
ILA	International Longshoremen's Association
kV	kilovolt
LED	light-emitting diode
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
LUST	leaking underground storage tank
Ma	million years
MAA	Management Agency Agreement
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MARAD	U.S. Department of Transportation Marine Administration
MB-OS	Mission Bay Open Space
MB-OS	Mission Bay, Open Space
MBBTCC	Mission Bay Ballpark Transportation Coordination Committee
MBD	Mission Bay Datum
MB-RA	Mission Bay Redevelopment Area
MBTA	Migratory Bird Treaty Act
MCLs	maximum contaminant levels

MERV	Minimum Efficiency Reporting Value
mg/l	milligrams per liter
MHE	maximum historic earthquake
MHW	mean high water
million $MTCO_2e$	million gross metric tons of CO_2e
MIR	maximally impacted receptor
MMPA	Marine Mammal Protection Act
MPN/100 mL	most probable number per 100 milliliters
MS4	Municipal Separate Storm Sewer Systems
MSW	municipal solid waste
MT/yr	metric tons per year
MTC	Metropolitan Transportation Commission
Muni	San Francisco Municipal Railway
Mw	moment magnitude
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Act
NFPA	National Fire Protection Agency
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NOP	notice of preparation
North Bay	Golden Gate Transit
NPDES	National Pollutant Discharge Elimination System
NPRA	National Parks and Recreation Association
NRC Report	Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future
NRC	National Research Council
NTUs	nephelometric turbidity units
O&M	operation and maintenance

OCII	Office of Community Investment and Infrastructure
OHP	California Office of Historic Preservation
OSP	Oceanside Water Pollution Control Plant
PAR	Environmental Planning Preliminary Archaeological Review: Checklist for the Mission Rock Pier 48 and Seawall Lot 337 Project
PCBs	polychlorinated biphenyls
PDA	Port of San Francisco Priority Development Area
Peninsula	San Francisco Peninsula
PG&E	Pacific Gas & Electric
Planning Code	San Francisco Planning Code
Port	Port of San Francisco
Port Historic Guidelines	Port of San Francisco Historic Preservation Review Guidelines for Pier and Bulkhead Wharf Substructures
PPD	per person per day
PRC	Public Resources Code
Project	Seawall Lot 337/Pier 48 Mixed-Use Project
Regional Water Board	Regional Water Quality Control Board
RHA	Rivers and Harbors Act
RHNA	Regional Housing Needs Allocation
RPD	Recreation and Parks Department
RTP	Regional Transportation Plan
RWD	Report of Waste Discharge
RWS	Regional Water System
SB	Senate Bill
SB 610	California Senate Bill 610
SBx7-7	Senate Bill x7-7
SCS	Sustainable Communities Strategy
SDPS	Storm Drain Pump Station
SDWA	Safe Drinking Water Act
Seaport Plan	San Francisco Bay Area Seaport Plan
Secretary's Standards	Secretary of the Interior's Standards for the Treatment of Historic Properties
SEL	sound exposure level

SF&SJ	San Francisco & San Joaquin
SFDPH	San Francisco Department of Public Health
SFEI	San Francisco Estuary Institute
SFFD	San Francisco Fire Department
SFHAs	Special Flood Hazard Areas
SFMTA	San Francisco Municipal Transportation Agency
SFO	San Francisco International Airport
SFPD	San Francisco Police Department's
SFPL	San Francisco Public Library
SFPUC	San Francisco Public Utilities Commission
SFPW	San Francisco Public Works
SFUSD	San Francisco Unified School District
SHPO	State Historic Preservation Officer
SLR	sea-level rise
SMCLs	secondary maximum contaminant levels
SOMA	South of Market
SP	service population
SPCC	Spill Response and Countermeasure Plan
SR	State Route
SSIP	Sewer System Improvement Program
SUD	Special Use District
SVP	Society of Vertebrate Paleontology
SWMP	Stormwater Management Plans
SWPPP	Stormwater Pollution Prevention Plan
SWPS	Stormwater Pump Station
SWRCB	State Water Resources Control Board
TDM	Transportation Demand Management
TDMP	Transportation Demand Management Program
TIDF	Transit Impact Development Fee
TMDL	total maximum daily load
TNW	traditional navigable water
TSF	Transportation Sustainability Fee
Tvis	visible light transmittance

UCSF	University of California San Francisco
US 101	U.S. Highway 101
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGBC	U.S. Green Building Council
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
VegCAMP	Vegetation Classification and Mapping Program
VOCs	volatile organic compounds
WDRs	Waste Discharge Requirements
Westar	Westar Marine Services
WLUP	Waterfront Land Use Plan
WSA	Water Supply Assessment
µg/l	micrograms per liter

4.H GREENHOUSE GAS EMISSIONS

This section describes the affected environment and regulatory setting for greenhouse gas (GHG) emissions and climate change. It also describes the greenhouse gas emissions and climate change impacts that would result from implementation of the Seawall Lot 337 and Pier 48 Mixed-Use Project (Mission Rock Project or proposed project) and provides mitigation measures that would reduce these impacts, where applicable.

Issues identified in response to the notice of preparation (NOP) (Appendix 1) were considered in preparing this analysis. Applicable issues that were raised pertain to identifying GHG impacts and mitigation measures and including a GHG emissions analysis consistent with Assembly Bill 32, the California Global Warming Solutions Act.

ENVIRONMENTAL SETTING

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Gases that trap heat in the atmosphere are referred to as GHGs because they capture heat radiated from the sun as it is reflected back into the atmosphere much like a greenhouse does. The accumulation of GHGs contributes to global climate change. The primary GHGs, or climate pollutants, are carbon dioxide (CO_2), black carbon, methane (CH_4), nitrous oxide (N_2O), ozone, and water vapor.

Individual projects contribute to the cumulative effects of climate change by emitting GHGs during demolition, construction, and operations. Although the presence of some of the primary GHGs in the atmosphere is naturally occurring, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within the earth's atmosphere.

Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Black carbon has emerged as a major contributor to global climate change, possibly second only to CO_2. Black carbon is produced naturally and by human activities as a result of the incomplete combustion of fossil fuels, biofuels and biomass.[1] N_2O is a by-product of agricultural processes (e.g., fertilizer application), nylon production, fuel-fired power plants, nitric acid production, and vehicle emissions. Other GHGs include hydrofluorocarbons, perfluorocarbons, and sulfur

[1] Center for Climate and Energy Solutions. 2010. *What is Black Carbon?* April. Available: http://www.c2es.org/docUploads/what-is-black-carbon.pdf. Accessed: March 17, 2016.

hexafluoride, which are generated in certain industrial processes, such as the production of petrochemicals, aluminum, and magnesium.[2] GHGs are typically reported in "carbon dioxide-equivalent" measures (CO_2e).[3]

There is international scientific consensus that human-caused increases in GHGs contribute to global warming and, thus, climate change. Many impacts of climate change, including sea-level rise, a greater number of fires, floods, severe storms, and heat waves, already occur and will only become more severe and costly in the future.[4] Secondary effects of climate change will most likely include impacts on agriculture, the state's electricity system, and native freshwater fish ecosystems; an increase in the vulnerability of levees, such as in the Sacramento-San Joaquin Delta; changes in disease vectors; and changes in habitat and biodiversity.[5,6]

GREENHOUSE GAS EMISSIONS ESTIMATES AND ENERGY PROVIDERS IN CALIFORNIA

The California Air Resources Board (ARB) estimated that, in 2010, California produced about 451.6 million gross metric tons of CO_2e (million $MTCO_2e$).[7,8] ARB found that transportation is the source of 38 percent of the state's GHG emissions, followed by electricity generation (both in-state generation and imported electricity) at 21 percent, and industrial sources at 19 percent. Commercial and residential fuel use (primarily for heating) accounted for 10 percent of GHG

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2 Intergovernmental Panel on Climate Change. 1996. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual.* Available: http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch2ref1.pdf. Accessed: September 23, 2016.

3 Because of the differential heat absorption potential of various GHGs, GHG emissions are frequently measured in "carbon dioxide equivalents," which present a weighted average, based on each gas's heat absorption (or "global warming") potential.

4 Intergovernmental Panel on Climate Change. 2013. *Climate Change 2013: The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Available: http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf. Accessed: March 17, 2016.

5 Intergovernmental Panel on Climate Change. 2013. *Climate Change 2013: The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Available: http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf. Accessed: March 17, 2016.

6 California Climate Change Center. 2012. *Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California.* July. Available: http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf. Accessed: March 17, 2016.

7 California Air Resources Board. n.d. *California Greenhouse Gas Inventory for 2000–2010— by Category, as Defined in the Scoping Plan*. Available: http://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2010/ghg_inventory_scopingplan_00-10_2013-02-19.pdf. Accessed: March 17, 2016.

8 One metric tonne (MT) is 1,000 kilograms, or 2,204.6 pounds or 1.1 short tons. One short ton or U.S. ton is 2,000 pounds. The abbreviation for "million metric tonnes" is MMT; thus, million metric tons of CO_2 equivalent is $MMTCO_2E$.

emissions.[9] In San Francisco, motorized transportation and natural gas sectors were the two largest sources of GHG emissions, accounting for approximately 42 percent (2.0 million $MTCO_2e$) and 31 percent (1.5 million $MTCO_2e$), respectively, of San Francisco's 4.75 million $MTCO_2e$ emitted in 2012.[10] Electricity consumption (building operations and transit) accounts for approximately 22 percent (1.0 million $MTCO_2e$) of San Francisco's GHG emissions.[11]

Electricity in San Francisco is provided primarily by Pacific Gas & Electric (PG&E) and the San Francisco Public Utilities Commission (SFPUC). In 2012, electricity consumption in San Francisco was approximately 6.0 million megawatt-hours (MWh). Of this total, PG&E produced approximately 71 percent of electricity distributed (4.2 million MWh [about 81 percent of San Francisco's electricity-driven GHG emissions]), and the SFPUC produced approximately 16 percent of electricity distributed (0.9 million MWh [17 percent of San Francisco's electricity-driven GHG emissions]).[12]

The majority of land use projects in San Francisco are provided power by PG&E, whose 2015 power mix was as follows: 25 percent natural gas, 23 percent nuclear, 30 percent eligible renewables (described below), 6 percent large hydroelectric, and 17 percent unspecified power.[13,14]

The SFPUC, which operates three hydroelectric power plants in association with San Francisco's Hetch Hetchy water supply system and distribution system, provides electrical power to the San Francisco Municipal Railway (Muni), city buildings, and a limited number of other commercial accounts in San Francisco. Electricity generated by the Hetch Hetchy system achieved net zero GHG emissions for 2012.[15]

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[9] California Air Resources Board. n.d. *California Greenhouse Gas Inventory for 2000–2010— by Category, as Defined in the Scoping Plan*. Available: http://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2010/ghg_inventory_scopingplan_00-10_2013-02-19.pdf. Accessed: March 17, 2016.

[10] San Francisco Department of the Environment. n.d. *Community GHG Inventory: 1990–2012*.

[11] San Francisco Department of the Environment. n.d. *Community GHG Inventory: 1990–2012*.

[12] San Francisco Department of the Environment. n.d. *Community GHG Inventory: 1990–2012*. (Note: The remaining electricity consumption is derived from third-party generators or other suppliers.)

[13] Pacific Gas & Electric. n.d. *PG&E's 2015 Electric Delivery Mix*. Available: https://www.pge.com/pge_global/common/pdfs/your-account/your-bill/understand-your-bill/bill-inserts/2016/11.16_PowerContent.pdf. Accessed: January 25, 2017.

[14] Beginning in 2010, transactions not specifically traceable to specific generation sources are designated as "unspecified" in accordance with AB 162's revisions to Public Utilities Code Section 398.2.

[15] San Francisco Department of the Environment. n.d. *Community GHG Inventory: 1990–2012*.

REGULATORY FRAMEWORK

STATE

Executive Orders S-3-05 and B-30-15. Executive Order (EO) S-3-05 sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million $MTCO_2e$); by 2020, reduce emissions to 1990 levels (approximately 427 million $MTCO_2e$); and by 2050, reduce emissions to 80 percent below 1990 levels (approximately 85 million $MTCO_2e$). As discussed in the Environmental Setting section above, California produced about 452 million $MTCO_2e$ in 2010, thereby meeting the 2010 target date to reduce GHG emissions to 2000 levels.

EO B-30-15 set an additional interim statewide GHG emissions reduction target of 40 percent below 1990 levels, to be achieved by 2030. The purpose of this interim target is to ensure that California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050.[16] EO B-30-15 also requires all state agencies with jurisdiction over sources of GHG emissions to implement measures within their statutory authority to achieve reductions in GHG emissions to meet the 2030 and 2050 GHG emissions reduction targets.

Assembly Bill 32 and the California Climate Change Scoping Plan. In 2006, the California legislature passed Assembly Bill 32 (California Health and Safety Code Division 25.5, Sections 38500 et seq., or AB 32), also known as the California Global Warming Solutions Act. AB 32 requires ARB to implement emission limits, regulations, and other feasible and cost-effective measures such that statewide GHG emissions are reduced to 1990 levels by 2020.

Pursuant to AB 32, ARB adopted the Climate Change Scoping Plan (Scoping Plan) in December 2008, which outlines measures for meeting the 2020 GHG emissions reduction limits. To meet the goals of AB 32, California must reduce its GHG emissions to 30 percent below projected 2020 business-as-usual emissions levels (approximately 15 percent below 2008 levels).[17] The Scoping Plan estimates that GHG emissions from transportation, energy, agriculture, forestry, and other high global warming sectors can be reduced, as shown in Table 4.H-1 on the following page.[18]

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[16] Governor's Office. 2015. *Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America.* April 29. Available: https://www.gov.ca.gov/news.php?id=18938. Accessed: March 17, 2016.

[17] California Air Resources Board. n.d. *California's Climate Plan: Fact Sheet*. Available: http://www.arb.ca.gov/cc/facts/scoping_plan_fs.pdf. Accessed: March 17, 2016.

[18] California Air Resources Board. n.d. *California's Climate Plan: Fact Sheet*. Available: http://www.arb.ca.gov/cc/facts/scoping_plan_fs.pdf. Accessed: March 17, 2016.

TABLE 4.H-1. GHG EMISSIONS REDUCTIONS FROM THE AB 32 SCOPING PLAN CATEGORIES

Scoping Plan Category	GHG Emissions Reductions (million $MTCO_2e$)
Transportation	62.3
Electricity and Natural Gas	49.7
Industry	1.4
Landfill Methane Control	1
Forestry	5
High Global Warming Potential GHGs	20.2
Additional Reductions Needed to Achieve the GHG Cap	34.4
Other Recommended Measures	
Government Operations	1–2
Agriculture – Methane Capture at Large Dairies	1
Water	4.8
Green Buildings	26
Recycling/Zero Waste	9
Total Reductions Counted Towards 2020 Target	**216.8–217.8**

Sources: California Air Resources Board, 2008[19] and 2010.[20]

The AB 32 Scoping Plan also anticipates that actions by local governments will reduce GHG emissions because local governments have the authority to plan, zone, approve, and permit development and thereby accommodate population growth and the changing needs of their jurisdictions.[21] The Scoping Plan also relies on the requirements of Senate Bill (SB) 375 (discussed below) to align local land use and transportation planning and reduce GHG emissions.

The Scoping Plan must be updated every 5 years to evaluate AB 32 policies and ensure that California is on track to achieve the 2020 GHG emissions reduction goal. In 2014, ARB released the First Update to the Climate Change Scoping Plan (First Update), which builds upon the initial scoping plan with new strategies and recommendations. The First Update identifies opportunities to leverage existing and new funds and drive GHG emissions reductions through strategic planning and targeted low-carbon investments. This update defines ARB's climate

[19] California Air Resources Board. 2008. *Climate Change Scoping Plan*. December. Available: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed: March 17, 2016.

[20] California Air Resources Board. n.d. *California's Climate Plan: Fact Sheet*. Available: http://www.arb.ca.gov/cc/facts/scoping_plan_fs.pdf. Accessed: March 17, 2016.

[21] California Agency Air Resources Board. 2008. *Climate Change Scoping Plan*, December. Available: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed: March 3, 2016.

change priorities for the next 5 years and sets the groundwork for reaching the long-term goals set forth in EO S-3-05. The First Update highlights California's progress toward meeting the near-term 2020 GHG emissions reduction goals in the initial scoping plan. It also evaluates actions to align the state's longer-term GHG emissions reduction strategies with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use.[22]

Senate Bill 375. The Scoping Plan also relies on the requirements of SB 375 (Chapter 728, Statutes of 2008), also known as the Sustainable Communities and Climate Protection Act of 2008, to reduce carbon emissions from land use. SB 375 requires regional transportation plans developed by each of the state's 18 metropolitan planning organizations (MPOs) to incorporate a "sustainable communities strategy" (SCS) in each regional transportation plan to achieve the GHG emissions reduction targets set by ARB. For the Bay Area, the per-capita GHG emissions reduction target is 7 percent by 2020 and 15 percent by 2035 from 2005 levels.[23] Plan Bay Area, the Metropolitan Transportation Commission's regional transportation plan, adopted in July 2013, is the region's first plan that will be subject to SB 375 requirements.[24]

Senate Bill 32. On August 24, 2016, the California Legislature passed Senate Bill 32 (California Health and Safety Code Division 25.5, Section 38566), amending the California Global Warming Solutions Act of 2006. SB 32 directs ARB to adopt, to the extent technologically feasible and cost effective, any rules and regulations necessary to achieve a reduction in statewide GHG emissions of 40 percent below 1990 levels by 2030. The passage of SB 32 codifies the 2030 interim GHG emissions reduction target established by EO B-30-15.

SB 32 was paired with AB 197 (California Government Code Article 7.6 of Chapter 1.5 of Division 2 of Title 2, California Health and Safety Code Sections 39510, 39607, 38506, 38531, and 38562.5), which became effective on January 1, 2017, in order for SB 32 to become operative. AB 197 provides additional guidance on how to achieve the reduction targets established in EO B-30-15 and SB 32.

Senate Bills 1078, 107, X1-2, and 350 and Executive Orders S-14-08 and S-21-09. California established aggressive renewable portfolio standards under SB 1078 (Chapter 516, Statutes of 2002) and SB 107 (Chapter 464, Statutes of 2006), which require retail sellers of electricity to provide at least 20 percent of their electricity from renewable sources by 2010. EO S-14-08

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[22] California Air Resources Board. 2014. *Fist Update to the Climate Change Scoping Plan*. May. Available: http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed: March 17, 2016.

[23] California Air Resources Board. 2011. Executive Order No. G-11-024, Relating to Adoption of Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375. February. Available: http://www.arb.ca.gov/cc/sb375/executive_order_g11024.pdf. Accessed: March 17, 2016.

[24] Association of Bay Area Governments and Metropolitan Transportation Commission. 2014. *Plan Bay Area*. Adopted July 18, 2013. Available: http://planbayarea.org/plan-bay-area.html. Accessed: March 17, 2016.

(November 2008) increased the state's renewable portfolio standard for 2020 from 20 percent to 33 percent. In September 2009, Governor Schwarzenegger continued California's commitment to the renewable portfolio standard by signing EO S-21-09, which directed ARB to enact regulations to help California meet the renewable portfolio standard of 33 percent renewable energy by 2020.[25]

In April 2011, Governor Brown signed SB X1-2 (Chapter 1, Statutes of 2011) codifying the GHG emissions reduction goal of 33 percent by 2020 for energy suppliers. This renewable portfolio standard preempts ARB's 33 percent renewable sources electricity standard and applies to all electricity suppliers (not just retail sellers) in the state, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. Under SB X1-2, all of these entities must adopt the new renewable portfolio standard goals of 20 percent of retail sales from renewable sources by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.[26] Eligible renewable sources include geothermal, ocean wave, solar photovoltaic, and wind but exclude large hydroelectric (30 MW or more). Because the SFPUC receives more than 67 percent of its electricity from large hydroelectric facilities, the remaining electricity provided by the SFPUC is required to be 100 percent renewable.[27] SB 350 (Chapter 547, Statutes of 2015), signed by Governor Brown in October 2015, dramatically increased the stringency of the renewable portfolio standard. SB 350 establishes a renewable portfolio standard target of 50 percent by 2030, along with interim targets of 40 percent by 2024 and 45 percent by 2027.

REGIONAL

The Bay Area Air Quality Management District (BAAQMD) is responsible for attaining and maintaining federal and state air quality standards in the San Francisco Bay Area Air Basin (SFBAAB), as established by the federal Clean Air Act (CAA) and the California Clean Air Act (CCAA), respectively. The CAA and the CCAA require plans to be developed for areas that do not meet air quality standards, generally. The most recent air quality plan, the Bay Area 2010 Clean Air Plan, includes a goal of reducing GHG emissions to 1990 levels by 2020, 40 percent below 1990 levels by 2035, and 80 percent below 1990 levels by 2050.[28] In addition, the

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[25] California Public Utilities Commission. n.d. *RPS Program Overview*, 2016. Available: http://www.cpuc.ca.gov/RPS_Overview/. Accessed: March 17, 2016.

[26] California Public Utilities Commission. n.d. *RPS Program Overview*, 2016. Available: http://www.cpuc.ca.gov/RPS_Overview/. Accessed: March 17, 2016.

[27] San Francisco Public Utilities Commission. 2011. *Approval of the Enforcement Program for the California Renewable Energy Resources Act*. December 13,. Available: https://infrastructure.sfwater.org/fds/fds.aspx?lib=SFPUC&doc=741114&data=285328890. Accessed: March 17, 2016.

[28] Bay Area Air Quality Management District. 2010. *Clean Air Plan*. September. Available: http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans. Accessed: March 17, 2016.

BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB; the program includes GHG-emissions reduction measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative energy sources.[29]

The BAAQMD California Environmental Quality Act (CEQA) Air Quality Guidelines helps lead agencies comply with the requirements of CEQA as they pertain to potentially adverse impacts on air quality. The BAAQMD advises lead agencies to consider adopting a GHG emissions reduction strategy that is capable of meeting AB 32 goals and then reviewing projects for compliance with the GHG emissions reduction strategy as a CEQA threshold of significance.[30] This is consistent with the approach to analyzing GHG emissions described in CEQA Guidelines Section 15183.5.

LOCAL

San Francisco Greenhouse Gas Reduction Ordinance. In May 2008, the City and County of San Francisco (City) adopted Ordinance No. 81-08, thereby amending the San Francisco Environment Code to establish GHG emissions targets, require departmental action plans, and authorize the San Francisco Department of the Environment to coordinate efforts to meet these targets. The City ordinance establishes the following GHG emissions reduction limits and target dates: determine 1990 citywide GHG emissions by 2008, the baseline level, with reference to which target reductions are set; reduce GHG emissions by 25 percent below 1990 levels by 2017; reduce GHG emissions by 40 percent below 1990 levels by 2025; and reduce GHG emissions by 80 percent below 1990 levels by 2050.[31] The City's GHG emissions reduction targets are consistent with—in fact, are more ambitious than—those set forth in Governor Brown's EO B-30-15, targeting a 40 percent reduction in GHGs emissions by 2025 rather than a 40 percent reduction by 2030.

San Francisco Greenhouse Gas Reduction Strategy. San Francisco has developed a number of plans and programs to reduce the city's contribution to global climate change and meet the goals of the Greenhouse Gas Reduction Ordinance. The San Francisco Planning Department's *Strategies to Address Greenhouse Gas Emissions*[32] documents City actions to pursue cleaner energy,

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[29] Bay Area Air Quality Management District. n.d. *Climate Protection Program*. Available: http://www.baaqmd.gov/plans-and-climate/climate-protection/climate-protection-program. Accessed: March 17, 2016.

[30] Bay Area Air Quality Management District. 2012. *California Environmental Quality Act Air Quality Guidelines*. May. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. Accessed: March 17, 2016.

[31] City and County of San Francisco. 2008. *Greenhouse Gas Emissions Targets and Departmental Action Plans*. May 13. Available: http://environment.sanfranciscocode.org/9/. Accessed: March 17, 2016.

[32] San Francisco Planning Department. 2010. *Strategies to Address Greenhouse Gas Emissions.* November. Available: http://sfmea.sfplanning.org/GHG_Reduction_Strategy.pdf. Accessed: March 17, 2016.

energy conservation, alternative transportation, and solid waste policies. For instance, the City has implemented mandatory requirements and incentives that have reduced GHG emissions measurably. These include, but are not limited to, increasing the energy efficiency of new and existing buildings, installing solar panels on building roofs, implementing a green building strategy, adopting a zero waste strategy, adopting a construction and demolition debris recovery ordinance, creating a solar energy generation subsidy, incorporating alternative-fuel vehicles in the City's transportation fleet (including buses), and adopting a mandatory recycling and composting ordinance. The strategy also includes 30 specific regulations for new development to reduce a project's GHG emissions. The City's GHG emissions reduction actions resulted in a 23.3 percent reduction in GHG emissions in 2012 compared with 1990 levels,[33] thereby exceeding the 2020 reduction goals in the BAAQMD's Bay Area 2010 Clean Air Plan, EOs S-3-05 and B-30-15, and AB 32.

ENVIRONMENTAL IMPACTS

This section describes the impact analysis related to GHG emissions for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the State CEQA Guidelines, which has been adopted and modified by the San Francisco Planning Department. The proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

METHODS FOR ANALYSIS

GHG emissions and global climate change represent cumulative impacts of human activities and development projects locally, regionally, nationally, and worldwide. GHG emissions cumulatively contribute to the significant adverse environmental impacts of global climate

[33] ICF International. 2015. *Technical Review of the 2012 Community-wide Inventory for the City and County of San Francisco*. January 21.

change. No single project could generate enough GHG emissions to noticeably change the global average temperature; instead, the combination of GHG emissions from past, present, and future projects and activities have contributed and will contribute to global climate change and its associated environmental impacts.[34]

The BAAQMD has prepared guidelines and methodologies for analyzing GHGs. These guidelines are consistent with CEQA Guidelines Sections 15064.4 and 15183.5, which address the analysis and determination of significant impacts from a proposed project's GHG emissions. CEQA Guidelines Section 15064.4 allows lead agencies to rely on a qualitative analysis or performance-based standards to describe, calculate, or estimate GHG emissions resulting from a project. CEQA Guidelines Section 15183.5 allows for public agencies to analyze and mitigate GHG emissions as part of a larger plan for the reduction of GHGs and describes the required contents of such a plan. Accordingly, San Francisco has prepared its own GHG emissions reduction strategy. As described above, San Francisco's *Strategies to Address Greenhouse Gas Emissions*[35] presents a comprehensive assessment of policies, programs, and ordinances that collectively represent San Francisco's Greenhouse Gas Reduction Strategy, in compliance with the BAAQMD and CEQA Guidelines. The BAAQMD has reviewed and concurred that the City's emission reduction strategy meets the BAAQMD's criteria for a qualified GHG emissions reduction strategy. In doing so, the BAAQMD concluded that "Aggressive GHG reduction targets and comprehensive strategies like San Francisco's help the Bay Area move toward reaching the state's AB 32 goals, and also serve as a model from which other communities can learn."[36] In addition, San Francisco's GHG emissions reduction goals are consistent with, or

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[34] Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors), which are primarily pollutants of regional and local concern. Given their long atmospheric lifetimes, GHGs emitted by countless sources worldwide accumulate in the atmosphere. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Therefore, GHG impacts are inherently cumulative.

[35] San Francisco Planning Department. 2010. *Strategies to Address Greenhouse Gas Emissions.* November. Available: http://sfmea.sfplanning.org/GHG_Reduction_Strategy.pdf. Accessed: March 3, 2016.

[36] San Francisco Planning Department. 2010. *Letter Regarding Draft GHG Reduction Strategy.* October 28. Available: http://www.sf-planning.org/ftp/files/MEA/GHG-Reduction_Letter.pdf. Accessed: March 17, 2016.

more aggressive than, the long-term goals established under EOs S-3-05[37] and B-30-15[38,39] as well as SB 32.[40] Therefore, projects that are consistent with San Francisco's Greenhouse Gas Reduction Strategy would not result in GHG emissions that would have a significant effect on the environment and would not conflict with state, regional, or local GHG reduction plans and regulations.

As recently stated by the Court of Appeal of the State of California, First Appellate District: "At the heart of San Francisco's greenhouse gas strategy are measures, to be implemented on a project-by-project basis, that are designed to achieve the specified city-wide emission level. These measures focus on four primary areas for reducing greenhouse gas emissions: transportation, energy efficiency, renewable energy, and solid waste. The greenhouse gas strategy includes 42 specific regulations to reduce the emissions from new developments, such as energy efficiency standards and a construction debris recovery ordinance. The strategy includes measures such as tree planting and installation of bicycle racks, the effects of which plaintiffs minimize. But the greenhouse gas strategy also contains stringent energy usage and other regulations to reduce greenhouse gas emissions. San Francisco successfully reduced greenhouse gas emissions by 14.5 percent between 1990 and 2010 despite a population increase of 11 percent during that time period."[41]

The following analysis of the proposed project's impact on climate change focuses on its contribution to cumulatively significant GHG emissions. Because no individual project could emit GHGs at a level that could result in a significant impact on the global climate, this analysis is presented in a cumulative context. This section does not include an individual, project-specific impact statement.

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[37] Executive Order S-3-05 sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million $MTCO_2e$); by 2020, reduce emissions to 1990 levels (approximately 427 million $MTCO_2e$); and by 2050, reduce emissions to 80 percent below 1990 levels (approximately 85 million $MTCO_2e$).

[38] Office of the Governor. 2015. *Executive Order B-30-15.* April 29. Available: https://www.gov.ca.gov/news.php?id=18938. Accessed: March 3, 2016. Executive Order B-30-15 sets a state GHG emissions reduction goal of 40 percent below 1990 levels by 2030.

[39] San Francisco's GHG reduction goals are codified in Section 902 of the Environment Code and include (i) by 2008, determine city GHG emissions for 1990; (ii) by 2017, reduce GHG emissions by 25 percent below 1990 levels; (iii) by 2025, reduce GHG emissions by 40 percent below 1990 levels; and by 2050, reduce GHG emissions by 80 percent below 1990 levels.

[40] Senate Bill 32 amends California Health and Safety Code Division 25.5 (also known as the California Global Warming Solutions Act of 2006) by adding Section 38566, which states that statewide GHG emissions shall be reduced by 40 percent below 1990 levels by 2030.

[41] *Mission Bay Alliance v. Office of Cmty. Investment & Infrastructure*, No. A148865, Cal. Ct. App. (Nov. 29. 2016).

LAND USE ASSUMPTIONS

In the context of typical urban residential, commercial, or mixed-use development projects, impacts related to GHG emissions occur because of an increase in population and/or employment, which, in turn, results in an increase in the number of vehicle trips and additional demand for utilities, including commercial and residential energy and service systems. The analysis regarding changes related to population and employment induced by the proposed project is presented in Section 4.C, *Population and Housing*.

Because of the different development scenarios considered under the High Residential and High Commercial land use assumptions, the number of employees and residents would differ. Under the High Commercial Assumption, the 1,000 housing units that would be constructed would result in approximately 2,350 onsite residents and approximately 6,050 people would be employed onsite at the project site. Under the High Residential Assumption, the 1,600 proposed housing units would house an onsite residential population of 3,760, and approximately 4,510 people would be employed onsite at the project site.

Although construction activity is anticipated to be similar under both assumptions, differences in the gross square footage of residential and commercial land uses would influence long-term operational emissions. More housing is proposed under the High Residential Assumption, which could result in higher GHG emissions from operational sources than the High Commercial Assumption. Conversely, more commercial uses are proposed under the High Commercial Assumption, which could result in higher mobile-source emissions. Given the differences in the land use scenarios, operational impacts under both assumptions are evaluated in this section.

IMPACTS AND MITIGATION MEASURES

Impact GG-1. The proposed project would generate GHG emissions but not at levels that would result in a significant impact on the environment or conflict with any policy, plan, or regulation adopted for the purpose of reducing GHG emissions. (Less than Significant)

Mixed-use development projects could contribute to the cumulative effects of climate change by directly or indirectly emitting GHGs during construction and operational phases. Direct operational emissions from residential and commercial uses could include GHG emissions from new vehicle trips and area sources (e.g., natural gas combustion). Indirect emissions from residential and commercial uses could include emissions from electricity providers; the energy required to pump, treat, and convey water; and emissions associated with waste removal, disposal, and landfill operations.

The proposed project would increase the intensity of use at the project site by introducing new residential, commercial, parking, production, industrial, and active/retail uses. As a result, the proposed project would contribute to annual long-term increases in GHG emissions by

increasing the number of vehicle trips (i.e., mobile sources). In addition, residential, commercial/office, and retail operations at Seawall Lot 377 and industrial/production, office, retail, restaurant, and event-related operations at Pier 48 would result in an increase in energy use, water use, wastewater treatment, and solid waste disposal. Construction activities that generate mobile-source emissions, consume energy, use water, or generate waste would also result in temporary increases in GHG emissions. In terms of GHG emissions associated specifically with construction and operations of Pier 48, these would be similar to those associated with the rest of the project site (Seawall Lot 337). These sources would include energy in the form of natural gas, mobile sources associated with automotive trips by users of the site as well as from truck deliveries, waste- and water-related GHG emissions, and emissions associated with emergency generators. Pier 48 GHG emissions would be the same under both land use assumptions.

San Francisco has developed a number of plans and programs to reduce the city's contribution to global climate change and meet the goals of the City's Greenhouse Gas Reduction Ordinance. San Francisco's Greenhouse Gas Reduction Strategy identifies City actions to pursue cleaner energy, energy conservation, and alternative transportation and solid waste policies. The proposed project would be subject to San Francisco regulations adopted to reduce GHG emissions, as identified in the San Francisco Greenhouse Gas Reduction Strategy and Table 4.H-2, on the following page.[42] As shown in the table and discussed below, compliance with regulations that apply to project-related activities would reduce project GHG emissions related to transportation, energy use, waste disposal, wood burning, and the use of refrigerants.

Compliance with the City's Commuter Benefits Program, Emergency Ride Home Program, Transportation Sustainability Fee (TSF), Jobs-Housing Linkage Program, transportation management programs, bicycle parking requirements, low-emissions car parking requirements, and car-sharing requirements would reduce the proposed project's transportation-related emissions. These regulations are designed to reduce GHG emissions from single-occupancy vehicles by promoting the use of alternative transportation modes with zero or lower GHG emissions on a per capita basis. Project compliance with these strategies, policies, and requirements is shown above in Table 4.H-2.

[42] San Francisco Planning Department. 2016. *Greenhouse Gas Analysis: Compliance Checklist for Seawall Lot 337 and Pier 48 Mixed-Use Project*. March 23.

TABLE 4.H-2. COMPLIANCE CHECKLIST TABLE FOR GREENHOUSE GAS ANALYSIS

Code	Ordinance	Requirements	Project Compliance	Remarks
Transportation and Land Use				
SF Environment Code, Section 427(b)	Commuter Benefits Ordinance	All employers of 20 or more employees must provide at least one of the following benefit programs: (1) A Pre-Tax Election consistent with 26 U.S.C. § 132(f), allowing employees to elect to exclude from taxable wages and compensation employee commuting costs incurred for transit passes or vanpool charges, OR (2) Employer-Paid Benefit whereby the employer supplies a transit or vanpool subsidy for each Covered Employee. The subsidy must be at least equal in value to the current cost of the Muni Fast Pass, including BART travel, OR (3) Employer-Provided Transportation furnished by the employer at no cost to the employee in a vanpool or bus or similar multi-passenger vehicle operated by or for the employer.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	Any and all construction contractors and end-user employers occupying the buildings, including Pier 48, (e.g., commercial retail, homeowners association [HOA]) would comply with relevant commuter benefit programs to the extent applicable and required.
SF Environment Code, Section 427(d)	Emergency Ride-Home Program	All San Francisco companies are eligible to register for the Emergency Ride-Home Program. Employers must register annually. Once registered, all San Francisco employees of the company are eligible to request reimbursement.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	Any and all construction contractors and end-user employers occupying the buildings at the project site, including Pier 48, would be encouraged to enroll in the Emergency Ride-Home Program to the extent applicable and required.
SF Planning Code, Section 163	Transportation Management Programs	Requires new buildings or additions over a specified size (buildings > 25,000 gross square feet (gsf) or 100,000 gsf, depending on the use and zoning district) within certain zoning districts to implement a Transportation Management Program and provide onsite transportation management brokerage services for the life of the building.	☐ Project Complies ☒ Not Applicable ☐ Project Does Not Comply	The project site is not within the C-3, C-3-O(SD), SSO, or MUO District. As such, Section 163 does not apply to the project. However, a Transportation Demand Management Program (TDMP) would be prepared

Code	Ordinance	Requirements	Project Compliance	Remarks
				for the project, which would provide a comprehensive strategy to manage the transportation demands created by the project. Among other TDMP strategies, the TDMP would require the appointment of a transportation coordinator to manage the transportation needs of project residents, visitors, and employees; educate the public about the transportation system serving the project area; implement and administer various TDMP elements; coordinate with the City, transit agencies, and other nearby developments; and manage and coordinate transportation needs for onsite special events. Therefore, the project meets the intent of this ordinance.
SF Planning Code, Section 411A	Transportation Sustainability Fee	Establishes citywide fees for all new development. Fees based on a proportion of the gross area of the project and the type of use. Fees are paid to the Department of Building Inspection and provided to the San Francisco Municipal Transportation Agency to improve local transit services.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would include approximately 1.2 to 1.6 million gsf of commercial and active/retail space and approximately 1.1 to 1.6 million gsf of residential space. Planning Code Section 411A establishes a Transportation Sustainability Fee (TSF), which applies to residential and non-residential uses and supersedes the

Code	Ordinance	Requirements	Project Compliance	Remarks
				application of the Transit Impact Development Fee (TIDF) for such uses. However, under the grandfathering provisions of Section 411A.3(e), the project sponsor would be required to pay 50% of the TSF for the residential portion of the project and the applicable TIDF rate for the non-residential portions of the project. The project sponsor would pay the applicable TIDF and TSF as required pursuant to Section 411A.3(e).
SF Planning Code, Section 413	Jobs-Housing Linkage Program	The Jobs-Housing Program found that new large-scale developments attract new employees to the city who require housing. The program is designed to provide housing for new uses within San Francisco, thereby allowing employees to live close to their place of employment. The program requires a developer to pay a fee or contribute land suitable for housing to a housing developer or pay an in-lieu fee.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project would include residential units on site. The project sponsor would pay a fee or contribute land suitable for housing to a housing developer or pay an in-lieu fee, as applicable.
SF Planning Code, Section 155.4	Showers and Lockers	Requires showers and clothes lockers for short-term use by tenants or employees of the building in new and expanded buildings, change of occupancy, or increase of use intensity. Number of showers based on size and use of building (see Section 155.4(c)).	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The site would meet the San Francisco Planning Code requirement to provide shower and clothes locker facilities for tenants and employees in buildings with certain uses. Offices (including child-care centers, business services, and light manufacturing facilities) that exceed 10,000 gsf must provide at least one shower

Code	Ordinance	Requirements	Project Compliance	Remarks
				and six clothes lockers; for facilities between 20,000 and 50,000 gsf, the building must provide two showers and 12 lockers. Those exceeding 50,000 gsf must provide four showers and 24 lockers. Retail stores and restaurants exceeding 25,000 gsf must also provide one shower and six clothes lockers; those exceeding 50,000 gsf must provide at least two showers and 12 lockers.
SF Planning Code, Section 155.2 and CALGreen, Section 5.106.4	Bicycle Parking	Requires bicycle facilities for new and expanded buildings, new dwelling units, change of occupancy, increase of use intensity, and added parking capacity/area. Refer to Section 155.2 for requirements by use. Projects that add 10 or more tenant vehicular parking spaces: meet Planning Code Section 155 and CALGreen Section 5.106.4 (provide short- and long-term [secure] bicycle parking for at least 5% of motorized vehicle capacity), whichever is stricter.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would provide bicycle parking spaces in accordance with the San Francisco Planning Code, Section 155.2, and CALGreen, Section 5.106.4. For the High Commercial Assumption, the minimum number of bicycle parking spaces would be: • 710 Class I bicycle spaces • 371 Class II bicycle spaces For the High Residential Assumption, the minimum number of bicycle parking spaces would be: • 765 Class I bicycle spaces • 388 Class II bicycle spaces

Code	Ordinance	Requirements	Project Compliance	Remarks
CALGreen, Section 5.106.5	Requirements for Fuel Efficient Vehicle and Carpool Parking	Requires new large commercial projects, large first-time commercial interior projects, and major commercial interior projects to provide designated parking for low-emitting, fuel-efficient, and carpool/vanpool vehicles. Refer to Table 5.106.5.2 to determine number of spaces. If more than 200 spaces, mark 8% of parking spaces for such vehicles. For non-residential additions and interior alterations to existing buildings, the regulation applies for projects that would add 10 or more parking spaces to the project site.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would provide designated parking spaces for low-emitting, fuel efficient, and carpool/vanpool vehicles in accordance with the Port of San Francisco Green Building Standards Code. Both scenarios include 3,100 total parking spaces. For 3,100 spaces, the project would provide 8% or 248 designated parking spaces for low-emitting, fuel efficient, and carpool/vanpool vehicles.
SF Planning Code, Section 166	Car-Sharing Requirements	New residential projects or renovation of buildings being converted to residential uses within most of the City's mixed-use and transit-oriented residential districts are required to provide car-share parking spaces (refer to Table 166 in the Planning Code).	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would provide car-share parking spaces in accordance with the San Francisco Planning Code, Section 166. For the High Commercial Assumption, the minimum number of car-share spaces would be 38 (31 for office and seven for residential uses). For the High Residential Assumption, the minimum number of car-share spaces would be: 31 (23 for office and eight for residential uses).

Code	Ordinance	Requirements	Project Compliance	Remarks
Energy Efficiency Sector				
Port of San Francisco Green Building Standards Code, Sections 4.103, 5.103	Requirements for Energy Efficiency	4.103.1: New residential buildings must be GreenPoint Rated and applicants must submit documentation demonstrating that a minimum of 75 GreenPoints from the GreenPoints Single Family New Construction Checklist or the GreenPoints Multifamily New Construction Checklist will be achieved. Alternatively, this rating requirement may be met by obtaining LEED® Silver certification. 5.103.1: Permit applicants for new large commercial buildings must submit documentation to achieve LEED® "Gold" certification. 5.103.1.4 Commissioning. Permit applicants for new large commercial buildings must submit documentation verifying that the facility has been or will meet the criteria necessary to achieve CALGreen section 5.410.2 and Option 1 of LEED EA credit (Enhanced Commissioning), in addition to LEED EA Prerequisite (Fundamental Commissioning) and Verification.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would comply with the Port's Green Building Standard by attaining a LEED Gold rating for non-residential buildings and a LEED Silver rating for residential buildings.
Port of San Francisco Green Building Standards Code Sections 5.410.2, 5.410.4; CALGreen, Sections 5.410.2, 5.410.4	Commissioning of Building Energy and Water Systems	New non-residential buildings and alterations to non-residential buildings must conduct design and construction commissioning to verify that energy- and water-using components meet the owner's or owner representative's project requirements. Commissioning requirements apply to all building operating systems covered by Title 24, Part 6, as well as process equipment and controls and renewable energy systems. • Non-residential new buildings and alterations < 25,000 and ≥ 10,000 gsf: commission all energy systems (CALGreen, Section 5.410.2) • Non-residential new buildings and alterations less than 10,000 gsf, complete testing and adjusting of energy systems (CALGreen, Section 5.410.4)	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would comply with the CALGreen by attaining LEED Gold rating for all non-residential buildings and a LEED Silver rating for all residential buildings. In addition, the project would commission building energy systems to meet LEED EAc3 and LEED prerequisite EAp1.

Code	Ordinance	Requirements	Project Compliance	Remarks
SF Building Code - Housing Code, Chapter 12	Residential Energy Conservation Ordinance	Prior to transfer of title as a result of sale (including condominiums), for residential properties that received a building permit prior to July 1978, the seller must provide the buyer with a certificate of compliance, and the certificate must be recorded with the San Francisco Recorder's Office. To comply, install the following, as applicable: • Attic insulation, weather stripping for all doors leading from heated to unheated areas, insulation for hot-water heaters and hot-water pipes, and low-flow showerheads. Also, caulking and sealing any openings or cracks in the building's exterior and insulating accessible heating and cooling ducts. Apartment buildings and hotels are also required to insulate steam and hot-water pipes and tanks, clean and tune their boilers, repair boiler leaks, and install a time clock on the burner. • Maximum required expenditure: $1,300 for one- or two-unit dwellings; for buildings with three or more units, 1% of the assessed value or purchase, price as applicable. Although these requirements apply to existing buildings, compliance must be completed through the Department of Building Inspection, for which a discretionary permit (subject to CEQA) would be issued.	☐ Project Complies ☒ Not Applicable ☐ Project Does Not Comply	The project would not contain residential properties that received a building permit prior to 1978.
SF Environment Code, Chapter 20	Existing Commercial Buildings Energy Performance Ordinance	Owners of nonresidential buildings in San Francisco with ≥ 10,000 gsf that is heated or cooled must conduct energy efficiency audits and annually measure and disclose energy performance. Certain exceptions apply for new construction or if specified performance criteria are met.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would include nonresidential space greater than 10,000 gsf, and therefore would comply with all standards in the San Francisco Existing Commercial Buildings Energy Performance Ordinance as applicable and/or required.

Code	Ordinance	Requirements	Project Compliance	Remarks
CALGreen, Section 5.106.8	Light Pollution Reduction	For nonresidential projects, comply with lighting power requirements in the California Energy Code, CCR Part 6. Meet California Energy Code minimum requirements for Lighting Zones 1–4, with backlight/uplight/glare ratings meeting CALGreen Table 5.106.8.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would include nonresidential uses and would comply with the lighting power requirements of the California Energy Code, CCR Part 6.
SF Environment Code, Chapter 26, SF Planning Code, Section 149	Better Roof Requirements	All new residential buildings between four and 10 stories must install solar photovoltaic systems and/or solar thermal systems in the solar zone, as required by Title 24, Part 6,Section 110.10 This section has been added by Ordinance 71-16 (approved May 2016) and applies to projects beginning January 1, 2017. Projects with a gross floor area of at least 2,000 square feet, with 10 or fewer occupied floors, and disturbing 5,000 square feet of ground surface or more may install a living roof as an alternative to the solar roof requirement, pursuant to SF Planning Code Section 149.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would comply with the Better Roof Requirements or equivalent as required by the San Francisco Environment Code, Chapter 26 and San Francisco Planning Code Section 149.
SF Administrative Code, Chapter 63	Water Efficient Irrigation Ordinance	Projects that include 500 square feet or more of new or modified landscape are subject to this ordinance, which requires that landscape projects be installed, constructed, operated, and maintained in accordance with rules adopted by the SFPUC that establish a water budget for outdoor water consumption. Tier 1: 1,000 square feet < = project's modified landscape < 2,500 square feet Tier 2: (A) New project landscape area is greater than or equal to 500 square feet or (B) the project's modified landscape area is greater than or equal to 2,500 square feet. Note: Tier 2 compliance requires the services of landscape professionals. See the SFPUC web site for information regarding exemptions to this requirement: www.sfwater.org/landscape.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would include new parks, landscaped green space, and additional landscape features. The proposed project would comply with the San Francisco Water-Efficient Irrigation Ordinance. A landscape professional would be retained to implement the requirements of this ordinance per Tier 2 design controls.

Code	Ordinance	Requirements	Project Compliance	Remarks
SF Health Code, Article 12C	Alternate Water Sources for Non-Potable Applications	Large development projects (equal to or greater than 250,000 gsf) should meet toilet and urinal flushing and irrigation demands through the collection and reuse of available onsite rainwater, graywater, and foundation drainage to the extent required by application of the water budget documentation developed for each development project. Small development projects should use the water budget calculator, as provided by the general manager's rules, to prepare a water budget assessing the amount of rainwater, graywater and foundation drainage produced onsite and the planned toilet and urinal flushing and irrigation demands. Prior to initiating installation of any alternate water source project, project applicants shall submit to the director an application for permits to operate alternate water source systems.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would exceed 250,000 gsf and therefore comply with the Alternate Water Sources for Non-Potable Application Ordinance.
Zero Waste				
SF Environment Code, Chapter 19 CALGreen, Section 5.410.1	Mandatory Recycling and Composting Ordinance	All persons in San Francisco are required to separate their refuse into recyclables, compostables, and trash and place each type of refuse in a separate container designated for disposal of that type of refuse (San Francisco Environment Code, Chapter 19). All new construction, renovation, and alterations must provide for the storage, collection, and loading of recyclables, compost, and solid waste in a manner that is convenient for all users of the building (San Francisco Environment Code, Chapter 19, and CALGreen, Section 5.410.1)	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would comply with San Francisco Green Building Requirements for solid waste by providing space for recycling, composting, and trash storage, collection, and loading that is convenient for all users of the buildings.
SF Environment Code, Chapter 14	Construction and Demolition Debris Recovery Ordinance	Applies to all projects: No construction and demolition material may be taken to a landfill or placed in the garbage. All mixed debris must be transported by a registered hauler to a registered facility to be processed for recycling. Source-separated material must be taken to a facility that recycles or reuses those materials. Additionally, projects that include full demolition of an existing structure must submit a waste diversion plan to the Director of the Department Environment. The plan	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	Disposal of construction and demolition material would comply with the Construction and Demolition Debris Recovery Ordinance.

Code	Ordinance	Requirements	Project Compliance	Remarks
		must provide for a minimum of 65% diversion from landfill of construction and demolition debris, including materials source separated for reuse or recycling.		
Port of San Francisco Green Building Standards Code, Sections 5.103.1.3.1 and 4.103.2.3	Construction and Demolition Debris Recycling Requirements	In addition to complying with the Construction and Demolition Debris Recovery Ordinance, new commercial buildings of ≥ 25,000 gsf and new residential buildings of four or more occupied floors must develop a plan to divert a minimum of 75% of construction and demolition debris from the landfill and meet LEED® Materials and Resources Credit 2.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would include a new commercial building greater than 25,000 gsf. Construction and demolition activities associated with the project would comply with the Port of San Francisco Green Building Requirements for Construction and Demolition Debris Recycling.
Environment/Conservation Sector				
SF Public Works Code, Section 806(d)	Street Tree Planting Requirements	Public Works Code, Section 806(d) requires projects that include new construction, significant alterations, new curb cuts, a new garage, or new dwelling units to plant a 24-inch box tree for every 20 feet along the property's street frontage.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would comply with Planning Code Section 138.1 by placing new trees along the street frontage, providing sidewalk landscaping, and/or paying in-lieu fees as appropriate given the project site's constraints and design objectives.
CALGreen, Sections 5.508.1.-5.508.2	Enhanced Refrigerant Management	Commercial buildings must not install equipment that contains chlorofluorocarbons (CFCs) or halons. Applies to new construction and all alterations. For new commercial refrigeration systems containing refrigerants with a Global Warming Potential (GWP) of 150 or greater installed in food stores with 8,000 gsf or more of refrigerated display cases, walk-in coolers, or freezers connected to remote compressor units or condensing units, piping shall meet all requirements of Section 5.508.2 (all sections) and shall undergo pressure testing during installation prior to evacuation and charging. System shall stand unaltered for 24 hours with no more than a 1 pound pressure change from 300 psig.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would comply with all standards pursuant to enhanced refrigerant management as applicable and/or required.

Code	Ordinance	Requirements	Project Compliance	Remarks
CALGreen, Sections 5.504 (non-residential) and 4.504 (residential)	Low-emitting Adhesives, Sealants, Caulks, Paints, and Coatings	Paints and Coatings – Comply with VOC limits in the California Air Resources Board's Architectural Coatings Suggested Control Measure. Aerosol paints and coatings should meet BAAQMD VOC limits (Regulation 8, Rule 49) and product-weighted MIR limits for reactive organic compounds (CCR Title 17, Section 94520). Adhesives, Sealants, and Caulks – Comply with VOC limits in SCAQMD Rule 1168 and VOC limits and California Code of Regulations, Title 17, for aerosol adhesives. See CALGreen Tables 4.504.1–4.504.3 for details for residential and Tables 5.504.1–5.504.3 for non-residential.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would comply with all standards for low-emitting adhesives, sealants, caulks, paints, and coatings as applicable and/or required in CALGreen 5.504 and 4.504.
CALGreen, Sections 5.504 (non-residential) and 4.504 (residential)	Carpet, Wood, and Flooring	All carpet cushions must meet Carpet and Rug Institute Green Label standards, and indoor carpet adhesive and carpet pad adhesive must not exceed 50 g/L VOC content (Tables 4.504.1 and 5.504.4.1). In addition, all carpet must meet one of the following: (1) Carpet and Rug Institute Green Label Plus Program, (2) California Department of Public Health Standard Practice for the Testing of VOCs (Specification 01350), (3) NSF/ANSI 140 at the Gold level, (4) Scientific Certifications Systems Sustainable Choice, OR (5) For non-residential, compliance with the Collaborative for High-Performance Schools (CHPS) California Criteria Interpretation for EQ 7.0 and EQ 7.1, dated July 2012 and listed in the CHPS High-Performance Product Database. Composite Wood – Meet CARB Air Toxics Control Measure for Composite Wood, including meeting the emission limits in CALGreen Tables 5.504.4.5 and 4.504.5. Resilient Flooring Systems – For 80% of floor area receiving resilient flooring, install resilient flooring that is: (1) Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program,	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would comply with all standards for flooring as applicable and/or required in CALGreen 5.404 and 4.504.

Code	Ordinance	Requirements	Project Compliance	Remarks
		(2) Compliant with the VOC-emission limits and testing requirements of California Department of Public Health 2010 Standard Method for the Testing and Evaluation Chambers, v.1.1, (3) Compliant with the CHPS and listed in the CHPS High-Performance Product Database, OR (4) Certified under UL GREENGUARD Gold.		
Port of SF Building Code, Section 3111 CALGreen, Sections 4.503.1 and 5.503.1	Wood-Burning Fireplace Ordinance	Bans the installation of wood-burning fireplaces (except those that are designed for food preparation in new or existing restaurants or bakeries OR historic wood-burning appliances installed with approval in historic structures), except for direct-vent or sealed-combustion units that are compliant with EPA Phase II limits (CALGreen, Sections 4.503.1 and 5.503.1) and at least one of the following: (1) Pellet-fueled wood heater, (2) EPA- approved wood heater, or (3) Wood heater approved by the Northern Sonoma Air Pollution Control District.	☐ Project Complies ☒ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would not include wood-burning fireplaces, except that restaurant or bakery uses could include wood-burning appliances that are designed primarily for food preparation, which are exempt from the Wood-Burning Fireplace Ordinance. As such, this requirement is not applicable to the non-residential portion of the project.
		Water Efficiency		
SF Public Works Code, Article 4.2 (Section 147)	Stormwater Management Ordinance	All projects that will disturb 5,000 square feet or more of impervious surface must manage stormwater onsite using a low-impact design and must apply for a Construction Site Runoff Control Permit prior to commencing a project. Comply with the Stormwater Management Ordinance, including SFPUC Stormwater Design Guidelines. Every small development project (between 2,500 and 5,000 square feet of impervious surface) shall implement post-construction stormwater controls and submit documentation of these measures, as described in the Stormwater Management Requirements and Design Guidelines, in accordance with Article 4.2.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	A Stormwater Control Plan would be designed for review and approval by the San Francisco Public Utilities Commission because the proposed project, with the exception of Pier 48, would result in ground disturbance of an area greater than 5,000 square feet. The project would be required to manage stormwater onsite using low-impact design. The project sponsor would also include a signed maintenance

Code	Ordinance	Requirements	Project Compliance	Remarks
				agreement to ensure proper care of the necessary stormwater controls.
Port of SF Green Building Standards Code, Sections 4.103.2.2 (residential), 5.103.1.2 (non-residential), CALGreen, Sections 4.303.1, 5.303	Requirements for Water Use Reduction	All new buildings must comply with current California water fixture and fitting efficiency requirements. New buildings or additions greater than 50,000 gsf must install metering devices. All fixtures and fittings within areas of alteration, or serving areas of alteration, must be upgraded to current California and San Francisco fixture and fitting water efficiency requirements. (For local requirements applicable to alterations, see Commercial Water Conservation Ordinance and Residential Water Conservation Ordinance below.) Additionally, new large commercial and high-rise residential projects must submit documentation verifying that a minimum 30% reduction in the use of indoor potable water has be been achieved, as calculated to meet LEED® WE3.2.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project, including Pier 48, would comply with the current California water fixture and fitting efficiency requirements by incorporating fixtures and fittings that would reduce domestic water consumption by 30% and wastewater by 20%.
Port of SF Building Code, Chapter 13A	Commercial Water Conservation Ordinance	Water conservation measures required for alterations to commercial buildings on or before January 1, 2017: 1. If showerheads have a maximum flow > 2.5 gallons per minute (gpm), replace with unit meeting California Code of Regulations, Title 20 requirements 2. All showers shall have no more than one showerhead per valve 3. If faucets and faucet aerators have a maximum flow rate > 2.2 gpm, replace with unit meeting California Code of Regulations, Title 20 requirements 4. If toilets have a rated water consumption >1.6 gallons per flush (gpf), replace with fixtures meeting San Francisco Plumbing Code, Chapter 4 requirements 5. If urinals have a maximum flow rate >1.0 gpf, replace with fixtures meeting San Francisco Plumbing Code, Chapter 4 requirements 6. Repair all water leaks	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would comply with all standards in the Commercial Water Conservation Ordinance by meeting at least the minimum standards specified in the ordinance as applicable and/or required.

Code	Ordinance	Requirements	Project Compliance	Remarks
Port of SF Building Code - Housing Code, Chapter 12A	Residential Water Conservation Ordinance	Requires all residential properties (existing and new) prior to sale and during major improvement projects to upgrade to the following minimum standards: 1. f showerheads have a maximum flow > 2.5 gallons per minute (gpm), replace with unit meeting California Code of Regulations, Title 20 requirements 2. All showers shall have no more than one showerhead per valve 3. If faucets and faucet aerators have a maximum flow rate > 2.2 gpm, replace with unit meeting California Code of Regulations, Title 20 requirements 4. If toilets have a rated water consumption >1.6 gallons per flush (gpf), replace with fixtures meeting San Francisco Plumbing Code, Chapter 4 requirements 5. Repair all water leaks. Although these requirements apply to existing buildings, compliance must be completed through the Department of Building Inspection, for which a discretionary permit (subject to CEQA) would be issued.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project would comply with all standards in the Residential Water Conservation Ordinance by meeting at least the minimum standards specified in the ordinance as applicable and/or required.
SF Public Works Code, Article 4.2 (Section 146.5)	Construction Site Runoff Pollution Prevention for New Construction	Construction site runoff pollution prevention requirements depend upon project size, occupancy, and the location in areas served by combined or separate sewer systems. Any project disturbing ≥ 5,000 square feet of ground surface is required to submit and receive approval of an Erosion and Sediment Control Plan prior to commencing any construction-related activities. The plan must be site specific, detailing the use, location, and emplacement of the sediment and erosion control devices at the project site. All construction sites, regardless of size, must implement BMPs to prevent illicit discharges into the sewer system. For more information on San Francisco's requirements, see www.sfwater.org.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The ordinance applies to the project because it would include more than 5,000 square feet of soil disturbance. Erosion and sediment control BMPs would be implemented for project construction occurring during the wet season. Additional BMPs for wind and rain would be implemented as applicable. The project would comply with all applicable construction site runoff pollution prevention requirements and BMPs.

In addition, as shown in Table 4.H-2, page 4.H-14, any and all construction contractors and end-user employers occupying the buildings would comply with relevant commuter benefit programs, to the extent applicable and required. The project sponsor would be required to pay 50 percent of the TSF for the residential portion of the project and the applicable Transit Impact Development Fee (TIDF) rate for the nonresidential portions of the project, which would go to support public transportation. The project sponsor would pay a fee or contribute land suitable for housing to a housing developer or pay an in-lieu fee, as applicable under the Jobs-Housing Linkage Program, to address the effects of housing demand caused by the project. These programs help to reduce commutes and the use of single-occupancy vehicles.

The project, per a Development Agreement between the City and the project sponsor, has proposed a Transportation Demand Management Program (TDMP) as part of the project, as outlined in Chapter 2, *Project Description*. A Transportation Program also would be prepared for the project, which would provide a comprehensive strategy to manage the transportation demands created by the project. The proposed project would provide 3,100 total parking spaces between the Block D parking structure, Mission Rock Square garage, and in-building parking as well as bicycle parking in parking garages and residential buildings. With respect to low-emissions car-parking requirements and car-sharing requirements, the proposed project would provide designated parking spaces for low-emitting, fuel-efficient carpool/van pool and car-sharing vehicles, in accordance with the San Francisco Planning Code and Port of San Francisco Green Building Standards Code

The proposed project would also be required to comply with the energy efficiency requirements of the Port of San Francisco Green Building Standards Code, Stormwater Management Ordinance, Water Conservation Ordinance, and Irrigation Ordinance, which promote energy and water efficiency. This would reduce GHG emissions associated with the proposed project's consumption of energy to serve project buildings and open spaces during their operation.[43] Additionally, new buildings associated with the proposed project would be required to meet the renewable energy criteria of the Port of San Francisco Green Building Standards Code, thereby further reducing the project's energy-related GHG emissions.

The proposed project's waste-related emissions both during construction and operation of project buildings would be reduced through compliance with the Port's Recycling and Composting Ordinance, Construction and Demolition Debris Recovery Ordinance, and Green Building Standards Code. These regulations reduce the amount of material sent to landfills to

[43] Compliance with water conservation measures would reduce the amount of energy required to convey, pump, and treat water required for the proposed project. GHG emissions would also be reduced.

reduce GHGs emitted by landfill operations. These regulations also promote reuse of materials, thereby conserving their embodied energy[44] and reducing the energy required to produce new materials.

The project sponsor had proposed a landscape plan that would be approved as part of the project approvals. The landscape plan obligates to project sponsor to install and maintain landscape improvements that would be included in project construction and operations. Project compliance with, or potential exceedance of, the City's street tree planting requirements would serve to increase carbon sequestration. Other regulations, including those that limit refrigerant emissions, would reduce emissions of GHGs. Regulations that require the use of low-emitting finishes would reduce volatile organic compounds (VOCs).[45] Thus, it was determined that the proposed project would be consistent with San Francisco's GHG emissions reduction strategy, thereby reducing the proposed project's GHG emissions in all categories (transportation, energy efficiency and waste reduction).[46]

Further, the proposed project would include the following design features to reduce GHG emissions. To help meet environmental goals, the project sponsor and the Port of San Francisco (Port) and other City agencies have designated the project site as a Type 1[47] Eco-District through the Sustainable City initiative,[48] which focuses on the creation of a low-carbon neighborhood. A Type 1 Eco-District is characterized by a large amount of undeveloped land that is typically owned by a single property owner, enabling horizontal infrastructure development to be implemented concurrent with vertical development to maximize efficiency through district-wide infrastructure systems. Designation of a Type I Ecodistrict does not have specific requirements for GHG emissions but does have the following GHG objectives: (1) to reduce vehicle miles traveled and achieve a reduction in single-vehicle occupancy trips; (2) to achieve a GHG-free, renewable, and resilient energy system; (3) to capture all cost-effective energy efficiency; and (4) to increase renewable energy procurement and generation. The project sponsor, in conjunction with the Port and other City agencies, would develop an integrated Eco-District Plan that identifies measurable goals, standards, and performance metrics. Single-

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[44] Embodied energy is the total energy required for the extraction, processing, manufacture, and delivery of building materials to the building site.

[45] Although not a GHG, VOCs are precursor pollutants that form ground-level ozone. Increased ground-level ozone is an anticipated effect of future global warming that would result in added health effects locally. Reducing VOC emissions would reduce the anticipated local effects of global warming. The project would implement Mitigation Measure AQ-1.4, which would require the use of low-VOC coatings.

[46] San Francisco Planning Department. *2016. Greenhouse Gas Analysis: Compliance Checklist for Seawall Lot 337 and Pier 48 Mixed-Use Project*. March 23.

[47] The Planning Department has identified four types of Eco-Districts within the city, each defined by the community that exists within the district.

[48] San Francisco Planning Department. n.d. *Sustainable City.* Available: http://sf-planning.org/sustainable-development.

occupancy vehicle use and building operations are two of the largest sources of GHG emissions at the proposed project site. The proposed project would focus on GHG emissions reduction measures to reduce single-occupancy vehicle use through measures outlined in the TDMP plan and offset all GHG emissions from building operations through purchase of onsite and offsite renewable energy.[49] Multiple sustainable site approaches, which would be part of the Eco-District Plan, to reduce energy use, water use, waste generation, and vehicle miles traveled would be considered from the outset of horizontal development to enable vertical development design proposals to exceed Port of San Francisco Building Code requirements and deliver a low-carbon community.

As part of complying with the Port of San Francisco Green Building Standards Code, the goal for overall development of the project would include Leadership in Energy and Environmental Design (LEED) Gold certification for all commercial office/retail/industrial buildings, including Pier 48, and LEED Silver certification for all residential development onsite, as outlined in the Port of San Francisco Green Building Standards Code. As part of these compliance requirements, the project sponsor would implement a comprehensive Sustainability Strategy, which would include strategies for achieving LEED certification; outline the targets for carbon reductions; and explain how the infrastructure, buildings, and community would coordinate to achieve these targets consistent with design controls. The project sponsor would collaborate with the City through the SFPUC, the Department of the Environment, the Planning Department, and the Port to develop the Sustainability Strategy. The project sponsor would be required to comply with these regulations, which have proven effective in reducing GHG emissions, as demonstrated by San Francisco's Greenhouse Gas Reduction Strategy and the success of energy savings, LEED certification, and the TDMP in reducing both the city's and the state's GHG emissions.

In addition, the project sponsor is also pursuing a goal of meeting 100 percent of the project's building energy demands with renewable energy by investing in energy conservation as well as onsite and offsite renewable energy projects. Additionally, the proposed project would include the installation of an onsite looped recycled water distribution system in order to conserve water. These strategies comply with the mitigation measures outlined in CEQA Guidelines Appendix F, which aim to improve energy efficiency, conserve energy and water, and use alternative sources of energy.

San Francisco's local GHG emissions reduction targets are consistent with the long-term GHG emissions reduction goals of EO S-3-05, EO B-30-15, AB 32, SB 32 and the Bay Area 2010 Clean Air Plan. San Francisco's GHG emissions have decreased measurably compared with 1990

[49] The City's Sustainability Plan (Executive Summary and Section 10, GHG Emission Assessment) illustrates the estimated reduction in GHG emissions that can be achieved by employing sustainable site approaches compared to a typical San Francisco development.

levels, demonstrating that San Francisco's Greenhouse Gas Reduction Strategy has been effective. The City has met or exceeded the EO S-3-05, AB 32, and Bay Area 2010 Clean Air Plan GHG emissions reduction goals for 2020. Further, the project would be consistent with Plan Bay Area because it would be located in an urban infill, priority development area that is identified as an appropriate place for development to meet the Plan Bay Area's per-capita GHG emissions reduction targets. Other existing regulations, such as those implemented through AB 32, including the Pavley vehicle emissions standards, the renewables portfolio standard, and the low-carbon fuel standard, will continue to reduce contributions to climate change from proposed projects.

Pier 48 would be subject to all applicable requirements of the City's Greenhouse Gas Reduction Strategy, including transportation and transit requirements, TDM, and other transportation requirements (e.g., providing bicycle parking to employees), which would reduce GHG emissions from vehicular emissions associated with the Pier 48 use. Other Greenhouse Gas Reduction Strategy requirements applicable to building renovations would also apply. Also, the emergency generators at Pier 48 would be subject to the mitigation requirements set forth in the Section 4.5, *Air Quality*. Moreover, as part of the requirement to comply with the Port's Green Building Standards Code, including preparing a project, the Sustainability Strategy for Pier 48 would include Leadership in Energy and Environmental Design (LEED) Gold certification. Pier 48 would require permits from BAAQMD for its stationary source (i.e., combustion sources); however, BAAQMD does not have any permit requirements that would specifically apply to GHG emissions.

As documented in Table 4.H-2, it was determined that the proposed project's construction and operation would be consistent with San Francisco's energy and conservation standards, as reflected in San Francisco's Greenhouse Gas Reduction Strategy. As explained, compliance with the strategy would reduce specific sources of GHG emissions that would otherwise occur from the proposed project. San Francisco has been successful in meeting its stated GHG reduction goal through implementation of the strategy, and those goals are consistent with state GHG reduction goals. Therefore, the proposed project would also be consistent with the GHG emissions reduction goals of EO S-3-05, EO B-30-15, AB 32, SB 32, and the Bay Area 2010 Clean Air Plan. It would not conflict with these plans and would not exceed San Francisco's applicable GHG emissions threshold of significance. As such, the proposed project would result in a ***less-than-significant*** impact with respect to project-level and cumulative GHG emissions. No mitigation measures are necessary.

4.I WIND AND SHADOW

This section of the EIR analyzes potential wind and shadow impacts that could occur as a result of the proposed project and assesses the potential for project implementation to adversely affect existing wind and shadow Patterns. The analyses in this section are based in part on the *Pedestrian Wind Study/Wind Tunnel Tests*[1] (Wind Study) prepared by Rowan Williams Davies & Irwin Inc. (RWDI) and the *CEQA Evaluation of the Shadow Effects of the Seawall 337/Mission Rock Project on Public Open Spaces in San Francisco, CA*[2] (Shadow Study) prepared by PreVision Design. These reports are included as Appendix 7-1 and 7-2, respectively.

Issues identified in response to the Notice of Preparation (NOP) (Appendix 1) were considered in preparing this analysis. The City and County of San Francisco (City) received three NOP comments related to shadow; no NOP comments related to wind were received. The NOP comments related to shadow expressed concern that the buildings could create shadows along the waterfront and China Basin Park and that the proposed project would cast shadows on the proposed Mission Rock Square.

WIND

ENVIRONMENTAL SETTING

Generally, winds in San Francisco originate on the Pacific Ocean and blow through the city in an easterly direction. Average wind speeds are highest in the summer and lowest in the winter However, the strongest peak winds occur during the winter. The highest average wind speeds occur during the mid-afternoon, and the lowest wind speeds occur during the morning. The winds that are most prevalent in San Francisco are those from the northwest, west-northwest, west, and west-southwest.

A building's exposure, massing, and orientation affect nearby ground-level wind accelerations. Exposure is a measure of the degree to which a building extends above surrounding structures into the wind stream. A building surrounded by taller structures is unlikely to cause adverse wind accelerations at ground level, while even a small building can cause wind acceleration if it is freestanding and exposed. Groups of structures tend to slow the winds near ground level because of the friction and drag of the structures themselves on the winds. Buildings that are much taller than the surrounding buildings intercept and redirect winds that might otherwise flow overhead and bring them down the vertical face of the building to ground level where they

[1] RWDI. 2017. *Pedestrian Wind Study/Wind Tunnel Tests.* Final report, January 25.

[2] PreVision Design. 2016. *CEQA Evaluation of the Shadow Effects of the Seawall 337/Mission Rock Project on Public Open Spaces in San Francisco, CA*. December 12.

create ground-level wind and turbulence. These redirected winds can be relatively strong, as well as relatively turbulent, and incompatible with the intended uses of nearby ground-level spaces, depending on the level and type of pedestrian use.

Massing affects how much wind a building intercepts and whether wind accelerations occur at ground level. In general, slab-shaped buildings (oriented perpendicular to the prevailing wind direction) have the greatest potential for wind acceleration, and buildings with an unusual shape or setbacks have a lesser effect. Building orientation also affects the amount of wind a structure intercepts and the corresponding extent of wind acceleration. Buildings with a wide axis, perpendicular to prevailing winds, will generally cause greater ground-level wind acceleration. Moreover, structure designs that present tall, flat surfaces that are square to strong winds can create ground-level winds that can prove hazardous to pedestrians in the vicinity. Conversely, a building with a height that is similar to the heights of surrounding buildings typically would cause little or no additional ground-level wind acceleration and turbulence. Thus, wind impacts are generally caused by large building masses that extend substantially above their surroundings and buildings that are oriented so that a large wall can catch a prevailing wind, particularly if such a wall includes little or no articulation. In general, new buildings that are less than 80 feet in height are unlikely to result in substantial adverse effects on ground-level winds such that pedestrians would be uncomfortable. Such winds may occur under existing conditions, but shorter buildings typically do not cause substantial changes in ground-level winds.

The comfort of pedestrians varies under different conditions (e.g., with variations in sun exposure, temperature, wind speed). Winds of up to 4 miles per hour (mph) have no noticeable effect on pedestrian comfort. With velocities between 4 and 8 mph, wind is felt on the face. Winds between 8 and 13 mph will disturb hair, cause clothing to flap, and extend a light flag mounted on a pole, while winds between 13 and 19 mph will raise loose paper, dust, and dry soil and disarrange hair. For wind velocities between 19 and 26 mph, the force of the wind will be felt on the body. At 26 to 34 mph, umbrellas are used with difficulty, hair is blown straight, there is difficulty in walking steadily, and the wind noise is unpleasant. Winds of more than 34 mph can result in loss of balance, and gusts can blow people over.

WIND PATTERNS IN THE MISSION BAY PLAN AREA VICINITY

The project is not within but is directly adjacent to Mission Bay. Thus, wind patterns in Mission Bay are highly relevant for describing conditions at the project site. In San Francisco, including Mission Bay, more than 90 percent of all measured winds with speeds greater than 13 mph blow from the northwest, west-northwest, west, and west-southwest.

The wind conditions for pedestrians in the Mission Bay Plan area (Plan area) are determined by the interactions between the higher-speed northwest, west-northwest, west, and southwest winds and the combined effects of the Mission Bay Plan street grid and the large buildings

within the Plan area. The west and the west-northwest winds, which, in combination, make up nearly half of all winds, align closely with the street grid and contribute to the strong winds that flow along the east/west-oriented streets within the Plan area. Although the northwest and southwest winds are not aligned with the street grid, both contribute to winds that flow eastward along the east/west-oriented streets.[3]

Located on the eastern waterfront of San Francisco, the project site is exposed to storm winds that approach from the Bay. The existing pedestrian wind conditions on large vacant parcels of land in the Mission Bay South Plan area can be characterized as windy.

The existing project site is generally windy because of its open surroundings and exposure to the prevailing westerly winds, with wind speeds averaging 15 mph.

REGULATORY FRAMEWORK

PLANNING CODE SECTION 148

San Francisco Planning Code Section 148, Reduction of Ground-level Wind Currents in Downtown Commercial (C-3) Districts, specifically outlines wind reduction criteria for the C-3 District. The project site is not in a C-3 District and is not subject to Planning Code Section 148; however, these criteria can and have been applied as a guideline to nearby areas such as the project site. The Wind Study prepared for this project was performed using wind testing analysis and evaluation methods to determine conformity with Section 148 criteria.

The Planning Code establishes defined wind hazard and wind comfort criteria. The hazard criterion is based on winds that are measured for 1 hour and averaged. However, the wind speeds reported directly from available meteorological data have much shorter averaging periods, about 1 minute; therefore, the speed must be adjusted to correct for the difference between the 1-hour and the 1-minute averaging time. When adjusted to a 1-minute averaging period, the hazard criterion speed is a 1-minute average of 36 mph. The Planning Code defines these wind speeds in terms of equivalent wind speeds and average wind speed (mean velocity), adjusted to include the level of gustiness and

[3] Final Subsequent Environmental Report. Golden State Warriors Event Center and Mixed-Use Development at Mission Bay Blocks 29-32. Page 5.6-4. Certified November 3, 2015.

turbulence. The hazard criterion requires that the development not cause equivalent wind speeds[4] to exceed the hazard level of 26 mph, as averaged for a single full hour of the year.

The comfort criteria are based on wind speeds that are measured for 1 minute and averaged. The comfort criteria state that wind speeds will not exceed 11 mph in substantial pedestrian use areas and 7 mph in public seating areas more than 10 percent of the time year-around between 7:00 a.m. and 6:00 p.m.[5]

MISSION BAY DESIGN GUIDELINES

The Mission Bay Design Guidelines are not used in determining the proposed project's wind impacts because the project would not be located in the Mission Bay Plan area, which is located upwind of the project site. All discussion about the Mission Bay Design Guidelines is provided for informational purposes, given the proximity of the project site to the Mission Bay Plan area. Development that is part of the Mission Bay area must adhere to the Mission Bay Design Guidelines. The Mission Bay North Redevelopment Plan area wind standards focus on using all feasible means to eliminate wind hazards and reduce adverse wind impacts, including uncomfortable wind conditions for projects that include buildings that would be more than 100 feet in height. Wind tunnel testing is also required for these buildings, unless it is determined that the exposure, massing, and orientation of the building would not result in adverse wind impacts. Under these guidelines, wind analyses are conducted to assess wind conditions for the project in conjunction with the anticipated pattern of development on surrounding blocks.

ENVIRONMENTAL IMPACTS

This section describes the impact analysis for the proposed project related to wind. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

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[4] The equivalent wind speeds were calculated according to the specifications in Section 148, whereby the mean hourly wind speed is increased when the turbulence intensity is greater than 15 percent, according to the following formula:

where EWS = equivalent wind speed
V_m = mean pedestrian-level wind speed
TI = turbulence intensity

[5] The wind comfort criteria are defined in terms of equivalent wind speed, which is the average wind speed (mean velocity) adjusted to include the level of gustiness and turbulence. Equivalent wind speed is defined as mean wind velocity multiplied by quantity (one plus three times the turbulence intensity) divided by 1.45. This calculation magnifies the reported wind speed when turbulence intensity is greater than 15 percent.

SIGNIFICANCE CRITERIA

The proposed project would be considered to have a significant impact related to wind if it were to alter wind in a manner that would substantially affect public areas.

To assess whether a project would result in a significant impact under the CEQA significance criterion, the City uses the Planning Code's hazard criterion. That is, the City determines whether a project would cause equivalent wind speeds to reach or exceed the wind hazard criterion of 26 mph for a single hour of the year. If a project would cause a new wind hazard or exacerbate an existing wind hazard in a public area, it may result in a significant impact under CEQA. Although the City requires mitigation measures to avoid new wind hazards or an increase in existing wind hazards, outside of Section 148 areas, project approval may still be granted if new wind hazard exceedances cannot be avoided. The Section 148 comfort criteria are not CEQA significance criteria. The comfort criteria and the proposed project's effects on wind comfort are discussed for informational purposes only.

METHODS FOR ANALYSIS

The Wind Study was conducted to assess the existing and proposed wind environment around the project site in terms of pedestrian hazards relative to the wind metrics specified in Section 148, as applied on a site-wide basis. The 1:300 (1- to 25-inch) wind tunnel model included the project site and all relevant surrounding buildings and topography within a 1,200-foot radius of the project site.

The Wind Study also assessed the existing and proposed wind environment in terms of a comfort criterion. The Planning Department considers the wind comfort criterion enumerated in Section 148 when assessing the design of buildings in the C-3 zoning area. The comfort criterion is based on whether the project would cause wind speeds to exceed 11 mph more than 10 percent of the time. The project would not be located in a C-3 area where Section 148 would apply, and the Planning Department does not consider exceedances of the comfort criterion a significant impact for CEQA purposes. However, because the Wind Study assessed wind conditions related to the comfort criterion, the results of this assessment are included in this section of the EIR for informational purposes.

The Wind Study followed the standard methodology for studies in San Francisco, which includes existing, existing plus project, and cumulative configurations. To evaluate the effect of various building and landscaping modifications on wind conditions, an additional six configurations were analyzed. The additional configurations included building massing modulations, windscreens, canopies, and landscaping to analyze which of these wind reduction measures or combinations of wind reduction measures would result in the most favorable wind environment on the project site. In total, nine configurations were studied (Configurations A through I), including existing, existing plus project, existing plus project with measure (for five

different configurations, consisting of combinations of the wind reduction measures that could be implemented), and project plus cumulative configurations (one with measures and one without measures).

The mean speed profile and turbulence of the natural wind approaching the modeled area were simulated in the boundary-layer wind tunnel. The model used 169 wind speed sensors to measure mean and gust wind speeds at a full-scale height of approximately 5 feet. The wind measurement locations were placed at strategic points (i.e., locations that could affect public areas) on and around the project site to capture potential wind accelerations caused by the buildings. This included building corners, narrow (pedestrian-oriented) streets between buildings, broad pedestrian-friendly public sidewalks, and known pedestrian areas, including the proposed Mission Rock Square and China Basin Park. Wind measurements at each of the 169 locations were recorded for the west-southwest, west, west-northwest, and northwest wind directions, which are the most prevalent wind directions in the city.

LAND USE ASSUMPTIONS

Because taller buildings tend to intercept stronger winds at higher elevations, the High Residential Assumption, which includes taller buildings on Blocks H, I, and J, is considered to be the more likely of the two land use assumptions to result in the greatest wind effects. Therefore, the Wind Study conservatively analyzed wind conditions under the High Residential Assumption.

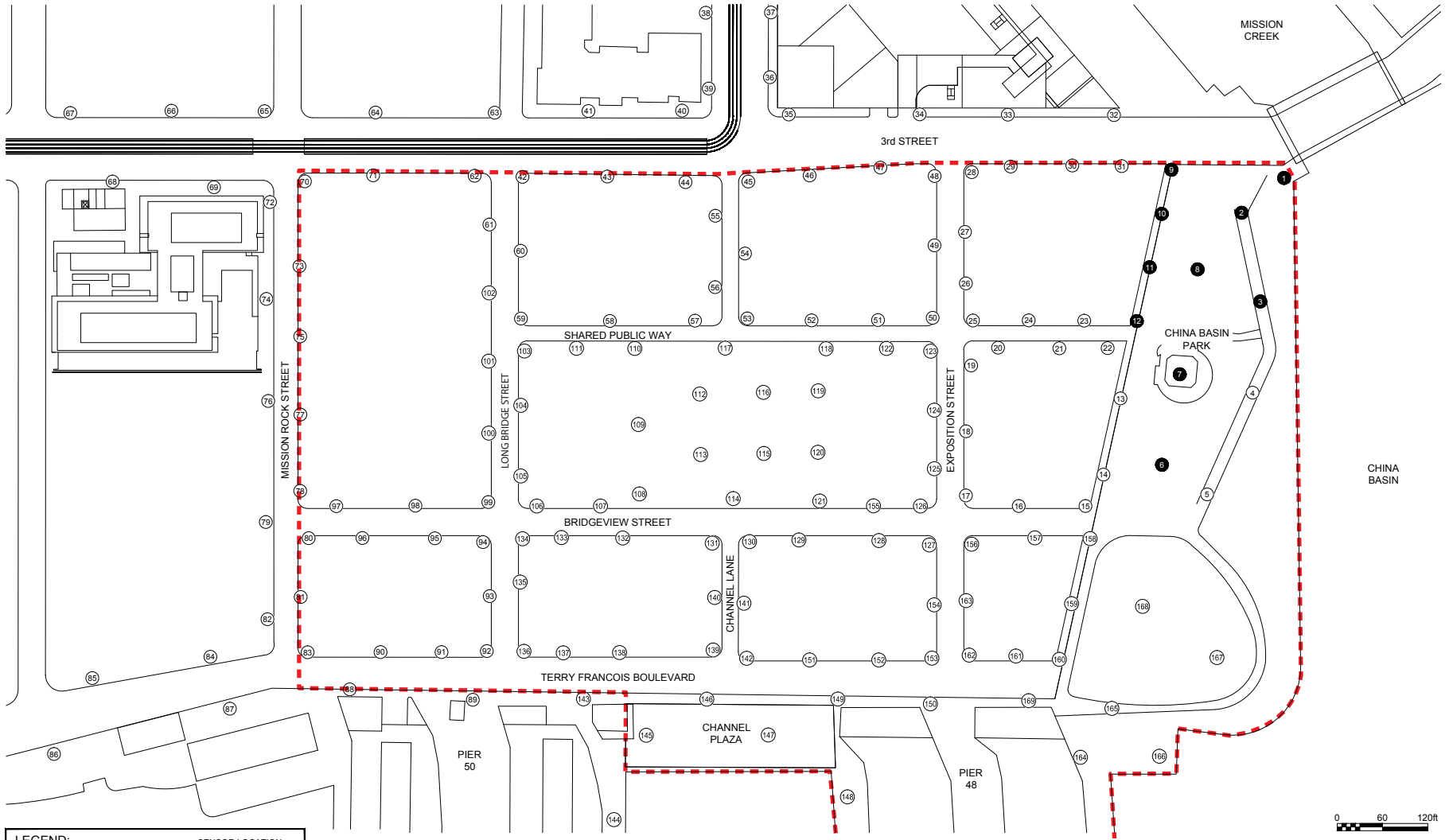
IMPACTS AND MITIGATION MEASURES

Impact WS-1. The project would alter wind in a manner that would substantially affect public areas. (Significant and Unavoidable with Mitigation)

As discussed under Methods for Analysis, a wind tunnel test was conducted as part of the Wind Study to define the pedestrian wind environment with respect to the hazard criterion and assess how wind hazards would change under the project. The wind tunnel test analyzes the wind hazard associated with wind force under existing conditions and with the project. It presents the test results as well as recommendations for conceptual wind control measures where necessary.

Figures 4.I-1 through 4.I-7 on the following pages present the wind hazard analysis results (i.e., the number of hours per year the wind hazard criterion would be exceeded[6] at the 169 onsite and offsite study test points). A summary of the results for the tested configurations is presented in Table 4.I-1, page 4.I-14.

[6] Per the legend in Figures 4.I-1 through 4.I-7, "Pass" denotes a test point location that did not exceed the wind hazard criterion.



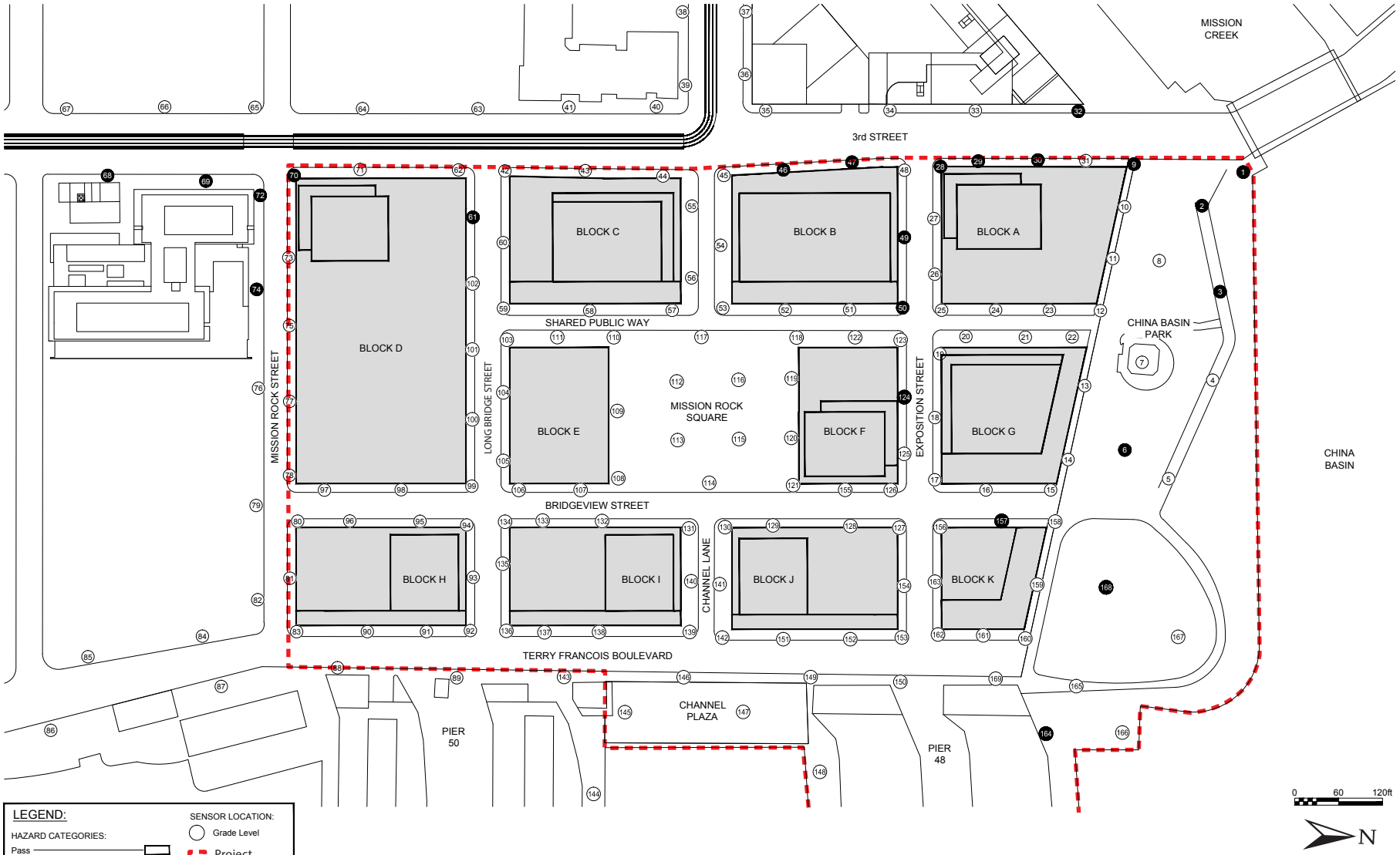
Note: No blocks or buildings currently exist on the project site and the proposed block outlines are shown only to demonstrate wind test point locations relative to how the site would be laid out per the project.

Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-1
Configuration A: Existing Wind Conditions



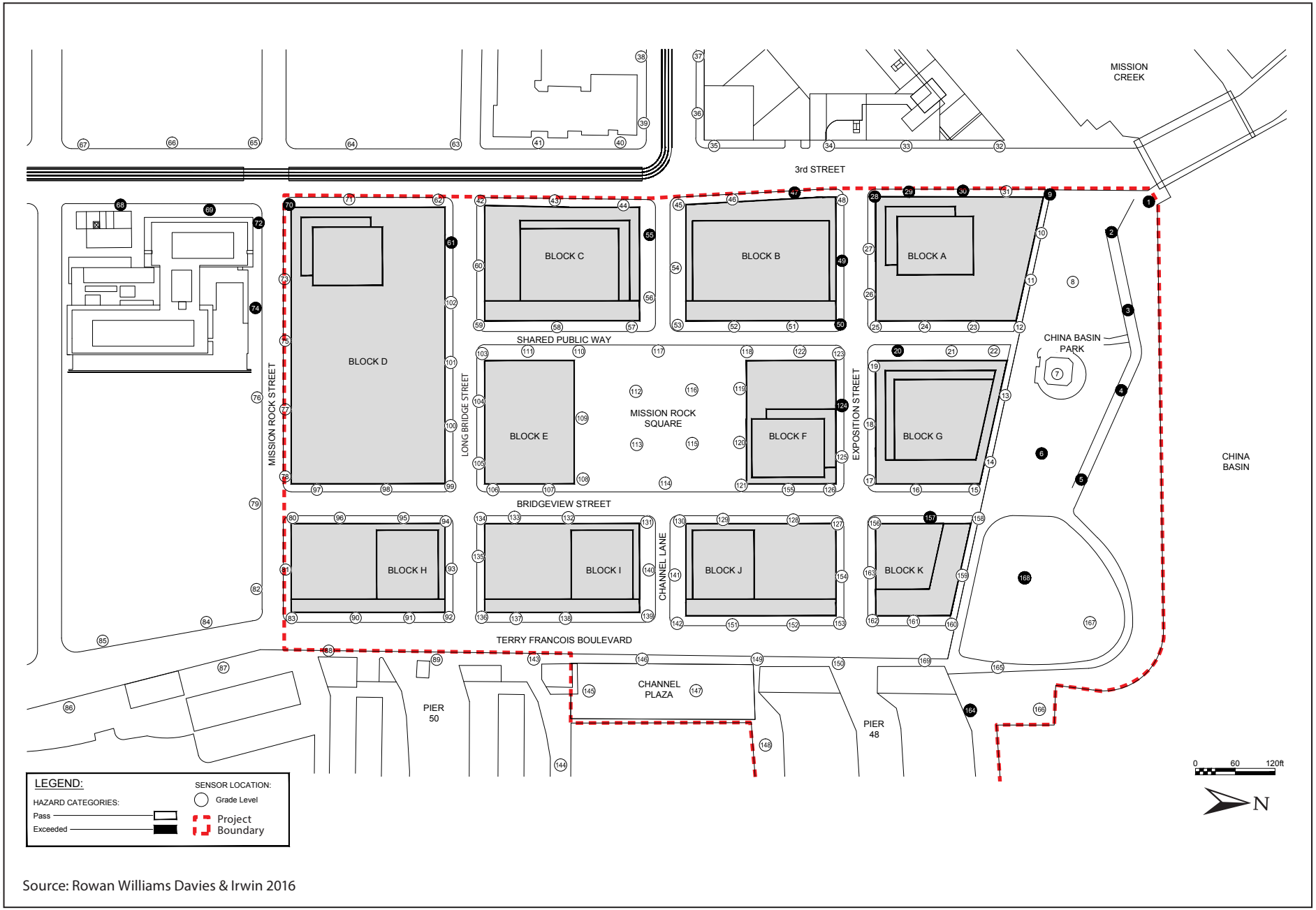
Note: Includes the proposed project buildings and off-site surrounding buildings.

Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-2
Configuration B: Existing plus Project Wind Conditions with Buildings Only

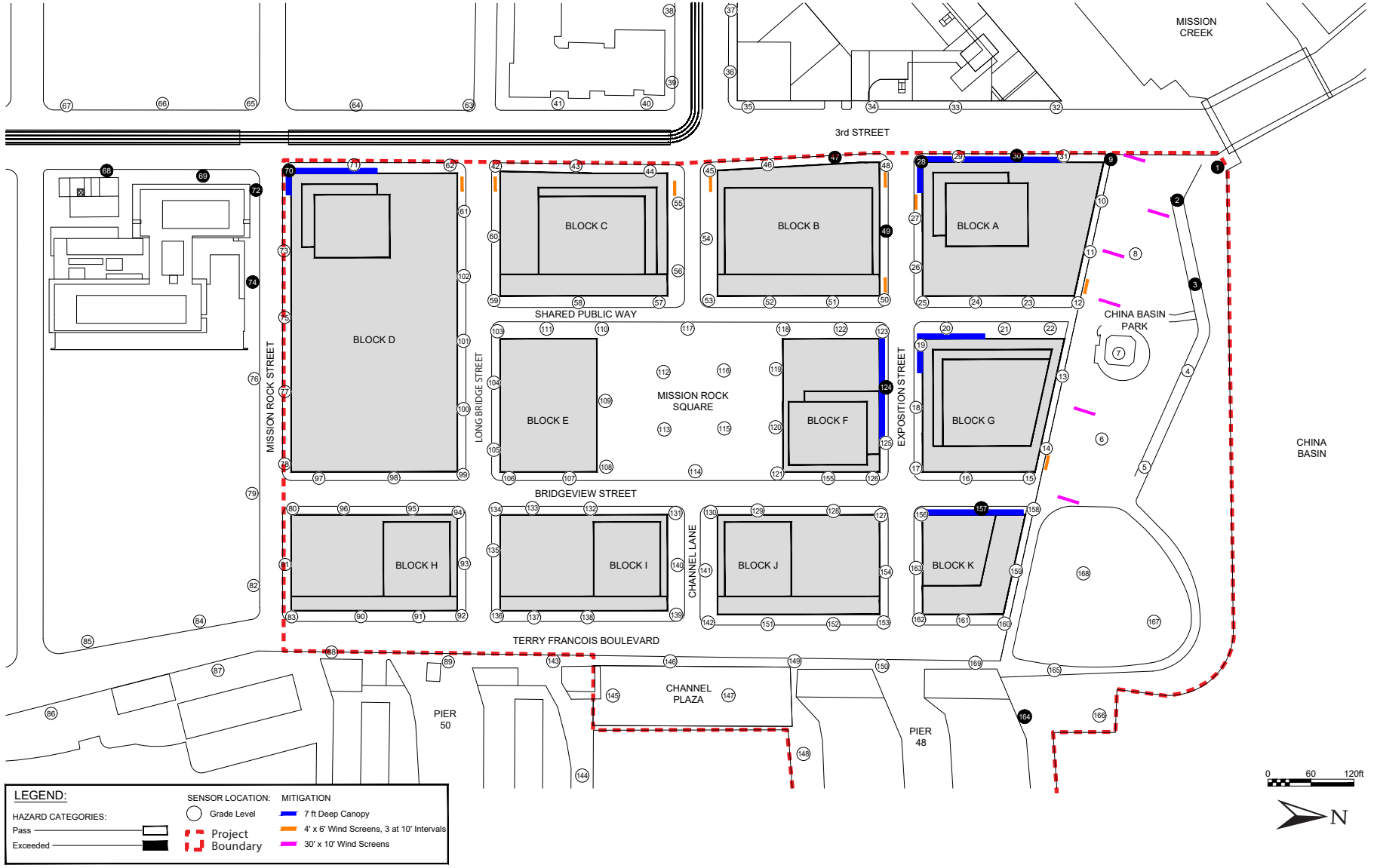


Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-3
Configuration C: Existing plus Project Wind Conditions with Increased Setback

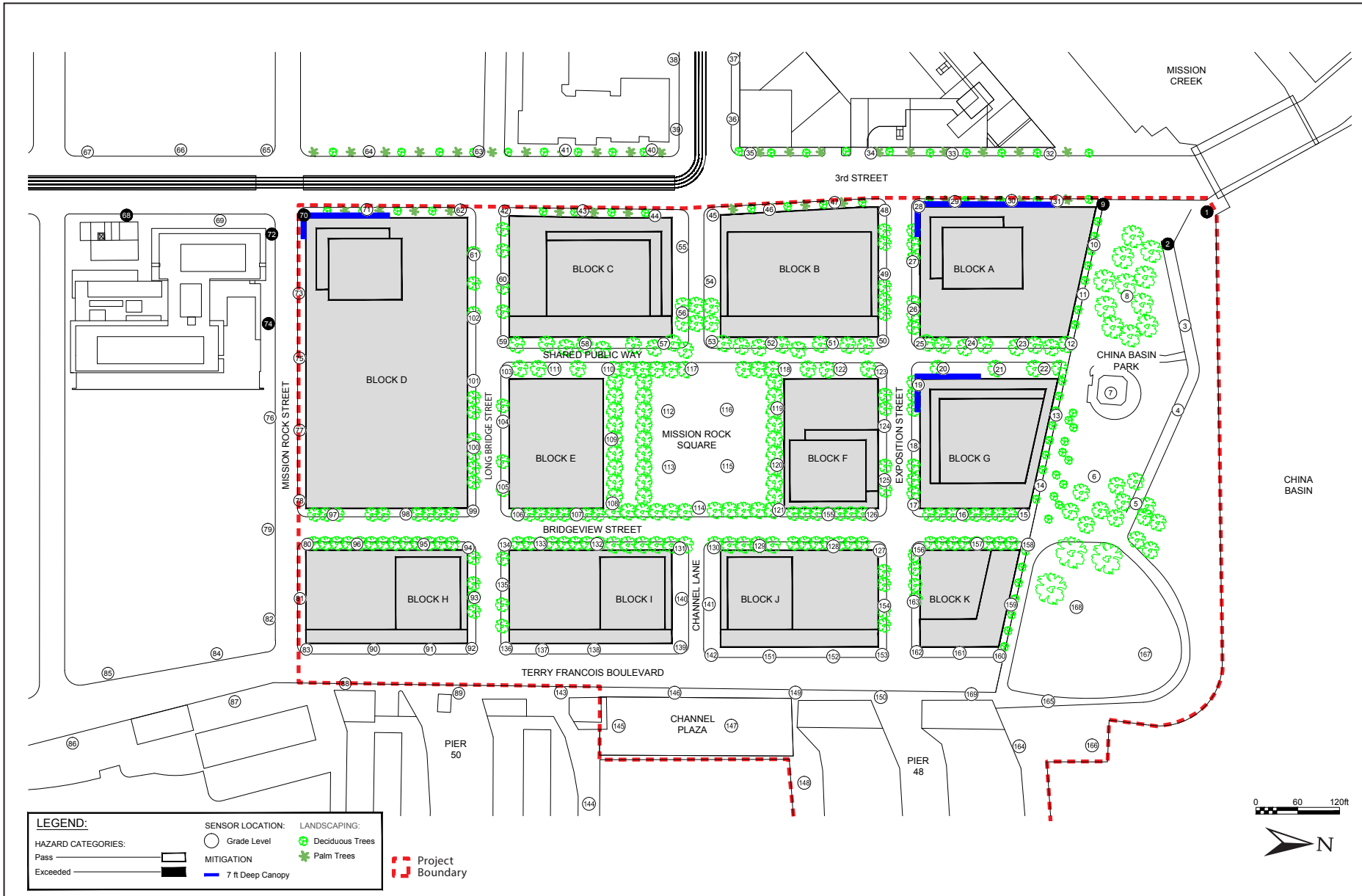


Source: Rowan Williams Davies & Irwin 2016

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Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-4
Configuration D: Existing plus Project Wind Conditions with Increased Setback, Canopies, and Wind Screens



Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-5
Configuration E: Existing plus Project Wind Conditions with Increased Setback, Canopies, and Proposed Onsite Landscaping

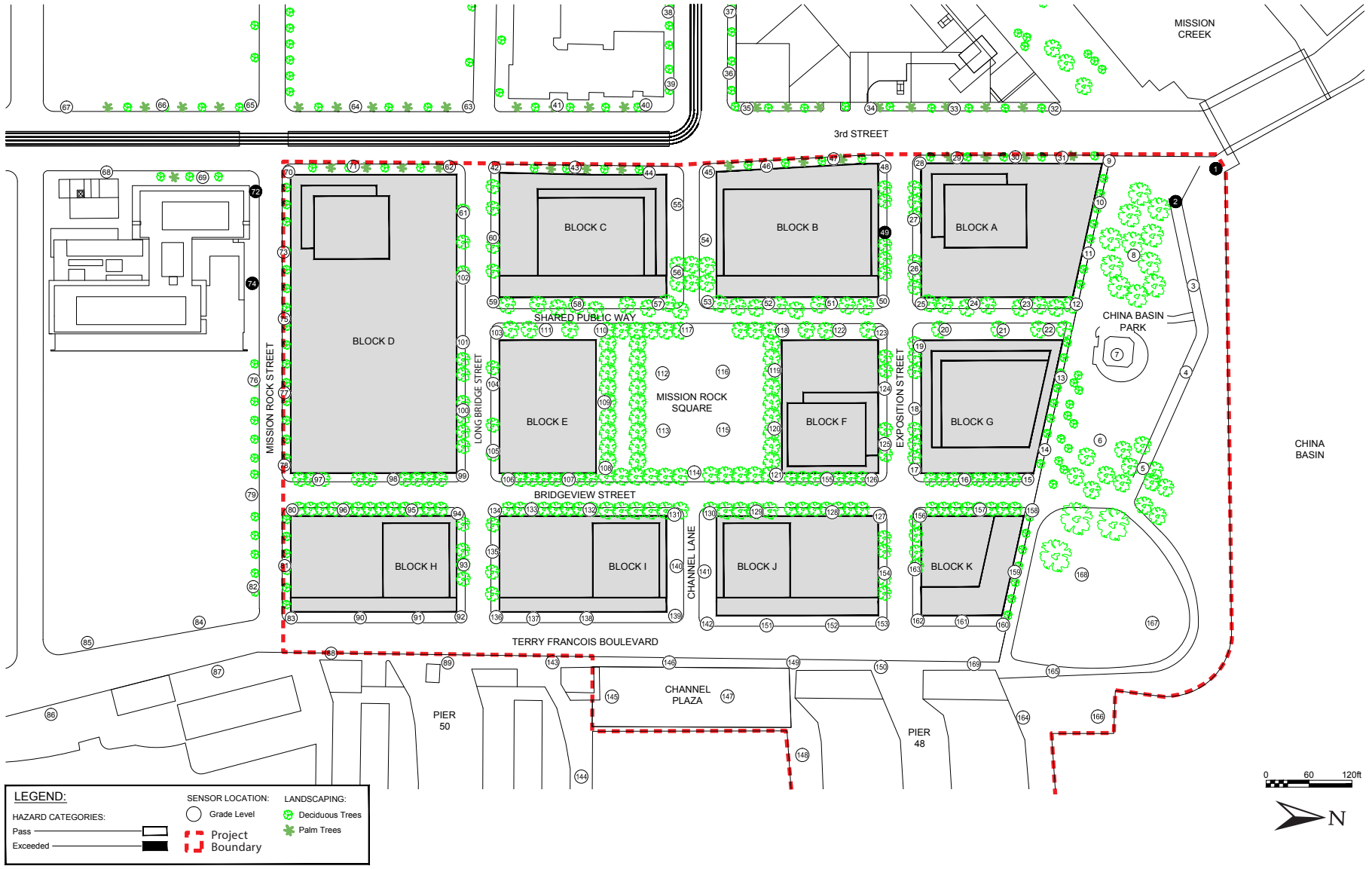


Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-6
Configuration F: Existing plus Project Wind Conditions with Increased Setback and Proposed Onsite Landscaping



Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Figure 4.I-7
Configuration G: Existing plus Project Wind Conditions with Increased Setback, Proposed Onsite Landscaping, and Additional Offsite Landscaping

TABLE 4.I-1. SUMMARY OF WIND TUNNEL STUDY RESULTS FOR THE HAZARD CRITERION

Configuration		Number of Hazard Exceedance Locations	Hours/ Year of Hazard Exceedance	Average Hazard Wind Speed (mph), 1 Hour/Year
A	Existing (Figure 4.I-1)	10	104	28
B	Existing plus Project with Buildings Only (Figure 4.I-2)	23 (5 existing, 18 new)	335	27
C	Existing plus Project with Increased Setback (Figure 4.I-3)	25 (5 existing, 20 new)	352	27
D	Existing plus Project with Increased Setback, Canopies, and Windscreens (Figure 4.I-4)	16 (4 existing, 12 new)	419	27
E	Existing plus Project with Increased Setback, Canopies, and Proposed Onsite Landscaping (Figure 4.I-5)	7 (3 existing, 4 new)	147	21
F	Existing plus Project with Increased Setback and Proposed Onsite Landscaping (Figure 4.I-6)	8 (3 existing, 5 new)	127	21
G	Existing plus Project with Increased Setback, Proposed Onsite Landscaping, and Additional Offsite Landscaping (Figure 4.I-7)	5 (2 existing, 3 new)	67	20

Source: RWDI. 2017. *Pedestrian Wind Study/Wind Tunnel Tests.* Final report, January 25.

CONFIGURATION A: EXISTING WIND CONDITIONS

Configuration A represents existing wind conditions at the project site. As shown in Figure 4.I-1, page 4.I-7, and summarized in Table 4.I-1, above, 10 of the 169 locations tested (Locations 1 through 3 and 6 through 12) currently exceed the hazard criterion a total of 104 hours per year. These locations occur in the northwest portion of the project site, on the west side of China Basin Park. For all locations tested, the average hazard wind speed[7] was 28 mph.

CONFIGURATION B: EXISTING PLUS PROJECT WITH BUILDINGS ONLY

Configuration B represents wind conditions with the addition of the proposed project buildings at the project site. As shown in Figure 4.I-2 (page 4.I-8) and summarized in Table 4.I-1, 23 of the 169 locations tested would exceed the hazard criterion a total of 335 hours per year under the existing

[7] The Wind Study measured all average hazard wind speeds in 1 hour/year.

plus project with buildings only configuration, which would include the proposed project buildings and baseline surroundings (i.e., no additional wind attenuation features). Five of the locations would exceed the hazard criterion under existing conditions; 18 of the locations are new exceedances. For all locations tested, the average hazard wind speed was 27 mph.

As shown in Figure 4.I-2, page 4.I-8, an increase in wind speeds would be anticipated on the upwind (west) side of the project site along Third Street and China Basin Park, particularly near building corners. The 18 new hazard locations would be around the buildings primarily on Blocks A, B, D, F, G, and K (Figure 4.I-2, page 4.I-8). Six of the exceedances would be offsite on the west side of Third Street (Location 32), the east side of Terry A. Francois Boulevard (Location 164), and near the Public Safety Building to the south at Third Street and Mission Rock Street (Locations 68, 69, 72, and 74). These additional hazard exceedances would be the result of common wind-flow patterns, such as downwashing, corner accelerations, and channeling flows, which typically occur with the addition of building mass to an exposed site. These locations represent the windiest areas on and around the project site under the existing plus project with buildings only configuration.

The overall "redistribution" of wind speeds on and around the site would result in an average hazard wind speed of 27 mph, which is slightly lower than the average speed of 28 mph under existing conditions (Configuration A). Tables 1.1 and 2.1 of the Wind Study (Appendix 7-1) illustrate that the project would be expected to improve wind speed conditions on the interior of the project site (on sidewalks between buildings) and on the downwind (east) side along Terry A. Francois Boulevard.

WIND REDUCTION MEASURES

As noted above, the Wind Study also evaluated whether there were measures that could be implemented to reduce project-caused wind hazards. This section describes the various modeling configurations (Configurations C through G) that were studied to determine the relative effectiveness of the different approaches.

CONFIGURATION C: EXISTING PLUS PROJECT WITH INCREASED SETBACK

Under this configuration, the towers above the podium on Blocks A, C, D, F, and G were set farther back on the podium so that the offset distance of the tower from the edges of the podiums was set as close as feasible to 15 feet (the dimensions of these increased setbacks are shown on Image 3: *Initial Project Setback Dimensions* in the Wind Study). The blocks with increased setbacks were chosen because of their large windward-facing façades, relatively narrower initial setbacks, and the wind consultant's assessment of wind-flow patterns in the area. Because of the height of the towers along the windward side (west) of the proposed project, ultimately, the increased offset had minimal impact on wind conditions.

As presented in Figure 4.I-3, page 4.I-9; summarized in Table 4.I-1, page 4.I-14; and shown in Tables 1.1 and 1.2 of the Wind Study (Appendix 7-1), the adjustments to the tower locations on the podiums resulted in an average hazard wind speed of 27 mph, similar to the existing plus project with buildings only configuration (Configuration B). Compared to the existing plus project with buildings only configuration (Configuration B), two hazard locations would be eliminated on Third Street (Locations 32 and 46), and four additional hazard locations would be generated in China Basin Park (Locations 4 and 5) and near Blocks C (Location 55) and G (Location 20). Thus, the total number of hazard locations under this configuration would be 25, compared to 23 under the existing plus project with buildings only configuration (Configuration B) and 10 under existing conditions (Configuration A). The total exceedance under this configuration would be 352 hour per year, compared to 335 hours under the existing plus project with buildings only configuration (Configuration B) and 104 hours under the existing-conditions configuration (Configuration A). The new hazard exceedance locations would result from the redirection of winds by the modified building massing. This is a common occurrence around buildings and would occur in an area where existing wind speeds at several locations are already close to the hazard speed threshold. This would result in a slight increase in wind speeds and an exceedance of the hazard criterion.

CONFIGURATION D: EXISTING PLUS PROJECT WITH INCREASED SETBACK, CANOPIES, AND WINDSCREENS

This configuration presents the existing plus project configuration, including the increased setback under Configuration C, with the addition of canopies on Blocks A, D, F, G, and K as well as wind screens in China Basin Park and on the sidewalks between Blocks A, B, C, and D. The locations of these features are shown in Figure 4.I-4, page 4.I-10 and summarized in Table 4.I-1, page 4.I-14. The canopies and wind screens were placed above or upwind of the locations of hazard exceedance found in Configuration C, with the intent of trying to reduce the hazard exceedances, and within the limitations of the site boundaries. Canopies and wind screens typically help reduce the energy in wind gusts and, thus, eliminate the hazard locations around them.

The average hazard wind speed is expected to remain at 27 mph, as under the previous existing plus project with buildings only configuration (Configuration B) and existing plus project increased setback configuration (Configuration C), but the number of exceedances would be reduced to 16, compared to 23 under the existing plus project with buildings only configuration (Configuration B) and 25 with the existing plus project increased setback configuration (Configuration C). There would be 419 hours of exceedance per year, compared to 335 hours under the existing plus project with buildings only configuration (Configuration B) and 104 hours under existing conditions (Configuration A). The number of exceedances would still be higher than under existing conditions (10). Compared to existing conditions (Configuration A), Configuration D, with increased setback, canopies, and windscreens, would eliminate six of the 10 existing hazard locations but add 12 new exceedance locations northeast of the project site; on the northern half of the project site, on the proposed Exposition Street and Bridgeview Street

as well as China Basin Park and Third Street; and around the Public Safety Building to the south. Compared to the existing plus project with increased setback configuration (Configuration C), nine hazard exceedance locations would be eliminated by Configuration D with increased setback, canopies, and windscreens (refer to Locations 4, 5, 6, 20, 29, 50, 55, 61, and 168 in Figure 4.I-4, page 4.I-10).

CONFIGURATION E: EXISTING PLUS PROJECT WITH INCREASED SETBACK, CANOPIES, AND PROPOSED ONSITE LANDSCAPING

Configuration E includes the proposed project with increased tower setbacks and canopies on Blocks A, D, and G, as in Configuration D; as well as proposed onsite landscaping, including trees in China Basin Park and between the proposed buildings (Figure 4.I-5, page 4.I-11). The trees were modeled at the locations to the maximum of the height range (30 to 60 feet) for each species and area specified in Appendices A2 and A3 of the Wind Study. As illustrated in Figure 4.I-5, page 4.I-11, the addition of mature landscaping is expected to result in a substantial reduction in wind activity on and around the proposed project. Depending on the species and location, the proposed onsite landscaping would require between 5 and 20 years to mature.

Implementation of the proposed onsite landscaping would eliminate seven of the 10 wind hazard locations that exist under existing conditions (Configuration A) and add four new hazard exceedance locations. Thus, as illustrated in Figure 4.I-5, page 4.I-11 and summarized in Table 4.I-1, page 4.I-14, wind speeds would exceed the hazard criterion at a total of seven locations out of the 169 tested, with an average hazard wind speed of 21 mph. Configuration E would eliminate 16 wind hazard locations out of the 23 reported under the existing plus project with buildings only configuration (Configuration B). In addition to an improvement over existing conditions (Configuration A), the results depict an improvement in wind conditions compared to Configurations B through D. There would be 147 hours of exceedance per year, compared to 335 hours under the existing plus project with buildings only configuration (Configuration B) and 104 hours under existing conditions (Configuration A). Locations where hazard exceedances would occur with Configuration E are in exposed areas on the northwest portion of the project site (Locations 1, 2, and 9 [areas where hazard exceedances also occur under existing conditions]) and south of the project site on Third and Mission Rock Streets (Locations 68, 70, 72, and 74).

CONFIGURATION F: EXISTING PLUS PROJECT WITH INCREASED SETBACK AND PROPOSED ONSITE LANDSCAPING

Configuration F includes the proposed project with increased tower setbacks, similar to Configurations C through E, and landscaping, similar to Configuration E. This configuration did not include the added benefits of canopies and wind screens. Wind activity on and around the project site is expected to be reduced compared to conditions under existing conditions (Configuration A), existing plus project with buildings only configuration (Configuration B), and existing plus project with increased setback, canopies, and windscreens configuration (Configuration D).

As shown on Figure 4.I-6 (page 4.I-12) and summarized in Table 4.I-1, page 4.I-14, implementation of Configuration F is expected to eliminate seven of the 10 wind hazard locations reported under existing conditions (Configuration A) but generate five new hazard locations. Configuration F would eliminate 15 wind hazard locations out of the 23 reported under the existing plus project with buildings only configuration (Configuration B). Ultimately, winds are expected to exceed the hazard criterion at a total of eight locations out of the 169 tested (Figure 4.I-6, page 4.I-12), three of which (Locations 1, 2, and 9) currently exceed the hazard criterion under existing conditions (Configuration A). Other hazard exceedances would be on Exposition Street north of Block B (Location 49) and south of the project site on Third and Mission Rock Streets (Locations 68, 70, 72, and 74). The average hazard wind speed would be 21 mph. There would be 127 hours of exceedance per year, compared to 335 hours under the existing plus project with buildings only configuration (Configuration B) and 104 hours under existing conditions (Configuration A).

CONFIGURATION G: EXISTING PLUS PROJECT WITH INCREASED SETBACK, PROPOSED ONSITE LANDSCAPING, AND ADDITIONAL OFFSITE LANDSCAPING

This configuration includes increased tower setbacks, similar to Configurations C through F; landscaping, similar to Configurations E and F; and existing street trees around the development site (see Figure 4.I-7, page 4.I-13; Table 4.I-1, page 4.I-14; and Appendix A4 of the Wind Study). The existing offsite landscaping along the western side of Third Street slows winds from westerly and northwest directions as they approach along Mission Rock, Long Bridge, and Channel Streets and from the park north of Mission Bay Block 1.

As shown in Figure 4.I-7, page 4.I-13, when the additional offsite landscaping is taken into account, the previous eight hazard locations under Configuration F would be reduced to five with the elimination of three hazard exceedances (Locations 9 [northwest corner of Block A], 68, and 70 [south of the project site along Third Street]). Similarly, the total number of hours per year when wind speeds would exceed the hazard criterion would be expected to be reduced from 127 (under Configuration F) to 67 when factoring in the additional existing offsite landscaping.

Compared to existing conditions (Configuration A), eight hazard locations would be eliminated, and three new exceedance locations would be added. Configuration G would eliminate 18 wind hazard locations out of the 23 reported in the existing plus project with buildings only) configuration (Configuration B). The result would be five out of 169 locations with wind speeds above the hazard criterion, compared to 10 under existing conditions (Configuration A). Of these five exceedances, two would be in the northwestern corner of China Basin Park near Lefty O'Doul Bridge (Locations 1 and 2), both of which currently exceed the hazard criterion under existing conditions. The average hazard wind speed would be further reduced to 20 mph, compared to 28 mph under existing conditions (Configuration A). Wind speeds at Location 2 would improve, although this location would continue to exceed the hazard criterion; at Location 1, wind speeds would slightly worsen. Of the other three

exceedance locations, two would be along Mission Rock Street near the corner at Third Street (Locations 72 and 74), and one would be on the proposed Exposition Street between Third Street and the proposed Shared Public Way (Location 49). There would be 67 hours of exceedance per year, a reduction compared to the 335 hours under the existing plus project with buildings only configuration (Configuration B) and 104 hours under existing conditions (Configuration A). On balance, the wind hazard exceedances on the project site would be improved compared to existing conditions as well as the existing plus project with buildings only configuration (Configuration B).

SUMMARY OF HAZARD CRITERION WIND ANALYSIS

Hazard wind conditions would worsen overall with the addition of the proposed project, assuming implementation of the existing plus project with buildings only configuration (Configuration B).

Although increased setbacks may not reduce overall wind speeds under the various configurations, localized reductions to hazard exceedances are expected. Therefore, increased setbacks are regarded as effective and modeled throughout Configurations C through G and I. Although not tested, it can be inferred that the benefits of the proposed onsite landscaping, canopies, screens, and additional existing offsite landscaping would still apply, even with the original setbacks (as proposed by the project).

The addition of increased tower setbacks would result in reduced wind speeds in areas adjacent to the modified setbacks but increased wind speeds in areas where winds would be redirected by the tower setbacks. The combination of increased setbacks with canopies and wind screens (Configuration D) would reduce the number of hazard exceedance locations to 16, compared to 23 and 25 hazard exceedance locations from the buildings only configuration (Configuration B) and existing plus project increased setback configuration (Configuration C), respectively. The combination of increased tower setbacks, canopies, and proposed onsite landscaping (Configuration E) would further reduce the number of exceedance locations to seven.

The increased tower setbacks and the proposed onsite landscaping plan (Configuration F) would result in a total of eight exceedance locations. Finally, with the additional offsite landscaping in conjunction with increased tower setbacks and proposed onsite landscaping (Configuration G), the number of hazard locations would be reduced to five.

Overall, the wind reduction measures included in Configurations C through G, especially with landscaping, would have a positive impact on wind conditions on and surrounding the project site because the measures would reduce wind speeds in localized areas. As demonstrated in the Wind Study, the larger the area of coverage with respect to landscaping or wind reduction measures, the greater the wind reduction efficiency of the measures.

Overall, the configurations that include landscaping would result in a net reduction in the number of hazard criterion exceedance locations but introduce new wind hazard locations. The configurations that include physical measures (but not landscaping) would result in net increases in the number of hazard criterion exceedance locations and substantial increases in the number of hours per year of exceedance. The net reduction in the number of wind hazard locations with the inclusion of landscaping indicates that impacts related to the hazard criterion would be ***less than significant*** when evaluating impacts on the site-wide level. However, there may be temporary periods of time in which site-wide conditions as reflected in Configuration G are not met for several reasons. Landscaping is not necessarily permanent, requires maintenance, and takes time to reach a level of maturity that can be effective at mitigating wind speeds. As discussed in Chapter 2, *Project Description*, the project would ensure that landscaping maintenance would be appropriately funded and that the street trees would be inspected and maintained as well as replaced, as necessary, consistent with the landscape maintenance plan and standards to be approved by the City. Nevertheless, landscaping that is not installed at full maturity would not be as effective in baffling wind by the time the project would be built out as assumed in the analysis. This is because, depending on the species and location, landscaping typically requires 5 to 20 years to mature. In addition, despite maintenance commitments, there could be occasions when trees die or need replacement, thereby temporarily worsening wind conditions until new landscaping is planted and reaches full maturity.

In addition, the fully built-out project with mature landscaping was modeled in the Wind Study. However, it is possible that wind conditions during the approximate 6-year buildout period could be worse than the conditions reported in this analysis as certain blocks are constructed while others remain vacant. It is also possible that an economic slowdown or other factors cause a long-term halt to construction; if conditions exist at that time that are worse than conditions assumed in the analysis, those conditions could exist for an even longer period of time than that anticipated in the phasing schedule (refer to Table 2-10 in Chapter 2, *Project Description*). This impact would be significant.

MITIGATION MEASURE. To reduce wind hazard impacts as much as possible, Mitigation Measure M-WS-1 would be implemented. It would require an assessment of the effectiveness of the wind reduction measures as each building is proposed, thereby providing the most effective combination of wind reduction measures as each building is added to the project site.

Even with implementation of Mitigation Measure M-WS-1, the effectiveness of the mitigation is still uncertain because landscaping is considered an "impermanent" feature, meaning it may be subject to change over time or through the seasons and thus is not effective at all times. In addition, the model assumed full buildout but periods of time may occur before full buildout when wind conditions may worsen temporarily while some blocks are constructed and others remain vacant. Thus, impacts related to wind hazards are considered ***significant and unavoidable with mitigation***.

M-WS-1: Assessment and Mitigation of Wind Hazards on a Building-by-Building Basis.

1. Prior to or as part of the submittal package for the schematic design of a new building (Proposed Building), the Proposed Building developer shall submit to the Planning Department, for its review and approval, a report from a Qualified Wind Consultant (QWC) that reviews the Proposed Building schematic design, absent landscaping.[8] "QWC" means a wind consultant retained by the Proposed Building(s) developer and approved by the Planning Department for preparation of the report. The EIR wind consultant for the proposed project and any other wind consultant on the City's then approved list or otherwise approved by the City will be considered a QWC.

2. The QWC report shall evaluate whether the Proposed Building(s) would create a Significant Wind Impact. "Significant Wind Impact" means a substantial increase on a site-wide basis in the number of hours per year that the 26 mph wind hazard criterion is exceeded or, if baseline wind conditions are greater than 26 mph, a substantial increase in the area subjected to winds greater than 26 mph. This analysis shall focus on the entire project area that was studied in wind tunnel tests conducted for the EIR and not just the area immediately surrounding the Proposed Building(s).

3. The QWC shall consider the Proposed Building(s) in the context of the "Current Project," which, at any given time during construction of the Project, shall be defined as the building masses used in the Original Model (Wind Study Configuration B[9]), except as updated to reflect schematic design submittals for any previously approved building that has not yet commenced construction, and construction permit designs for on-site buildings that are under construction or have completed construction. This model shall be referred to as the "Current Project" and shall be updated over time as architectural design for each proposed project block/building is completed.

4. The Proposed Building shall be tested in the wind tunnel as proposed, including any architectural features that can be shown on plans to mitigate wind effects.[10] Testing may not include any existing or proposed onsite

[8] The scope of work for this report shall use the same methodology and wind test point locations as the Wind Study prepared for this EIR.

[9] All references to the Wind Study refer to the Mission Rock EIR Pedestrian Wind Study Wind Tunnel Tests Report prepared by RWDI, final report, January 25, 2017, which can be found in Appendix 7-1 to this EIR.

[10] These could include features such as setbacks, wind baffles, randomized balconies, overhands, canopies, awnings and the like, provided they are consistent with the project's Design Controls and shown on schematic architectural plans for the Proposed Building.

landscaping. A separate test shall be conducted with existing and proposed onsite landscaping included, if required per Section 5, below. The accompanying report shall compare the wind tunnel results analyzing the Proposed Building in the context of the Current Project to the following two baselines: (1) the EIR baseline conditions for the project site (Wind Study Configuration A), and (2) Existing Plus Project (i.e., with Mission Rock proposed project) conditions used in the EIR (Wind Study Configuration B).

5. No further analysis shall be required if the QWC concludes, and the Planning Department concurs, that the Proposed Building's schematic design, absent proposed onsite landscaping, would not create a Significant Wind Impact. If the QWC concludes that the Proposed Building's schematic design, absent proposed onsite and existing offsite landscaping, would create a Significant Wind Impact, as defined above, then a second wind tunnel test shall be conducted, taking into account proposed onsite landscaping and existing offsite landscaping. The intent of landscaping is to emulate the function and effect of a manmade wind screen. The following parameters have been determined to be the minimum requirements for landscaping features to be effective in controlling wind:[11]

   - It is the combined effect of a cluster or group of landscaping features that is most effective, rather than the maturity of one tree.
   - Since a general rule is that vertical wind control features should be taller than the average height of a person, foliage from the ground up is most effective at a height of approximately 6 to 8 feet.
   - Since winds can easily flow under tree crowns, underplantings (e.g., shrub plantings at the base of a tree) should be included where trunks are bare for the first 5 to 6 feet of a tree measured from the ground.
   - Tree crowns with at least 60 percent cover (density of leafage) and even spread of branches are most effective.

[11] RWDI, Landscaping, December 8, 2016.

INFORMATION REGARDING COMFORT CRITERION

For informational purposes, the Wind Study also assessed wind comfort speeds.

CONFIGURATION A: EXISTING WIND CONDITIONS

For existing conditions, the average measured 90th-percentile equivalent wind speed for the 169 test locations was approximately 15 mph. The majority of the existing site experiences windy conditions because it is vacant. Wind speeds at 163 test locations (out of 169) exceed the Planning Code's pedestrian comfort criterion of 11 mph. Winds currently exceed the applicable criterion 25 percent of the time under existing conditions (Configuration A).

CONFIGURATION B: EXISTING PLUS PROJECT WITH BUILDINGS ONLY

The addition of buildings to the site would result in an increase in wind activity on the windward side of the project site (i.e., the southwest, west, and north sides) and a reduction in wind speeds on the leeward side of buildings (i.e., east side). Under Configuration B, wind speeds calculated at 10 percent exceedance would average 14 mph, with winds at 111 of the 169 locations tested exceeding the 11 mph criterion. Winds would exceed the comfort criterion 20 percent of the time. This would be an improvement compared to the 15 mph average wind speed and 163 exceedances 25 percent of the time under existing conditions (Configuration A).

CONFIGURATION C: EXISTING PLUS PROJECT WITH INCREASED SETBACK

Under Configuration C, wind speeds are expected to average 13 mph, with winds at 109 of the 169 locations tested exceeding the 11 mph criterion. Winds would exceed the comfort criterion 20 percent of the time. This would be an improvement compared to the 15 mph average wind speed and 163 exceedances 25 percent of the time under existing conditions (Configuration A) as well as an improvement when compared to Configuration B.

CONFIGURATION D: EXISTING PLUS PROJECT WITH INCREASED SETBACK, CANOPIES, AND WINDSCREENS

The proposed canopies would modify winds in the areas closest to them. Although minor reductions in wind speeds were seen at some locations close to the canopies, minor increases in wind speeds were seen at other locations because of winds being redirected by the canopies. Similar to Configuration C, average wind speed under Configuration D is predicted to be 13 mph. However, with winds at 107 of 169 tested locations exceeding the 11 mph criterion, compared to 109 under Configuration C, winds would exceed the applicable criterion 18 percent of the time. These numbers are lower than what would occur under existing conditions (Configuration A) and similar to the existing plus project with increased setback configuration (Configuration C).

CONFIGURATION E: EXISTING PLUS PROJECT WITH INCREASED SETBACK, CANOPIES, AND PROPOSED ONSITE LANDSCAPING

Under Configuration E, wind speeds, which exceed the 11 mph criterion for 10 percent (or more) of the time annually, are expected to occur at 65 locations (out of 169 locations tested), with an average wind speed of 11 mph. Winds would exceed the applicable criterion 12 percent of the time. This would be a substantial improvement compared to existing conditions (Configuration A) and Configurations C and D.

CONFIGURATION F: EXISTING PLUS PROJECT WITH INCREASED SETBACK AND PROPOSED ONSITE LANDSCAPING

Under Configuration F, wind speeds, which exceed the 11 mph criterion for 10 percent (or more) of the time annually, are expected to occur at 67 locations (out of 169 locations tested), with an average wind speed of 11 mph. Winds would exceed the applicable criterion 12 percent of the time. This would be a substantial improvement compared to existing conditions (Configuration A) and Configurations C and D and would be similar to the results from the existing plus project with buildings only configuration (Configuration B) and Configuration E.

CONFIGURATION G: EXISTING PLUS PROJECT WITH INCREASED SETBACK, PROPOSED ONSITE LANDSCAPING, AND ADDITIONAL OFFSITE LANDSCAPING

Under Configuration G, wind speeds, which exceed the 11 mph criterion for 10 percent (or more) of the time annually, are expected to occur at 57 locations (out of 169 tested), with an average wind speed of 10 mph. Winds would exceed the applicable criterion 10 percent of the time. These wind conditions would be the most comfortable/favorable compared to all massing and configurations studied.

SUMMARY OF WIND COMFORT ANALYSIS

Compared to existing conditions (Configuration A), the proposed project, without the inclusion of any wind reduction measures (Configuration B), would result in an improvement in wind comfort conditions.

Configuration C, which would include setbacks, would further improve wind comfort conditions compared to Configurations A and B. Configuration D, which would include canopies and setbacks, would reduce wind speeds at some locations close to the canopies but increase wind speeds at other locations because of winds being redirected by the canopies. These wind speeds under Configuration D would be lower than what would occur under existing conditions (Configuration A) and similar to the existing plus project with increased setback configuration (Configuration C). Under Configurations E and F, which include proposed onsite landscaping, wind comfort conditions would result in a substantial improvement compared to existing conditions (Configuration A) and Configurations C and D. Similarly, Configuration G, which would include the proposed onsite landscaping and additional offsite landscaping, would result in the greatest improvement in wind comfort conditions across all massing and configurations studied.

CUMULATIVE IMPACTS

The geographic context for the analysis of cumulative impacts associated with wind hazards considers the Mission Bay area surrounding the project site. Specifically, the cumulative Wind Study considers future buildout of Mission Bay Block Lots 3E, 4E, 9, and 9A (see Chapter 2, *Project Description*, Figure 2-3). The projects considered in this analysis are listed in Table 4-1 of Chapter 4, *Environmental Setting and Impacts*.

Impact C-WS-1: The project, in combination with past, present, and reasonably foreseeable future projects, would alter wind in a manner that would substantially affect public areas. (Significant and Unavoidable)

The Wind Study included two additional configurations, Configurations H and I, to account for cumulative development. Configuration H, project plus cumulative buildings only, represents the wind hazard impact of the proposed project in the presence of all existing and baseline buildings and proposed future buildings in the surrounding offsite area (Blocks 3E, 4E, 9, and 9A), without wind reduction measures. This configuration setup is similar to the existing plus project with buildings only configuration (Configuration B), but it also includes cumulative buildings. Configuration I, project plus cumulative with increased setbacks, proposed onsite landscaping, and additional existing offsite landscaping, represents the wind impact of the proposed project in the presence of all existing and baseline buildings and proposed future buildings in the surrounding area with the incorporation of increased setbacks, proposed onsite landscaping, and existing offsite landscaping. This configuration setup is similar to the existing plus project with increased setback, proposed onsite landscaping, and additional offsite landscaping configuration (Configuration G), but it also includes cumulative buildings.

A summary of results for the tested cumulative configurations is presented in Table 4.I-2, on the following page, and illustrated in Figures 4.I-8 and 4.I-9, pages 4.I-27 and 4.I-28.

CONFIGURATION H: PROJECT PLUS CUMULATIVE WITH BUILDINGS ONLY

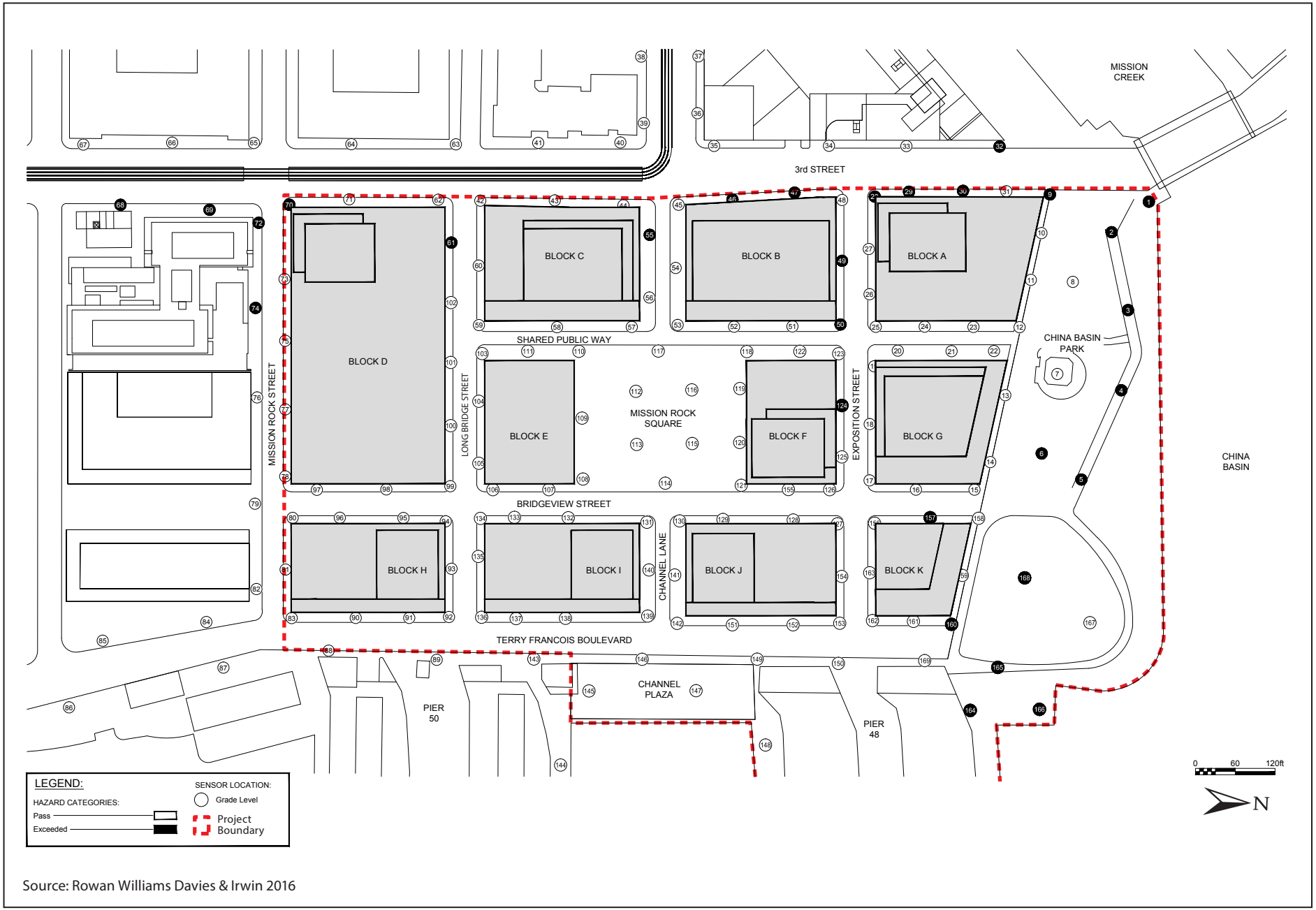
Configuration H was modeled to represent the highest exposure to prevailing winds on a site-wide basis. This configuration represents the wind hazard impact of the proposed project in the presence of all existing and baseline buildings and proposed future buildings in the surroundings (Blocks 3E, 4E, 9 and 9A), without any of the wind reduction measures included in Configurations C through G. This configuration is similar to the existing plus project with buildings only configuration (i.e., the building only assumptions described in Configuration B), but it also includes cumulative buildings.

TABLE 4.I-2. SUMMARY OF WIND TUNNEL STUDY CUMULATIVE RESULTS FOR THE HAZARD CRITERION

Configuration		Number of Exceedance Locations	Hours/ Year of Exceedance	Average Hazard Wind Speed (mph), 1 Hour/Year
A	Existing	10	104	28
B	Existing plus Project with Buildings Only	23 (5 existing, 18 new)	335	27
G	Existing Plus Project with Increased Setback, Proposed Onsite Landscaping, and Additional Offsite Landscaping	5 (2 existing, 3 new)	67	20
H	Project plus Cumulative with Buildings Only	29 (5 existing, 24 new)	517	27
I	Project plus Cumulative with Increased Setback, Proposed Onsite Landscaping, and Additional Offsite Landscaping	5 (2 existing, 3 new)	40	19

Source: RWDI. 2017. *Pedestrian Wind Study/Wind Tunnel Tests.* Final report, January 25.

The addition of cumulative buildings, and thereby densification of areas southwest of the project site, would cause the northwesterly and westerly winds to be redirected to the more open areas north of the site from time to time. Similar to the project-specific existing plus project with buildings only configuration (Configuration B), five of the 10 existing hazard exceedances would be eliminated. However, 24 new hazard locations would be generated, primarily around the exposed buildings on Blocks A, B, C, D, F, G, and K and the China Basin Park (Figure 4.I-8, on the following page). A total of 29 hazard exceedances are expected for this configuration. Average wind speed would be 27 mph, which is the same as in the project-specific existing plus project with buildings only configuration (Configuration B) and 1 mph lower than that under existing conditions (Configuration A). This configuration, under cumulative conditions, would result in 517 hours of exceedance per year, compared to 335 hours under the existing plus project with buildings only configuration (Configuration B) and 104 hours under existing conditions (Configuration A).

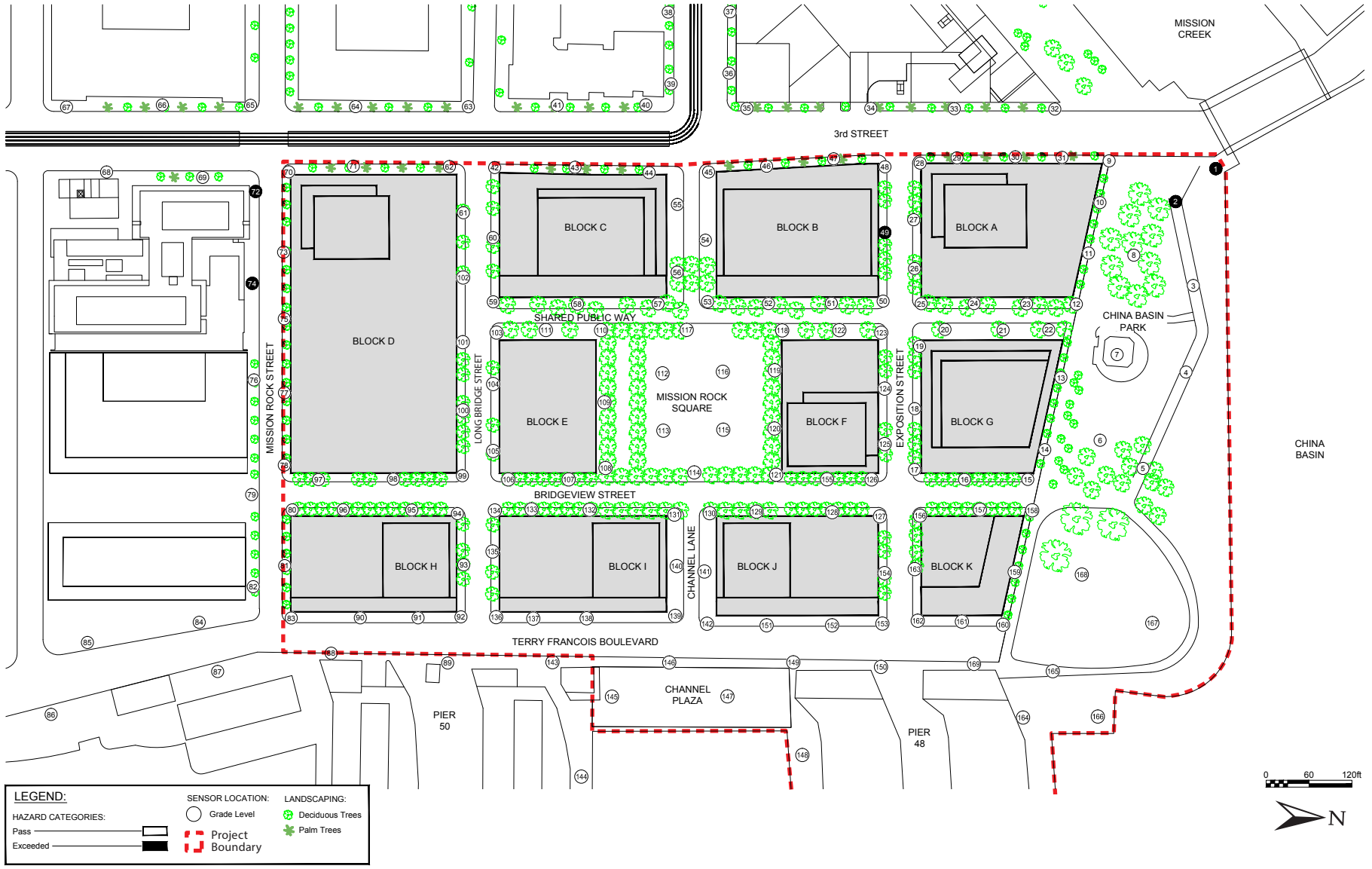


Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-8
Configuration H: Project plus Cumulative Wind Conditions with Buildings Only



Source: Rowan Williams Davies & Irwin 2016

Graphics ... 00336.13 (4-17-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-9
Configuration I: Project plus Cumulative Wind Conditions with Increased Setback, Proposed Onsite Landscaping, and Additional Offsite Landscaping

CONFIGURATION I: PROJECT PLUS CUMULATIVE WITH INCREASED SETBACK, PROPOSED ONSITE LANDSCAPING, AND ADDITIONAL OFFSITE LANDSCAPING

Configuration I was modeled to represent the least exposure to prevailing winds on a site-wide basis. This configuration represents cumulative buildings added to the existing plus project with the increased setback, proposed onsite landscaping, and additional offsite landscaping configuration (similar to Configuration G).

Because of the presence of proposed onsite and existing offsite landscaping (Configuration I), a large area of China Basin Park is protected from prevailing winds. The impact of the cumulative buildings would be substantially negated by the more localized sheltering afforded by landscaping, and therefore, the number of hazard exceedances in Configuration I is anticipated to be the same as in Configuration G (five exceedances [see Figure 4.I-7, p. 4.I-13]). All other existing plus project configurations with the addition of cumulative buildings would generate wind results that would be similar to one of the two tested cumulative configurations and their corresponding project-level wind test scenarios.

The addition of cumulative buildings is predicted to result in conditions similar to those presented in the project-level configuration with increased setback, proposed onsite landscaping, and existing offsite landscaping (Configuration G). Wind speeds are expected to exceed the hazard criterion at five of 169 locations, compared to 10 under existing conditions (Configuration A), 23 in the existing plus project with buildings only configuration (Configuration B), and 29 in the project plus cumulative with buildings only configuration (Configuration H) (see Figure 4.I-8, page 4.I-27). The five locations were reported as wind hazard locations under the existing plus project with buildings only (Configuration B) and project plus cumulative with buildings only configuration (Configuration H). Of these five exceedances, two would be in the northwestern corner of China Basin Park, near Lefty O'Doul Bridge (Locations 1 and 2); both would exceed the hazard criterion under existing conditions (Configuration A). Of the other three locations, two would be along Mission Rock Street near the corner at Third Street (Locations 72 and 74), and one would be on the proposed Exposition Street between Third Street and the proposed Shared Public Way (Location 49). Average wind speed is predicted to be 19 mph, which is 9 mph lower than under existing conditions. There would be 40 hours of exceedance per year, compared to 517 hours under the project plus cumulative with buildings only configuration (Configuration H) and 104 hours under existing conditions (Configuration A). On balance, the wind hazard exceedances on the project site would be improved overall compared to the existing, existing plus project with buildings only (Configuration B), and project plus cumulative with buildings only (Configuration H) configurations.

Similar to existing plus project with increased setback, proposed onsite landscaping and additional offsite landscaping (Configuration G), on a site-wide basis, because Configuration I shows a decrease in wind hazard exceedance locations and wind speeds, impacts would be

considered ***less than significant***, despite the creation of three new wind hazard locations. However, because of the uncertainty regarding the permanence of the proposed onsite and existing offsite landscaping, cumulative impacts are conservatively considered significant and unavoidable with mitigation. Even with Mitigation Measure M-WS-1, which would assess the effectiveness of wind measures on a building-by-building basis, impacts are considered ***significant and unavoidable.***

INFORMATION REGARDING COMFORT CRITERION

For informational purposes, the Wind Study also considered the effect of cumulative conditions plus the project on the comfort criterion.

CONFIGURATION H: PROJECT PLUS CUMULATIVE WITH BUILDINGS ONLY

Under this configuration, the results would be similar to those for the existing plus project with buildings only configuration (Configuration B). Wind speeds would exceed the 11 mph criterion at 113 of 169 locations, with wind speeds averaging at 14 mph, compared to 163 locations and a 15 mph average speed under existing conditions (Configuration A). Winds would exceed the applicable criterion 20 percent of the time, compared to 25 percent of the time under existing conditions (Configuration A).

CONFIGURATION I: PROJECT PLUS CUMULATIVE WITH INCREASED SETBACK, PROPOSED ONSITE LANDSCAPING AND ADDITIONAL OFFSITE LANDSCAPING

Under Configuration I, project plus cumulative with increased setback, proposed onsite landscaping, and additional offsite landscaping, the average wind speed is predicted to be 10 mph, and speeds at 50 locations (out of 169) are expected to exceed the 11 mph criterion. Winds would exceed the applicable criterion 9 percent of the time. This would be an improvement compared to existing conditions (15 mph and 163 exceedances) and all other project and cumulative configurations.

SHADOW

ENVIRONMENTAL SETTING

In an urban environment, shadow is a function of the height, size, and massing of buildings, as well as other elements of the built environment, and the angle of the sun. The angle of the sun varies with the time of day (from rotation of the earth) and the change in seasons (from the earth's elliptical orbit around the sun and its tilted axis). The longer midday shadows are cast during the winter (when the midday sun is lowest in the sky), and the shorter midday shadows are cast during the summer (when the midday sun is higher in the sky). At the time of the summer solstice (approximately June 21 of every year), the midday sun is highest in the sky. The longest day and shortest night occur on this date. Conversely, the shortest day and longest

night occur on the winter solstice (approximately December 21 of every year). The vernal/autumnal equinoxes (when day and night are equal in length) represent the halfway point between solstices. Therefore, measuring shadow lengths during the summer and winter solstices captures the extremes for the shadow patterns that occur throughout the year.

The difference between the current levels of shading and the levels that would be present with the addition of the proposed project yields the total annual increase, measured in square foot hours (sfh) of shadow. This increase is taken as a percentage of the existing total annual available sunlight in the park or open space (i.e., the amount of sun that would fall on the park or open space throughout the year if there were no shading present at any time) and used to determine the existing versus relative increase in new shadows created by the proposed project.

PARKS, RECREATIONAL FACILITIES, AND OPEN SPACES IN THE VICINITY OF THE PROJECT SITE

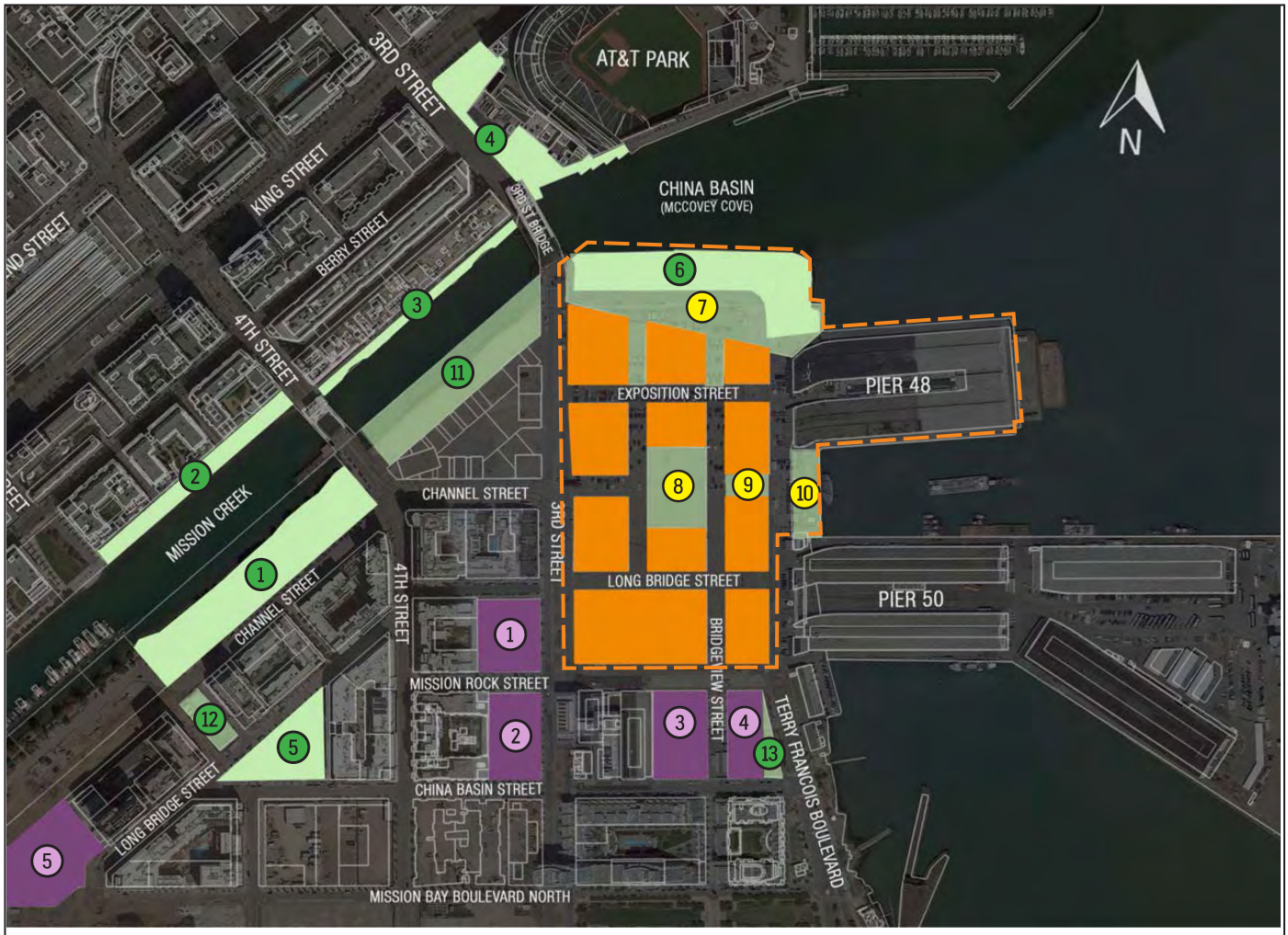
There are several parks, recreational facilities, and open spaces in the vicinity of the project site (refer to Section 4.J, *Public Services and Recreation,* for a more detailed discussion). The parks, recreational facilities, and open spaces analyzed in the EIR for this project are organized as follows (refer to Figure 4.I-10 on the following page for the locations of these facilities):

- Open spaces under the jurisdiction of the Recreation and Park Commission
- Other public open spaces
- Other outdoor recreation facilities
- Future public open spaces in the project vicinity
- Future public open spaces on the project site

OPEN SPACES UNDER THE JURISDICTION OF THE RECREATION AND PARK COMMISSION

The Shadow Study determined that no parks or open spaces that are under the jurisdiction of the Recreation and Park Commission (i.e., subject to the provisions of Planning Code Section 295) are close enough to the project site to receive any new shading from either the High Commercial Assumption or the High Residential Assumption. The closest park or open space that is under the jurisdiction of the Recreation and Park Commission is South Park, located approximately 0.4 mile northwest of the project site. Therefore, no properties under the jurisdiction of the Recreation and Park Commission are included in the analysis.[12]

[12] PreVision Design. 2016. *CEQA Evaluation of the Shadow Impacts of the Seawall 337/Mission Rock Project on Public Open Spaces in San Francisco, CA*. July 15.



Affected Public Open Spaces

1. Mission Creek Park South (P1)
2. Mission Creek Park Esplanade (NP1)
3. China Basin Building Promenade
4. AT&T Plaza (southern portion)
5. Kids' Park (P6)
6. China Basin Park (Existing)
7. New China Basin Park*
8. Mission Rock Square*
9. Channel Lane*
10. Channel Wharf*
11. Mission Creek Park (P3)*
12. Dog Run (P5)*
13. Mission Bay Park (P19)*

*under construction / proposed

Project Site
(Open spaces that are part of the Project are numbered in a yellow circle)

Cumulative (Future) Projects

1. Lot 3E
2. Lot 4E
3. Lot 9
4. Lot 9A
5. Lot 12W

Source: Prevision Design, 2016.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-10
Affected Open Spaces in the Project Vicinity

OTHER PUBLIC OPEN SPACES

There are several public open spaces that are not under the jurisdiction of the Recreation and Park Commission in the vicinity of the project site that could be affected by project-generated shadow. These existing open spaces include Mission Creek Park South, Mission Creek Park Esplanade, China Basin Building Promenade, AT&T Park Plaza (southern portion), Kids' Park, and China Basin Park (pre-expansion).

In addition, three proposed, reasonably foreseeable, or under-construction publicly accessible open spaces near the project site would be affected by new project shadows at some point during the year. These approved or under-construction publicly accessible open spaces in the vicinity of the project site include Mission Creek Park, Dog Run Park, and Mission Bay Park, as described below. For the purposes of analyzing the proposed project's shadow impacts, these future publicly accessible open spaces are being treated as if they are existing open spaces.

Although the project site is not located within the area subject to Mission Bay shading controls, some of the existing open spaces in the vicinity, as identified above, are within the Mission Bay Parks system. Therefore, for those open spaces, a discussion of shading per Mission Bay standards is included for informational purposes.

MISSION CREEK PARK SOUTH. Mission Creek Park South (Mission Bay Block P1)[13] is an existing, developed 3.2-acre, publicly accessible open space located in the South of Market neighborhood, along the south side of Mission Creek on Block 8710/Lot 002, Block 8731/Lot 001, and Block 3810/Lot 006. Mission Creek Park South is part of Mission Bay Parks and operated under the jurisdiction of the San Francisco Public Works (Public Works) and the Port of San Francisco (Port). The main entry to the park is from Fourth Street, with four smaller entrances along Channel Street. The daily hours of operation are from sunrise to 10:00 p.m. every day. The park includes an open lawn with benches, a small outdoor amphitheater, a walkway, and a plaza with public restrooms and facilities. Approximately 20 trees divide the walkway from the sidewalk on Channel Street, and mature trees line the periphery of the park.

The Shadow Study determined that, under existing conditions, Mission Creek Park South receives approximately 98.8 million sfh of shadow per year, which is equal to being shaded approximately 14.1 percent of the year. The majority of existing shadow falls during the early morning, affecting all portions of the park. In the summer, additional shadows fall along the edge of the park, adjacent to Mission Creek, during the late afternoon and evening.

[13] "P1," and subsequent "P#" references (i.e., P2, P3, etc.), stands for "Park 1" or "Park #" (i.e., Park 2, Park 3, etc.) on the Mission Bay Development Overview Map (http://sfocii.org/sites/default/files/Documents/Project%20Areas/MB/Mission%20Bay%20Development%20Overview%20Map%20July%2016.pdf).

The Mission Bay Design Guidelines establish a maximum area for allowable shading that falls continuously for 1 hour on Mission Creek Park (combination of park parcels NP1, NP2, NP3, P1, P2, P3, and P8) between 10 a.m. and 4 p.m. from March 20 to September 22. Currently, the largest area of the park affected by shading for 1 hour or more during that time period is equal to approximately 7.9 percent of the total park area, which is below the maximum allowable area of 13 percent.

MISSION CREEK PARK ESPLANADE. Mission Creek Park Esplanade (Mission Bay Block NP1)[14] is a 1.1-acre publicly accessible open space in the South of Market neighborhood at 301 Berry Street on Block 8708/ Lot 002. The esplanade is part of Mission Bay Parks and operated by the MJM Management Group through a contract with the Office of Community Investment and Infrastructure (OCII) and under the jurisdiction of Public Works. Entrances to the esplanade are provided from Fourth Street, Berry Street, and Mission Creek Senior Center. The daily hours of operation are from sunrise to 10:00 p.m. every day; however, the esplanade is not enclosed and therefore accessible at all times. The esplanade includes benches, landscaping, and approximately 17 trees.

Under existing conditions, Mission Creek Park Esplanade receives approximately 31.0 million sfh of shadow per year, which is equal to being shaded approximately 17.9 percent of the year. Some existing shadow is present during morning hours, but the park receives the majority of its shade during afternoon hours when the park is often largely cast in shadow.

The Mission Bay Design Guidelines determine maximum shading for Mission Creek Park, which includes Mission Bay Park South, Mission Creek Park Esplanade, and Mission Creek Park (P3), as well as other open space areas, in the aggregate. Currently, as explained in the above discussion of Mission Bay Park South, the largest area of the park affected by shading for 1 hour or more during the applicable time period is equal to approximately 7.9 percent of the total park area, which is below the maximum allowable area of 13 percent.

CHINA BASIN BUILDING PROMENADE. The existing 815-foot-long China Basin Building Promenade is located southeast of Berry Street and northwest of Mission Creek. The promenade, which is in the South of Market neighborhood, is a privately owned public open space. There are two public entrances at Fourth Street and Lefty O'Doul Bridge/Third Street and three private entries along the elevated walkway to and/or from Berry Street. The Waterfront Promenade is lined with planters with approximately 12 trees total and benches, providing covered and uncovered seating areas. The promenade is accessible 24 hours per day.

Under existing conditions, China Basin Building Promenade receives approximately 32.7 million sfh of shadow per year, which is equal to being shaded approximately 22.5 percent of the year. Existing shadows partially shade the park in the morning, but the park is shaded primarily during the afternoon hours.

[14] "NP #" corresponds to parks located in the north subarea on the Mission Bay Plan Map.

AT&T PARK PLAZA. AT&T Park Plaza is an existing 12-acre, publicly accessible open space located adjacent to AT&T Park at 24 Willie Mays Plaza, north of China Basin Park and northeast of Third Street. The plaza is located in the South of Market neighborhood on Block 3794/Lot 003-028 and under the jurisdiction of the Port. For purposes of this analysis, the portions of the plaza that were analyzed[15] represent three principal areas: Willie Mays Plaza (the main ballpark entry plaza, located at the corner of Third/King Streets), Lefty O'Doul Plaza (a secondary entry along Third Street, to the southeast), and a portion of Waterfront Promenade to the south and the footpath between the ballpark and China Basin. Willie Mays Plaza functions as a gathering space and features the main entry into AT&T Park via the Willie Mays Gate. Approximately 24 palm trees are planted throughout Willie Mays Plaza.

Under existing conditions, AT&T Park Plaza receives approximately 59.7 million sfh of shadow per year, which is equal to being shaded approximately 27.7 percent of the year. Existing shadows fall year-round, primarily during the morning and evening hours.

KIDS' PARK. Kids' Park is an existing 1.20-acre triangular park in the middle of Mission Bay South's residential core (i.e., north of China Basin Street, southeast of Long Bridge Street, west of Fourth Street). The park is in the Mission Bay neighborhood and under the jurisdiction of Public Works, with the Mission Bay Development Group as the Master Developer. There are six public entrances into the park between China Basin Street and Long Bridge Street. The park includes interactive play areas, a fenced playground, benches, picnic areas, bicycle racks, and water fountains. The park is open 7 days a week from 8:00 a.m. to 9:00 p.m.

Under existing conditions, Kids' Park currently receives approximately 54.2 million sfh of shadow per year, which is equal to being shaded approximately 27.8 percent of the year. Existing shadows fall on the park throughout the day, with the exception of midday during summer and fall.

The Mission Bay Design Guidelines establish a maximum area for allowable shading that falls continuously for 1 hour on Kids' Park (P6) between 10 a.m. and 4 p.m. from March 20 to September 22. Currently, the largest area of the park affected by shading for 1 hour or more during that time period is equal to 11.0 percent of the total park area, which is below the maximum allowable area of 17 percent.

[15] For purposes of this analysis, only the southern portion of this open space area was analyzed because there is no potential for shadow from the proposed project to affect the northern portion because of distance and intervening structures.

CHINA BASIN PARK. China Basin Park is an existing 2.2-acre[16] park located in the Mission Bay neighborhood of San Francisco on Block 8719/Lots 002 and 006 and Block 9900/Lot 062 at the corner of Third Street and Terry A. Francois Boulevard, within the northern portion of the project site. The park is under the jurisdiction of the Port. The park has two entry points, one at the southern end of Lefty O'Doul Bridge, at the intersection of Third Street and Terry A. Francois Boulevard, and one at Terry A. Francois Boulevard by Pier 48. The park includes an elevated rectangular lawn that has been enclosed within a concrete ledge, with approximately 25 trees lining the southern edge. A smaller secondary lawn is located on the northeastern corner. The Junior Giants Field, a small baseball field, is located to the south.

Under existing conditions, China Basin Park receives approximately 6.0 million sfh of shadow per year, which is equal to being shaded approximately 1.4 percent of the year. The limited amount of existing shadow falls during late afternoon/early evening hours from mid-spring through summer to mid-fall. These shadows occur on the western third of the park. Early-morning shadows are present during spring and fall on the southeastern side of the park near Pier 48. The duration of both morning and afternoon shading is longest during the winter when morning shading covers a portion of the southeastern corner. After an hour of midday full sun, shadows move from west to east across the western two-thirds of the park.

MISSION CREEK PARK (P3). Mission Creek Park (P3) (Mission Bay Block P3) is a proposed 2.32-acre park that would be located northeast of Fourth Street, northwest of Block 1, southeast of Mission Creek, and southwest of Third Street. The proposed park would be under the jurisdiction of the Port and Public Works, with the Mission Bay Development Group as the Master Developer. Mission Creek Park (P3) would include pedestrian pathways, children's play areas, gardens, and water-oriented viewing/seating areas. The park is planned to open in fall 2017 and would be part of Mission Bay Parks upon completion.

The area for the proposed Mission Creek Park (P3) currently receives approximately 117.0 million sfh of shadow per year, which is equal to being shaded approximately 30.5 percent of the year. Existing shadows fall from morning through mid-afternoon throughout the year; the area is additionally shaded for up to 1 hour in the afternoon and evening from late spring through early fall.

The Mission Bay Design Guidelines determine maximum shading for Mission Creek Park, which includes Mission Bay Park South, Mission Creek Park Esplanade, and Mission Creek Park (P3), as well as other open space areas, in the aggregate. Currently, as explained above,

[16] The Shadow Study assumes a size for China Basin Park of 2.57 acres. Since the initial drafting of the Shadow Study, it was determined that the actual park size is 2.2 acres, as described here and in Chapter 2, *Project Description*. This minor discrepancy does not affect the conclusions reached in the Shadow Study or the results presented in this section.

the largest area of the park affected by shading for 1 hour or more during the applicable time period is equal to approximately 7.9 percent of the total park area, which is below the maximum allowable area of 13 percent.

DOG RUN PARK. Dog Run Park (Mission Bay Block P5) is a proposed approximately 0.3-acre dog park that would be located northwest of Long Bridge Street and southeast of Channel Street. The park would be under the jurisdiction of Public Works, with the Mission Bay Development Group as the Master Developer. Dog Run Park would be designed for use as a small dog park and contain planting, hardscape, and furniture elements to enhance the visual connection between the parks. The park would serve as a link between Mission Creek Park to the north and Kids' Park to the south (each discussed above). At this time, it is unknown when the park will be open (although it is fully entitled).

The area of the proposed Dog Run Park currently receives approximately 24.5 million sfh of shadow per year, which is equal to being shaded approximately 45.6 percent of the year. Existing shadows fall throughout the day, with the exception of midday during summer and fall.

The proposed Dog Run Park is part of the Mission Bay Parks system. However, this park has no stated restrictions or limitations with respect to shadow under the Mission Bay Design Guidelines.

MISSION BAY PARK (P19). Mission Bay Park (Mission Bay Block P19) is a proposed approximately 0.2-acre, triangularly shaped public open space. The proposed park would be located north of China Basin Street, south of Mission Rock Street, east of Lot 9A, and west of Terry A. Francois Boulevard. The park would be under the jurisdiction of the Port, with the Mission Bay Development Group as the Master Developer. The park would provide plazas next to the neighboring residential building, an OCII affordable housing site, and a small planting strip along the residential units. It is anticipated that the park will open in spring 2017. The area of the proposed Mission Bay Park (P19) currently receives approximately 2.1 million sfh of shadow per year, which is equal to being shaded approximately 6.5 percent of the year.

The proposed Mission Bay Park (P19) is part of the Mission Bay Parks system. However, this park has no stated restrictions or limitations with respect to shadow under the Mission Bay Design Guidelines.

OTHER OUTDOOR RECREATION FACILITIES

MISSION CREEK. Mission Creek is located north of Channel Street and south of Mission Creek Park and Berry Street. There are three public entrances, at Fourth Street, Channel Street, and Berry Street. The Mission Creek boat launch provides access to and from Mission Creek and

San Francisco Bay for small non-motorized boats via Mission Creek Park. Mission Creek provides commercial and sport fishing, contact water recreation, noncontact water recreation, and suitable estuarine and wildlife habitat.[17]

SAN FRANCISCO BAY. San Francisco Bay is located east of the project site. The estuarine habitat provides areas for fish migration, spawning, and the preservation of rare and endangered species. Activities within San Francisco Bay include commercial and sport fishing, shell fish harvesting, contact water recreation, and noncontact water recreation.

REGULATORY FRAMEWORK

SAN FRANCISCO GENERAL PLAN

The San Francisco General Plan (General Plan) contains objectives and policies that are related to preserving sunlight on open spaces and other public areas. These objectives and policies are found in the Recreation and Open Space Element and the Urban Design Element.

RECREATION AND OPEN SPACE ELEMENT

The Recreation and Open Space Element establishes Policy 1.9, "Preserve sunlight in public open spaces," and states that solar access to public open space should be protected.[18] In San Francisco, the presence of the sun's warming rays is essential to enjoying open space. This is because climatic factors, including ambient temperature, humidity, and wind, usually combine to create a comfortable climate only when direct sunlight is present. Therefore, the shadows created by new development nearby can critically diminish the utility of the open space.

URBAN DESIGN ELEMENT

The Urban Design Element establishes Policy 3.4, "Promote Building forms that will respect and improve the integrity of open spaces and other public areas." The Urban Design Element further states that buildings to the south, east, and west of parks and plazas should be limited in height or effectively oriented so as not to prevent the penetration of sunlight to such parks and plazas. Large buildings and developments should, where feasible, provide ground-level open space on their sites that is well situated for public access and for sunlight penetration. [19]

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[17] Coastal Conservancy and Association of Bay Area Governments. 2016. *San Francisco Bay Area Water Trail Site Description for Mission Creek.* Available: http://scc.ca.gov/webmaster/project_sites/watertrail/agendas/MissionCreek_Reports_20160311.pdf. Accessed: March 2, 2017.

[18] City and County of San Francisco. 2014. *San Francisco General Plan*, Recreation and Open Space Element at p. 18. April. Available: http://www.sf-planning.org/ftp/General_Plan/Recreation_OpenSpace_Element_ADOPTED.pdf. Accessed: March 2, 2017.

[19] City and County of San Francisco. 2014. *San Francisco General Plan*, Urban Design Element. April. Available: http://generalplan.sfplanning.org/I5_Urban_Design.htm. Accessed: March 2, 2017.

PLANNING CODE SECTION 295

New development projects in San Francisco that would be more than 40 feet in height and could contribute new shading to parks that are under the jurisdiction of the Recreation and Park Commission are subject to review under Section 295 of the San Francisco Planning Code. Compliance with Section 295 of the Planning Code requires that proposed projects not adversely affect the use of existing or proposed open spaces that are under the jurisdiction of the Recreation and Park Commission. Such adverse effect is defined as any development in excess of 40 feet in height that would add additional levels of new shading that would be in excess of any potentially allowable new shadow increment on that open space throughout the year between 1 hour after sunrise and 1 hour before sunset, unless the Planning Commission, with input from the general manager of the Recreation and Parks Department and its commission, determines that such an impact would be insignificant.

The shadow analysis determined that no parks or open spaces that are under the jurisdiction of the Recreation and Park Commission would receive any new shading from either of the project land use assumptions; therefore, Section 295 does not apply to any of the open spaces reviewed in this analysis. However, the San Francisco Planning Department has determined that Section 295 analysis times, sfh shadow calculations, and the usage observation methodology, which is often used to support CEQA analysis for development projects in San Francisco, would be adequate and appropriate for evaluating shading under CEQA and determining if the proposed project would create a net new shadow that would affect, in an adverse manner, the use of any park, open space, outdoor recreation facility, or other public areas.

PLANNING CODE SECTION 101.1/PROPOSITION M

In November 1986, the voters of San Francisco approved Proposition M (the Accountable Planning Initiative), which added Section 101.1 to the Planning Code and established eight Priority Policies. These Priority Policies are the basis upon which inconsistencies with the General Plan are resolved. Priority Policy No. 8 calls for the protection of parks and open space and their access to sunlight and vistas. Prior to issuing a permit for any project that requires an initial study under CEQA; prior to issuing a permit for any demolition, conversion, or change of use; and prior to taking any action that requires a finding of consistency with the General Plan, the City is required to find that the proposed project or legislation would be consistent with the Priority Policies.

MISSION BAY DESIGN GUIDELINES

Development that is part of the Mission Bay Plan area must adhere to the Mission Bay Design Guidelines. The Mission Bay shading standards focus on shadows between the hours of 10:00 a.m. and 4:00 p.m. from March 20 to September 22. The shading standards set a maximum

allowable percentage of park or open space area that may be shaded for more than 1 hour by a proposed building project within identified parks or open spaces. The established percentages for existing and proposed parks[20] that are applicable to the project site are:

- Mission Creek Park (including Mission Creek Park South [P1], Mission Creek Park Esplanade [NP1], Mission Creek Park [P3]), 13 percent
- Kids' Park (P6), 17 percent

ENVIRONMENTAL IMPACTS

This section describes the impact analysis for the proposed project related to shadow. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

The proposed project would be considered to have a significant impact on shadow if it would create new shadows in a manner that would substantially affect existing outdoor recreational facilities or other public areas.

METHODS FOR ANALYSIS

In order to determine whether new shading would be considered significant, both quantitative findings (how large the shadows would be and when they would occur) as well as qualitative elements (what activities occur in the open spaces and how the spaces are used) were evaluated.

QUANTITATIVE METHODOLOGY

To evaluate the shadow impact of the proposed project, a 3D virtual model of the project area was prepared.

The massing models considered the project site, the affected open spaces (based on their lot boundaries per City records),[21] the surrounding urban and natural environment, and cumulative development in the project vicinity. The Planning Department has determined that Section 295 analysis times, sfh shadow calculations, and the usage observation methodology would be adequate and appropriate for evaluating the shading impacts of the proposed project,

[20] The proposed Dog Run Park and Mission Bay Park (P19) are part of the Mission Bay Parks System. However, these parks have no stated restrictions or limitations with respect to shadow under the Mission Bay Design Guidelines.

[21] Note that for the purposes of this analysis, shadow on proposed open spaces is analyzed as if the open space were existing.

even though the affected open spaces are not subject to Section 295. The purpose of this analysis is to inform decision-makers of the potential significance of the proposed project's shadow on existing nearby public parks and publicly accessible open spaces, specifically, whether or not the project would create new shadow in a manner that would substantially affect existing outdoor recreation facilities or other public areas and, therefore, cause a significant shadow impact for purposes of the Planning Department's review of the project under CEQA.

The models were used to simulate and calculate both existing amounts of shading and the levels of shading that would be present with the addition of the proposed project, starting 1 hour after sunrise through 1 hour before sunset. Between these times, the model performed snapshot analyses at 15-minute intervals and repeated this process for every 7 days between the summer solstice and winter solstice. This half-year is referred to as a "solar year;" the data taken from the 27 sample dates throughout the course of the solar year are mirrored with extrapolated interim times and dates to arrive at the full-year shading calculation.

The proposed project would include expansion of the existing China Basin Park. The analysis compares the total square footage of available sunlight on the existing park to the total square footage of available sunlight under the proposed expanded China Basin Park.

In order to provide a visual understanding of the location, size, and extent of the new shading, graphics were prepared to accompany the quantitative analysis. The diagrams depict the entire project site and larger surrounding area.[22] The diagrams were prepared for the following dates: June 21 (the summer solstice, when the sun is at its highest point in the sky); December 21 (the winter solstice, when the sun is at its lowest point in the sky); and March 20/September 22 (the vernal/autumnal equinoxes, when day and night are of approximately equal length). For each of these dates, three times of day are shown: one hour after sunrise, noon, and one hour before sunset.

For existing, approved, or under-construction affected parks and open spaces within the Mission Bay Parks system, shading effects relative to the Mission Bay shadow design criteria[23] were also reviewed for informational purposes. Mission Bay park areas are, or will be when developed, under the jurisdiction of either the Port or the City and County of San Francisco and under Public Works as dedicated public right-of-way. With the exception of the existing China

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[22] The Shadow Study also includes focused shadow diagrams that depict each of the affected open spaces and their immediate surroundings. Focused shadow diagrams were prepared 1 hour after sunrise, 9:00 a.m., 10:00 a.m., noon, 3:00 p.m., 5:00 p.m., and 1 hour before sunset. All diagrams showing the proposed project's contribution included cumulative shadow conditions.

[23] Ref. *Design for Development for the Mission Bay North Project Area*, page 32, weblink: http://sfocii.org/sites/default/files/FileCenter/Documents/786-MBD4DN_s.pdf, and *Design for Development for the Mission Bay South Project Area*, page 36, weblink: http://sfocii.org/sites/default/files/Documents/Project%20Areas/MB/MBSD4D-2015-11-09.pdf.

Basin Park, which is proposed for modification, shading on open spaces created by the project (e.g., Mission Rock Square, Channel Lane and Channel Wharf) is discussed for informational purposes. The Planning Department does not consider project shading on open spaces and parks that are created by a project to be impacts under CEQA because such shading is not part of the existing physical environment.

QUALITATIVE METHODOLOGY

The shadow consultant conducted six 30-minute site visits to each of the affected open spaces to observe the existing pattern and intensity of use at the affected park or open space. Two site visits were performed in the morning, two at midday, and two late in the day, with one visit on a weekday and one on a weekend day. The discussion of qualitative impacts on the affected spaces is based on the nature of existing versus new shadow profiles and how new shadows might adversely affect observed existing patterns of use in the open space. These observations help evaluate the potential for impacts on existing uses resulting from new shading, including shadow characteristics (size, duration, and location of new shadows) and the value of sunlight (time of day and year new shadows would be present at parks/open spaces relative to patterns of use).

OTHER FACTORS AFFECTING SUNLIGHT

Although present in many parks and open spaces, shade contributed by trees and other landscape features is not taken into consideration as part of the quantitative analysis because such features are considered "impermanent" (i.e., they may be subject to change over time, through the seasons, or added or removed). However, at times, such features are a defining feature of the open space (or features within it) and may constitute a significant shadow presence that may capture some or all new shading created by the proposed development. In such cases, a discussion of the presence and nature of such features is included for informational purposes.

LAND USE ASSUMPTIONS

The Shadow Study considered both the High Commercial Assumption and the High Residential Assumption. Of the 12 parks and open spaces evaluated, including parks proposed under the project, shading impacts at nine existing parks and open spaces (all off-site open spaces) would be the same under both land use assumptions. Shading impacts at the three remaining parks and open spaces proposed by the project were evaluated separately because the two land use assumptions would result in different shading impacts.

TOPICS NOT EVALUATED IN DETAIL

As discussed above, the Shadow Study determined that no parks or open spaces that are under the jurisdiction of the Recreation and Park Commission would receive any new shading from either or both of the project land use assumptions. Therefore, under the proposed project,

Section 295 does not apply to any of the parks or open spaces, and no further analysis under Section 295 was conducted.[24] The Mission Bay Design Guidelines apply to parks in Mission Bay. Because the project is outside the Mission Bay area, the Mission Bay Design Guidelines do not apply to the project. Where shadow impacts on Mission Bay parks are reviewed, the Mission Bay Design Guidelines are discussed for informational purposes, but the shadow impact conclusions for the project are based on the quantitative and qualitative methodology described previously.

IMPACTS AND MITIGATION MEASURES

Impact WS-2. The proposed project would not create new shadow in a manner that would substantially affect outdoor recreation facilities or public areas. (Less than Significant)

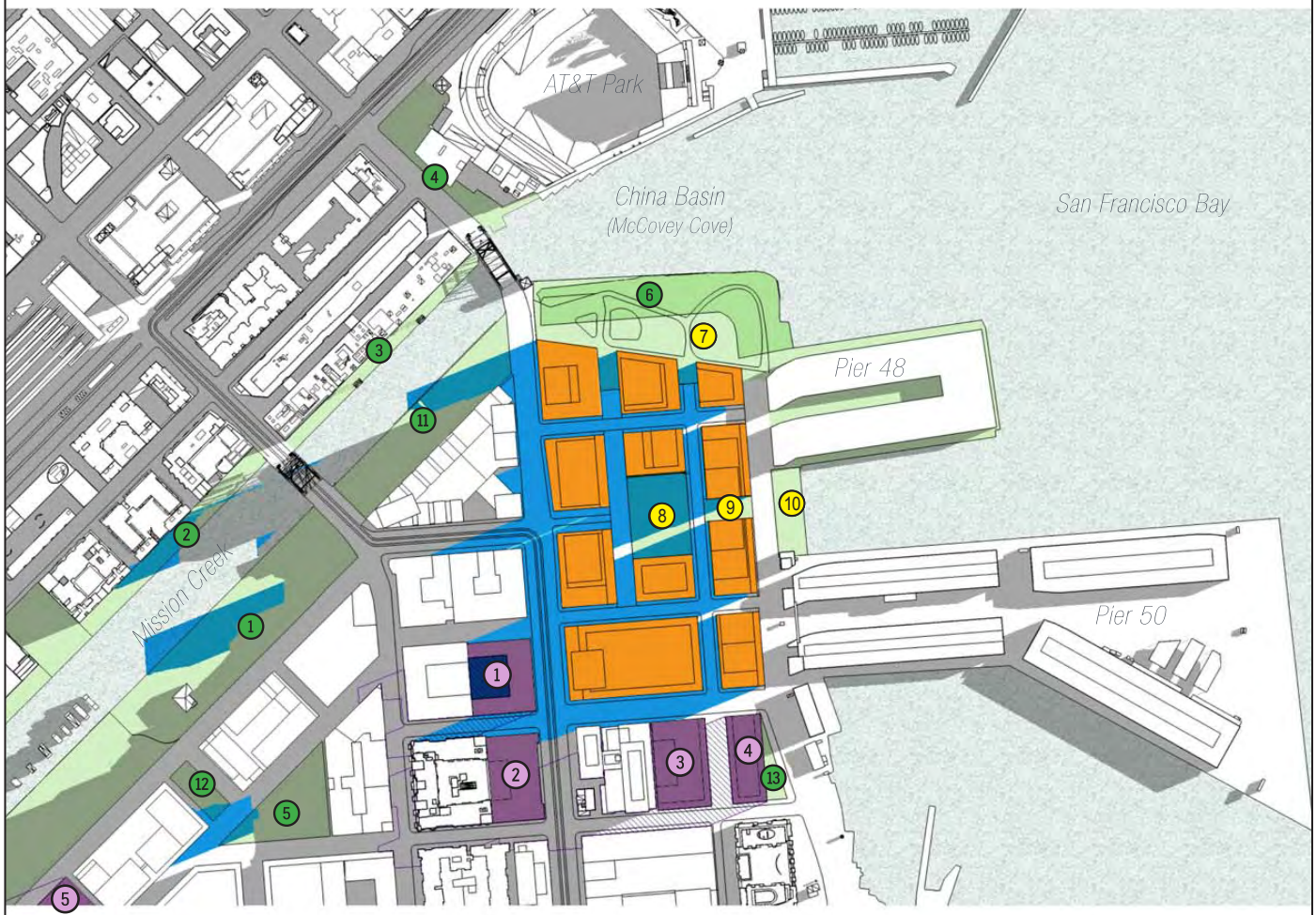
Existing shadow patterns and shadow patterns associated with the proposed project are shown in Figures 4.I-11 through 4.I-19 on the following pages. These figures provide representative snapshots of shadow patterns at the times of the day and seasons selected for the analysis. The figures illustrate the worst-case hours of day for the summer solstice, vernal/autumnal equinox, and winter solstice. The Shadow Study contains additional diagrams for various times of day for these particular times of year.

As described under Land Use Assumptions, the Shadow Study evaluated each park and open space under the High Commercial Assumption and the High Residential Assumption. The analysis concluded that project-generated shadow impacts on existing parks and open spaces would be the same under both land use assumptions, and project-generated shadow impacts on parks and open spaces proposed by the project would differ slightly between land use assumptions. Potential shadow impacts as a result of the proposed project on existing and proposed offsite public open spaces in the vicinity of the project site are described below.

EXISTING PUBLIC OPEN SPACES IN THE PROJECT VICINITY

MISSION CREEK PARK SOUTH. Under existing conditions, Mission Creek Park South currently receives approximately 98.8 million sfh of shadow per year, equal to being shaded approximately 14.1 percent of the year. The majority of existing shadow falls during the early morning and affects all portions of the park, with additional late-afternoon/evening shadows in the summer falling primarily along the edge of the park adjacent to Mission Creek. The proposed project would increase the amount of shadow that Mission Creek Park South receives by approximately 1.1 million sfh of shadow per year, equal to an increase of 0.2 percent over current shading conditions, from mid-February through the end of October (approximately 250 days a year).

[24] PreVision Design. 2016. *CEQA Evaluation of the Shadow Impacts of the Seawall 337/Mission Rock Project on Public Open Spaces in San Francisco, CA*. July 15.



Graphics ... 00336.13 (3-22-2017)

Source: Prevision Design, 2016.

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-11
Summer Solstice (June 21) Shadows

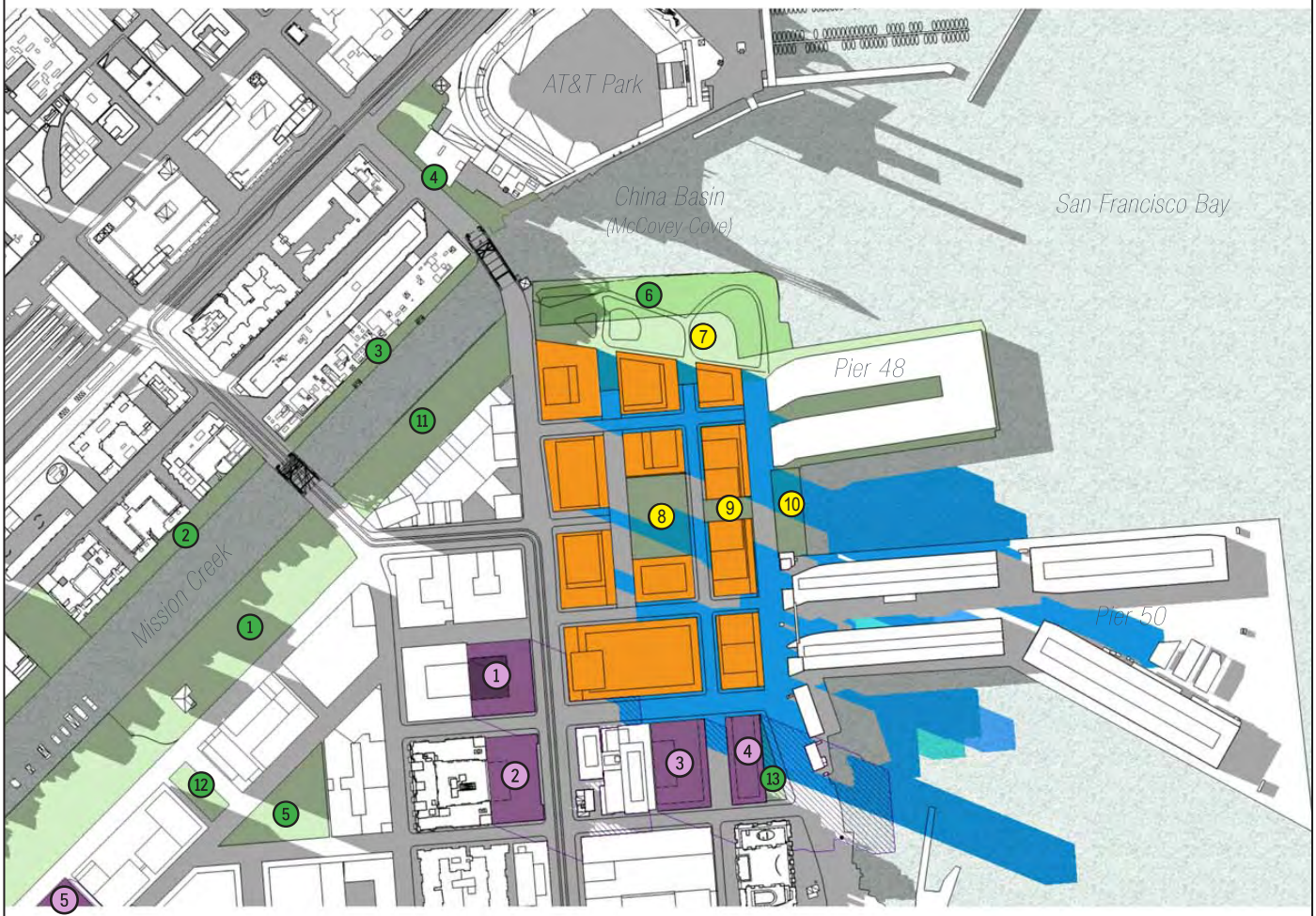


Source: Prevision Design, 2017.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-12
Summer Solstice (June 21) Shadows

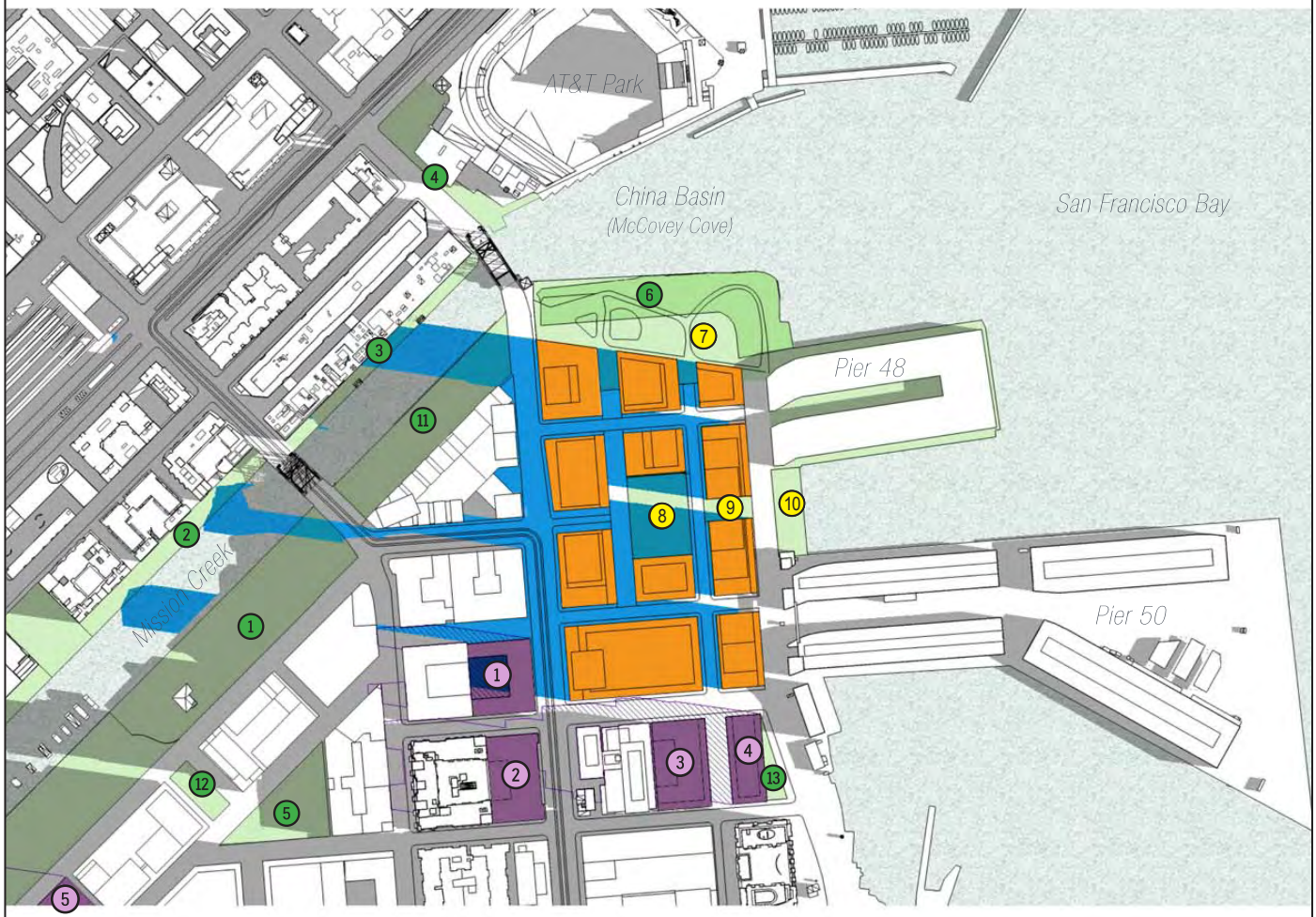


Source: Prevision Design, 2016.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-13
Summer Solstice (June 21) Shadows



Source: Prevision Design, 2016.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-14
Vernal/Autumnal Equinox (March 20/September 20) Shadows



Source: Prevision Design, 2017.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-15
Vernal/Autumnal Equinox (March 20/September 20) Shadows

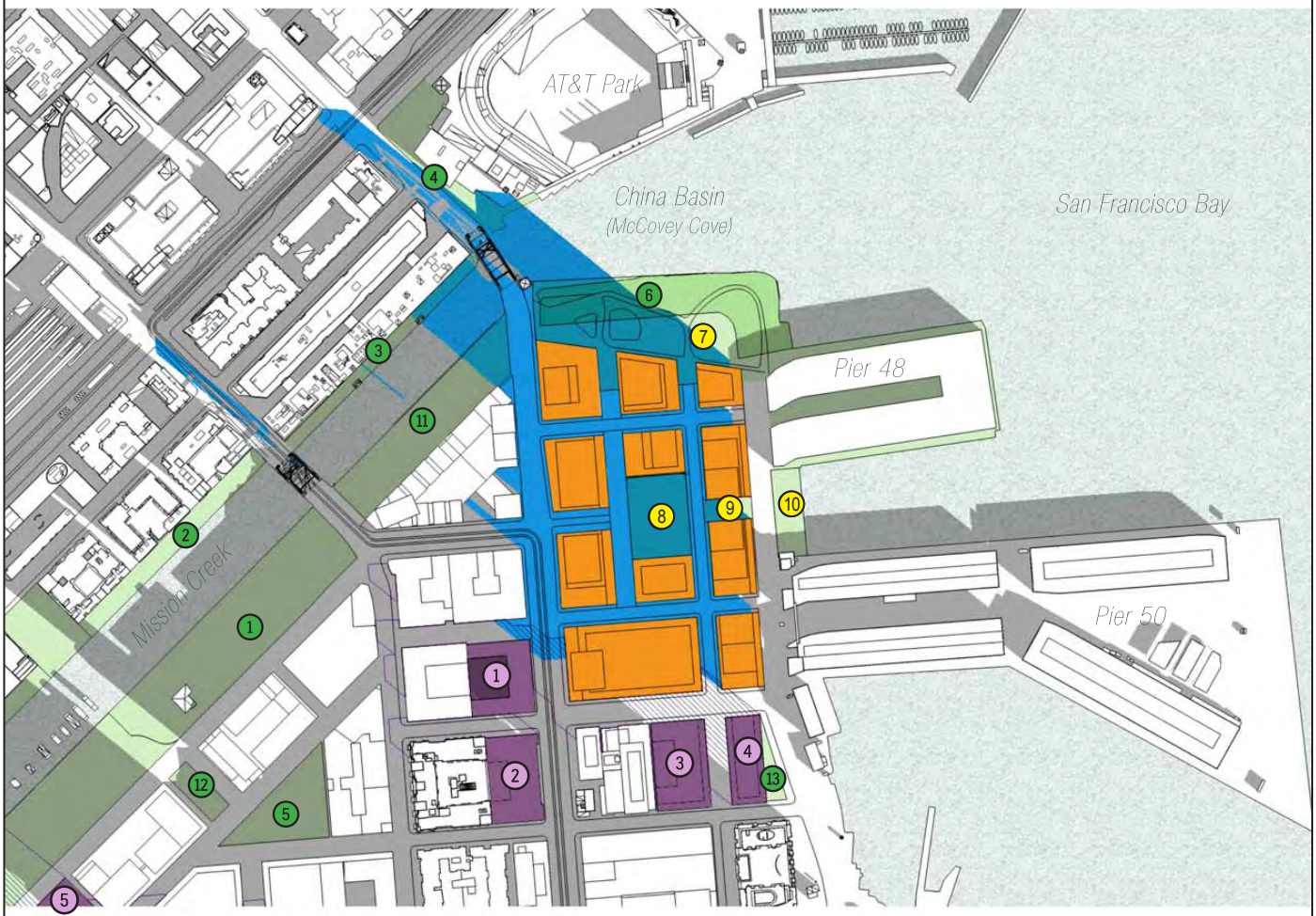


Source: Prevision Design, 2016.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-16
Vernal/Autumnal Equinox (March 20/September 20) Shadows



Source: Prevision Design, 2016.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-17
Winter Solstice (December 20) Shadows



N

WINTER SOLSTICE
DECEMBER 20

12:00 PM

LEGEND

- Project
- Existing Shadows
- Cumulative Project Shadows
- New Project Shadow
  Residential AND Commercial LUA
- Commercial LUA Shadow Only
- Residential LUA Shadow Only

(LUA = Land Use Assumption)

Open Spaces (number in yellow circle if part of Project)

1. Mission Creek Park South (P1)
2. Mission Creek Park Esplanade (NP1)
3. China Basin Park Promenade
4. AT&T Park Plaza (southern portion)
5. Kid's Park (P6)
6. China Basin Park (existing)
7. New China Basin Park *
8. Mission Rock Square*
9. Channel Lane*
10. Channel Wharf*
11. Mission Creek Park (P3)*
12. Dog Run (P5)*
13. Mission Bay Park (P19)*

* *under construction / proposed*

Cumulative Projects

1. Lot 3E
2. Lot 4E
3. Lot 9
4. Lot 9A
5. Lot 12W

Source: Prevision Design, 2017.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-18
Winter Solstice (December 20) Shadows



Graphics ... 00336.13 (3-22-2017)

Source: Prevision Design, 2016.

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.I-19
Winter Solstice (December 20) Shadows

Shading impacts would occur over a central area of the park close to Mission Creek and a northern portion near the Fourth Street entry in the early-morning hours for up to 45 minutes in the summer, from 6:45 to 7:30 a.m., and up to 25 minutes in the spring and fall, between 7:45 and 8:45 a.m. There would be no project-generated shadow in the winter.

Mission Creek Park South is part of the Mission Bay Parks system, which establishes the maximum amount of additional allowable shading (e.g., 13 percent for Mission Creek Park, which is the aggregate of parcels NP1, NP2, NP3, P1 (i.e., Mission Creek Park South), P2, P3, and P8) for parks in the Mission Bay Parks system between 10:00 a.m. and 4:00 p.m. from March 20 to September 22 under the Mission Bay Design Guidelines. Therefore, shading effects relative to the Mission Bay shadow design criteria are reviewed for informational purposes. Because the proposed project would result in new morning shadow on Mission Creek Park South only before 10:00 a.m., the proposed project would not increase the amount of shadow subject to the maximum under the Mission Bay Design Guidelines.

Use observations of Mission Creek Park South indicate that although a number of users were transitory, a large number remained in the park. The area of the park that would receive new shadow does not contain any of the park's fixed benches and is not particularly unique (similar features exist in other parts of the park). Moreover, new shadow from spring through the fall would occur at a time when the majority of the park area is already in shadow because of existing buildings. As such, the new shadow resulting from the proposed project would occupy the majority of the remaining unshaded area, which might be desirable for some users. Project shading would be short in duration and would be gone from the park no later than 7:30 a.m., a time when lower levels of use would be more likely.

MISSION CREEK PARK ESPLANADE. The proposed project would increase the amount of shadow that Mission Creek Park Esplanade would receive by 508,658 sfh of shadow per year, equal to an increase of 0.3 percent over current shading conditions, from mid-January through early December (approximately 340 days a year). Shading impacts would occur during the early-morning hours over the central and northern portions of the park in the summer and over the northern portions of the park in the spring and fall. Depending on the time of year, shadows from the proposed project would be cast 20 to 30 minutes between the hours of 6:45 and 8:30 a.m.

Mission Creek Park Esplanade is part of the Mission Bay Parks system, which establishes the maximum amount of additional allowable shading (e.g., 13 percent for Mission Creek Park, which is the aggregate of parcels NP1 [Mission Creek Park Esplanade], NP2, NP3, P1, P2, P3, and P8) for parks in the Mission Bay Parks system occurring between 10:00 a.m. and 4:00 p.m. from March 20 to September 22 under the Mission Bay Design Guidelines. Therefore, shading effects relative to the Mission Bay shadow design criteria are reviewed for informational purposes. Because the proposed project would not result in any new shading on Mission Creek Park Esplanade between 10:00 a.m. and 4:00 p.m. from March to September, the time period subject to shadow limits under the Mission Bay Design Guidelines, the proposed project would not increase the amount of shadow on Mission Creek Park Esplanade.

Use observations indicate somewhat lower levels of use in the morning, with about 90 percent of users passing through the esplanade rather than stopping and resting. Shade-sensitive features, such as two of the promenade's six fixed benches, would be in project-generated shadow for approximately 10 minutes, starting at 6:58 a.m. on the date of maximum shading (July 12), leaving two remaining sunny benches, which could affect the desirability of passive uses for some users for a short period of time during the summer months. At other times of year, one or no benches would be affected.

CHINA BASIN BUILDING PROMENADE. Under existing conditions, China Basin Building Promenade currently receives approximately 32.7 million sfh of shadow per year, equal to being shaded approximately 22.5 percent, of the year. Some existing shadow falls in the morning, but the park is shaded primarily during afternoon hours. The proposed project would increase the amount of shadow that China Basin Building Promenade would receive by approximately 3.4 million sfh of new shadow per year, equal to an increase of approximately 2.4 percent over current shading conditions, with new shadow being present in the morning hours over the central portions of the promenade throughout the year. Depending on the time of year, shadows from the proposed project would be cast for 1.75 to 2.75 hours between the hours of 7:15 and 10:45 a.m. Because this park is not part of the Mission Bay Parks system, it is not subject to the Mission Bay Design Guidelines.

Observations indicate that the majority of promenade usage is transitory; therefore, the promenade would be less likely to be affected by shading compared with other uses. Although some stationary users were observed in the morning hours, more were seen around the lunch hour. At that time, there would be no shading impacts from the proposed project.

AT&T PARK PLAZA. Under existing conditions, AT&T Park Plaza currently receives approximately 59.7 million sfh of shadow per year, equal to being shaded approximately 27.7 percent of the year. Existing shadow falls primarily during morning and evening hours year-round. The proposed project would increase the amount of shadow that AT&T Park Plaza would receive by approximately 873,823 sfh of shadow per year, equal to an increase of 0.4 percent over current shading conditions, from early November through early February (approximately 100 days a year). In the winter, shading would occur along the western edge of Willie Mays Plaza and throughout Lefty O'Doul Plaza and a portion of the Waterfront Promenade for 1 to 3 hours, from approximately 7:45 to 11:15 a.m. There would be no project-generated shadow from spring through fall. Because this park is not part of the Mission Bay Parks system, it is not subject to the Mission Bay Design Guidelines.

Usage of AT&T Park Plaza varies greatly. Large-scale events such as baseball games in the spring, summer, and fall, as well as additional year-round events, increase usage of AT&T Park. Because the proposed project would not generate new shadows during the baseball season, impacts on a great number of users would be diminished. However, the plaza is part of the San Francisco Bay Trail, which is a well-used pedestrian thoroughfare that operates at all times of

year, including during the winter months when the proposed project would shade a portion of the plaza in the morning. The plaza itself is a transitional space; therefore, users would be unlikely to be substantially affected. However, the fixed bench in the southern corner of the plaza would receive new shadow for up to approximately 90 minutes, which could affect its desirability for some users.

KIDS' PARK. Under existing conditions, Kids' Park currently receives approximately 54.2 million sfh of shadow per year, equal to being shaded approximately 27.8 percent of the year. Existing shadow falls throughout the day, with the exception of midday during summer and fall. Under either land use assumption, Kids' Park would receive an additional 38,383 sfh of shadow per year, equal to an increase of 0.02 percent over current shading conditions, from mid-May through late July (approximately 70 days a year). In the summer, new shadows would be cast over the southwestern portion of the park during the first 30 minutes of the morning hours, starting around 6:45 a.m., from late May through mid-July, thereby affecting the picnic area as well as a grassy area. There would be no new shading impacts in fall, spring, or winter.

Kids' Park is part of the Mission Bay Parks system. Therefore, shading effects relative to the Mission Bay shadow design criteria are reviewed for informational purposes. However, the proposed project would not result in any new shading between 10:00 a.m. and 4:00 p.m. from March 20 to September 22, the time period subject to shadow limits under the Mission Bay Design Guidelines. Shading would occur in the early morning and be gone prior to 10:00 a.m. Therefore, the proposed project would not increase the amount of shadow on Kids' Park subject to the maximum under the Mission Bay Design Guidelines.

Project shadows would occur for a short period of time during summer months in an area that contains seating and eating areas; portions of a grassy area could also be affected. Although these features could be considered sensitive to additional shadow, project-generated shadow would occur for only a short period of time during the early morning, when active use of these features may be low.

OTHER EXISTING OUTDOOR RECREATION FACILITIES

MISSION CREEK

Mission Creek is host to a number of user activities, including boating, canoeing, and paddle boarding. Although shadows cast on these areas could affect the aforementioned activities, the majority of these activities are transitory in nature. Therefore, most users would not remain in one specific area for an extended period of time and would be able to leave the areas shaded by the project. Between March and October, for up to approximately 4 hours after sunrise, the proposed project would cast shadows toward the west. These shadows would fall on Mission Creek. On or around the summer solstice, these shadows would fall on a section of Mission Creek south of the Fourth Street Bridge, between Mission Creek Park Esplanade and Mission Creek Park, but shadows would not extend as far southward as the mooring locations for a

row of permanent houseboat residences. On dates leading up to, or away from, the summer solstice, the shadows would progressively move northward, affecting the section of Mission Creek between the Third and Fourth Street Bridges until approximately October 15 and March 1.

SAN FRANCISCO BAY

Similar to Mission Creek, the San Francisco Bay is host to user activities including boating, canoeing, and paddle boarding. In addition, a boat launch serves as an origin point for certain Bay tours. Water areas affected in the afternoon include eastern portions of the San Francisco Bay to the east. On or around the summer solstice, new shadows would be southward past Pier 50, and on the winter solstice the northward extent of new shadows on the bay would reach the mouth of the South Beach Harbor Marina, but not shade the AT&T Park ferry terminal. Although shadows cast on these areas could affect the aforementioned activities, the majority of these activities are transitory in nature. Therefore, most users would not remain in one specific area for an extended period of time and would be able to leave the areas shaded by the project. A possible exception would be those users who gather in kayaks and other small watercraft during San Francisco Giants baseball games at AT&T Park (April through October); however, throughout the baseball season (when AT&T Park has the greatest number of regular visitors), the proposed project would not shade any portion of China Basin waterfront.

SIDEWALKS

Sidewalks in the project vicinity are already shadowed in the morning and afternoon by densely developed, multi-story buildings. Although implementation of the proposed project would add net new shadow to the streets and sidewalks in the project vicinity, these shadows would be transitory in nature, would not substantially affect the use of the streets and sidewalks, and would not increase shadows above levels that are common and generally expected in a densely developed urban environment. The proposed project would not create a significant shadow impact on streets and sidewalks in the project vicinity. This impact would be ***less than significant***.

FUTURE PUBLIC OPEN SPACES IN THE PROJECT VICINITY (TREATED AS EXISTING FOR PURPOSES OF THIS ANALYSIS)

As discussed above, three future open spaces (Mission Creek Park [P3], Dog Run Park, and Mission Bay Park [P19]) have been approved or are under construction. For the purposes of analyzing the proposed project's shadow impacts, these three future open spaces are being treated as existing open spaces.

MISSION CREEK PARK (P3). The area where Mission Creek Park (P3) would be located currently receives approximately 117.0 million sfh of shadow per year, equal to being shaded 30.5 percent of the year. Existing shadow in the area falls during morning through mid-afternoon hours year-around. In addition, existing shadow occurs for up to 1 hour in the afternoon/evening from

late spring though early fall. The proposed project would result in new shadows at Mission Creek Park (P3) 365 days per year. Under either land use assumption, Mission Creek Park (P3) would receive an additional 17.5 million sfh of new shadow per year, equal to an increase of approximately 4.6 percent over current shading conditions. In the summer, new shadows would occur over a portion of the central/northern area of the park during morning hours, lasting for up to 5 hours, from approximately 6:45 to 11:45 a.m. Similar shadows would occur during the fall and spring months, except that they would last for up to 4 hours, from approximately 7:45 to 11:45 a.m. In the winter, new shadows would be cast over the northern quarter of the park during morning hours, lasting for up to 3 hours, from approximately 7:30 to 10:30 a.m.

Mission Creek Park (P3) would be part of the Mission Bay Parks system, which, under the Mission Bay Design Guidelines, establishes the maximum amount of additional park area (e.g., 13 percent for Mission Creek Park, which is the aggregate of parcels NP1, NP2, NP3, P1, P2, P3 [Mission Creek Park {P3}], and P8) that can be shaded continuously for 1 hour or longer between 10 a.m. and 4 p.m. from March 20 to September 22. Therefore, shading effects relative to the Mission Bay shadow design criteria are reviewed for informational purposes. The project would result in new shading that would be present at 10:00 a.m. throughout the year and leave the park between 10:30 and 11:45 a.m. However, the areas of the park that would be shaded continuously for 1 hour or longer between March 20 and September 22 would represent less than 13 percent of total park area. As such, proposed project shading would not increase the amount of shadow on Mission Creek Park (P3) subject to the maximum under the Mission Bay Design Guidelines.

Given that Mission Creek Park (P3) would feature wide pedestrian pathways and serve as a connector between Third and Fourth Streets, it is likely that a large portion of users of this open space would be transitory and therefore less likely to be adversely affected by project shading, when present. With respect to nontransitory uses, the northern portion of the park that would be affected by project shading would contain approximately four fixed benches/seating areas (i.e., tables in a "picnic grove" as well as a designated seating area for "cafe seating").[25] It is likely that use of these spaces would be lower during the early-morning hours, the time when the project's shadow area is largest; however, some shading on the cafe seating area as well as one of the fixed benches on the northern end of the park would be present until later in the morning (until around 11:30 a.m.), at which time these areas may be more active. The tables in the picnic grove would be located under proposed trees, which would reduce the expectation of users for sunlight.

[25] OCII Commission. Schematic Design, March 19, 2013.

DOG RUN PARK. The area where Dog Run Park would be located receives approximately 24.5 million sfh of shadow per year, equal to being shaded 45.6 percent of the year. Existing shadow falls throughout the day, with the exception of midday during summer and fall. Under either land use assumption, Dog Run Park would receive an additional 49,947 sfh of new shadow per year, equal to an increase of 0.1 percent over current shading conditions, from mid-May through early August (approximately 80 days a year). During these summer months, new shadows would be cast over the southern portion of the park during the first 25 minutes of the morning hours, starting around 6:45 a.m., from mid-May through early August. There would be no new shadow during fall, spring, or winter. Dog Run Park is part of the Mission Bay Parks system. However, Dog Run Park has no stated restrictions or limitations with respect to shadow under the Mission Bay Design Guidelines. Therefore, the proposed project would not result in an exceedance of maximum shadow limits at Dog Run Park under the Mission Bay Design Guidelines.

Located southwest of the proposed project, Dog Run Park would receive no project-generated shadow at any time from the mid-morning on; project buildings would cast shadow on this open space only in the early morning hours. For a large portion of users, Dog Run Park would be a specific destination where they would remain with or near their pets. If the final design of Dog Run Park were to feature seating areas in the southwestern corner of the park, along the Long Bridge Street frontage, users would most likely be affected by early-morning shadows from the project during summer months; however, that shading would recede and leave the park over the span of 20 minutes or less and therefore would not displace any users who had chosen a sunny location.

MISSION BAY PARK (P19). The area where Mission Bay Park (P19) would be located currently receives approximately 2.1 million sfh of shading per year, equal to being shaded 6.5 percent of the year. Under either land use assumption, Mission Bay Park (P19) would receive an additional 139,994 sfh of shadow per year, equal to an increase of 0.4 percent over current shading conditions, from mid-April through late August (approximately 140 days a year). In the summer, new shadows would be cast over the northern two-thirds of the park in the later afternoon/evening, starting between 6:15 and 6:45 p.m. Other than a few afternoons in late spring, no project-generated shadow impacts would occur during the fall, spring, or winter months. Mission Bay Park (P19) is part of the Mission Bay Parks system. However, no shadow limit applies to this park under the Mission Bay Design Guidelines. Therefore, the proposed project would not result in any exceedance of maximum shadow limits at Mission Bay Park (P19) under the Mission Bay Design Guidelines.

Mission Bay Park (P19) would receive project-generated shadow only during late afternoons and evenings in the summer. Little specific information is available regarding the basic programming at this time. Only a conceptual discussion of possible qualitative shading effects is appropriate. However, it is likely that many of users of this open space would be transitory in nature. If features such as fixed seating were implemented on the northern side of the space, it is possible that users could be affected by project-generated shadows.

CONCLUSION OF SHADOW IMPACTS ON EXISTING AND PROPOSED OFFSITE PARKS

As described above, the proposed project would generate a new net shadow on each of the open spaces analyzed. The annual increase in new shadow on existing and proposed offsite parks and open spaces would range from 0.02 percent (Kids' Park) to 4.6 percent (Mission Creek Park South) throughout the year, with the number of days of increased shadow ranging from approximately 70 to 365 days a year.

With regard to qualitative shadow impacts, park and open space users in Mission Creek Park South (P1), China Basin Building Promenade, AT&T Park Plaza, Mission Creek Park (P3), and Mission Bay Park (P19) were found to be primarily transitory in nature and therefore less likely to be adversely affected by project shading. In parks and open spaces, including Mission Creek Park Esplanade, AT&T Plaza, Kids' Park, and Dog Run Park, shade-sensitive or fixed features such as benches would be shaded. However, shading would be short in duration.

Because project shading would be present from the time that the new offsite open spaces are created, users of these new open spaces would not experience such shading as additive to a baseline condition. Although it is possible that users of existing open spaces could be affected by the presence of new shadow, the likelihood that the project would create new shadow in a manner that would substantially affect existing outdoor recreation facilities or other public areas would appear to be low. In general, the new net shadow cast would represent a very small increase in shadows cast. Therefore, the new net shadow would not adversely affect the use of Mission Creek Park South, Mission Creek Park Esplanade, China Basin Building Promenade, AT&T Park Plaza, Kids' Park, Mission Creek Park (P3), Dog Run Park, or Mission Bay Park (P19). This impact is considered ***less than significant***.

FUTURE PUBLIC OPEN SPACES ON THE PROJECT SITE

As discussed above, one existing open space (China Basin Park) would be expanded as part of the proposed project, and three new open spaces (Mission Rock Square, Channel Lane, and Channel Wharf) would be created as part of the proposed project. Out of these four open spaces, China Basin Park, is the only open space included in the impact assessment because it is an existing open space.

CHINA BASIN PARK (EXPANDED). Under existing conditions, the existing China Basin Park receives approximately 6 million sfh of shadow per year, equal to being shaded approximately 1.44 percent of the year. The limited amount of existing shadow falls during late afternoon/early evening hours from mid-spring through summer and into mid-fall, occurring on the western third of the park. Early morning shadows are present during spring and fall on the southeastern side of the park near Pier 48, and the duration of both morning and afternoon shading is longest during the winter when morning shading covers a portion of the southeastern corner; after an hour of midday full sun, shadows move from west to east across the western 2/3 of the park.

Under existing conditions, the area where the proposed expanded China Basin Park would be located currently receives approximately 20.9 million sfh of shadow per year, equal to being shaded approximately 2.7 percent of the year. Existing shadow falls primarily during morning and evening hours year-round, with some midday shadow during the winter months. The proposed publicly accessible apron of Pier 48 currently receives 85.4 million sfh, or 13.4 percent, of shadow per year. As discussed above, China Basin Park is an existing park at the project site. The proposed expansion to 4.4 acres (an addition of 2.2 acres) would include the existing east–west portion of Terry A. Francois Boulevard. Upon completion, the expanded China Basin Park would be bounded by China Basin to the north, the San Francisco Bay to the east, Pier 48 to the southeast, proposed Blocks A, G, and K to the south, and Third Street/Lefty O'Doul Bridge to the northwest. The expanded China Basin Park would include open space (a lawn), a special-event/assembly area for about 5,000 people, waterfront café and kiosks, play areas, Little League baseball field, picnic area, and promenade.

The proposed project buildings would contribute to new shadow 365 days per year. Under the High Commercial Assumption, the expanded China Basin Park would receive an additional 224 million sfh of shadow per year, which is equal to an increase of 28.4 percent compared with existing conditions. In addition, the Pier 48 apron would receive an additional 6.3 million sfh of shadow per year, equal to being shaded approximately 1.0 percent of the year, under the High Commercial Assumption. Under the High Residential Assumption, the expanded China Basin Park would receive an additional 223.7 million sfh of shadow per year, or an increase of approximately 28.4 percent compared with existing conditions. The Pier 48 apron would receive an additional 6.8 million sfh of shadow per year, equal to being shaded approximately 1.1 percent of the year, under the High Residential Assumption.

Although the proposed expanded China Basin Park would receive an approximately 28 percent increase in shadow from the project than the area where the proposed expanded China Basin Park would be located, or than the existing China Basin Park receives, the expanded China Basin Park would also receive more sfh of theoretically available sunlight than the existing China Basin Park, because of the increased size of the expanded park relative to the existing park. The existing China Basin Park currently has 411.8 million sfh of theoretically available sun annually; the proposed expanded China Basin Park would have 767.6 million sfh of theoretically available sun annually. This represents an annual increase in total theoretically available sunny open space of 180 percent over existing conditions.

In the summer, new project-generated shadows would be present throughout the day but smaller relative to other times of year, and would be cast over the southern edge of the park throughout the day, affecting primarily the park promenade, and southern portions of the play areas and the Great Lawn (all of which are proposed features of the expanded China Basin Park). In the fall and spring months, new shadows would be cast throughout the day but farther northward than in summer months, shading the southern half of the park in September and

April and as much as the full park in October and March. Affected areas would be similar to those affected during summer months, with late-fall/early-spring impacts extending to the Waterfront Promenade and Rain Gardens. Most park features would receive some shadow at some point during the day. During the winter months, new shadows would be cast over the majority of the park and beyond to China Basin, sweeping from west to east from morning through evening. All park features would receive winter shadow from the proposed project at some point during the day.

Throughout the year, the park areas that would be most affected by daily project shading would be along the southern edge of the park. These areas immediately adjacent to the northernmost proposed buildings would be in shadow for most of the day, from fall through spring; however, planned uses in these areas are expected to be primarily transitory in nature (i.e., the park promenade) and, as such, would most likely be less affected by the presence of shadow. Use observations of the existing China Basin Park indicate that current park usage is predominately transitory; however, features such as Junior Giants Field were observed to have a slightly higher level of use than other existing park features (such as the promenade), and given the additional size and amenities that are planned for the enlarged park overall, it is reasonable to assume that a higher number of users may treat the renovated/expanded park as a destination. In addition to Junior Giants Field, other areas potentially more sensitive to new shadow, such as the central play areas and the Great Lawn, would receive more shadow during the fall, winter, and spring, particularly from afternoon through early evening, which could affect their nontransitory users.

CONCLUSION OF SHADOW IMPACTS ON CHINA BASIN PARK

As discussed above, China Basin Park would be expanded as part of the proposed project. Although the expanded China Basin Park would receive around 28 percent more shadow from the proposed project compared with the amount the existing China Basin Park receives under existing conditions, it would also receive a higher total sfh of theoretically available sunlight because of the increased size of the expanded park relative to the existing park. This represents an annual increase in total theoretically available sunny open space of 180 percent. Shading impacts would occur year-round, with the most affected area along the southern edge of the park. However, planned uses in this area of the expanded park are expected to be primarily transitory in nature. Because project shading would be present from the time that the expanded portion of China Basin Park is created, users of this new portion of open space would not experience such shading as additive to a baseline condition. Although it is possible that users of existing open spaces could be affected by the presence of new shadow, the likelihood that the project would create new shadow in a manner that would substantially affect existing outdoor recreation facilities or other public areas would appear to be low. In general, the new net shadow cast would be more than offset by the increase in the total amount of sunlight available at the park due to the increase in the size of the park. Therefore, the new net shadow would not adversely affect the use of China Basin Park (expanded). This impact is considered ***less than significant***.

Because the following open spaces would be developed as part of the proposed project, this discussion is presented for informational purposes only.

MISSION ROCK SQUARE. The proposed 1.1-acre Mission Rock Square would be located in the center of Seawall Lot 337. Mission Rock Square would be framed by a mix of residential and commercial uses above active/retail and production uses on the lower floors. Mission Rock Square would include a multi-use lawn, plaza, café pavilion, and special-event/assembly area for approximately 2,000 people.

Under project conditions, portions of Mission Rock Square would be shaded 365 days per year (refer to Figures 4.I-11 through 4.I-19). Under the High Commercial Assumption, Mission Rock Square would receive 95 million sfh of shadow per year. Under the High Residential Assumption, Mission Rock Square would receive 96.3 million sfh of shadow per year.

The project design optimizes sunlight on proposed open spaces during the active hours of the day – particularly on the northern portion of Mission Rock Square. From spring through fall, the proposed project would result in early-morning shadows that would cover the majority of Mission Rock Square; however, they would recede by mid-morning. In the early afternoon, shadows would be present in the southern portion of Mission Rock Square; shading would encroach from the west in the afternoon until the entire square would be in shadow by the later afternoon/early evening. During fall and spring, the midday shadow area south of the square would be larger than in the summer, and a band of sunlight running west–east would be present in the late afternoon. In the winter, early-morning shadows would cover all of the square but would recede by noon to cover only the southern one-half to two-thirds of the square. Shading would encroach from the west in the afternoon until the entire square would be in shadow by mid-afternoon. The central event space (particularly the northern half) and the northern boardwalk/seating area would be the areas of the park that would enjoy the greatest amount of sunshine during midday hours throughout the year, while the southern boardwalk/seating area would be more frequently cast in shadow. Early-morning park users would encounter more shadow on the eastern half of the park, whereas afternoon users would find shadows growing in size from the west. Given the park's location among proposed tall structures, significant shading is inevitable, and coupled with the fact that Mission Rock Square would be created at the same time as the surrounding structures that would cast shadow on it, it is unlikely that users would expect greater access to sunlight at this location.

CHANNEL LANE. Channel Lane would be part of the proposed Seawall 337 project and an approximately 0.2-acre pedestrian walkway, linking Mission Rock Square to Channel Wharf and the Bay. It would be located north of Block I and south of Block J, running east–west between the proposed Bridgeview Street and Terry A. Francois Boulevard on the Seawall Lot 337 site. Gathering spaces would be provided on either side of a ramp that would serve as an egress/ingress point for the Mission Rock Square parking garage. Site features could include overhead lighting, special paving, and shade-tolerant plants and trees. The proposed project

would result in shadow on portions of Channel Lane 365 days per year. Under the High Commercial Assumption, Channel Lane would receive 19.8 million sfh of shadow per year. Under the High Residential Assumption, Channel Lane would receive 20.3 million sfh of shadow per year.

In the summer months, morning shadows would fall on the northern side of Channel Lane, with the least amount of shading occurring around noon. Shadows would increase in the afternoon, affecting all areas of Channel Lane by late afternoon or evening. During the fall and spring, morning shadows would fall on the southern side of Channel Lane and move east. By noon, shadows would encompass the majority of the area. By afternoon or evening, sunlight would be present along the northwestern corner and the northern edge of Channel Lane. In the winter, morning shadows would fall on the southern side of Channel Lane, covering all but the northeast corner of Channel Lane. By the afternoon, shadows would cover most to all of Channel Lane.

Despite its proposed location immediately adjacent to two tall structures to the north and west, Channel Lane would have an open vista on the Bay to the east, which would provide morning sunlight, particularly on the eastern side of Channel Lane, as well as some afternoon sunlight, particularly during the fall and spring, through a gap in project buildings to the west. During summer months, midday sun would also be present over the majority of the space. Aside from its likely use as a transitional space between Mission Rock Square and the waterfront, Channel Lane would have a variety of seating areas, both fixed and open. This variety would allow park visitors to locate to a sunnier area if desired. As with Mission Rock Square, Channel Lane would be created at the same time as the surrounding structures that would cast shadow on it; therefore, it is unlikely that Channel Lane users would expect greater access to sunlight at this location.

CHANNEL WHARF. A new open space at Channel Wharf would be constructed in the location of the current marginal wharf between Piers 48 and 50, east of Terry A. Francois Boulevard. Channel Wharf would be a 0.5-acre paved plaza with public art, seating, and a drop-off area leading to the recreational uses at the project site. It is intended to provide public access to the Bay front and function as a maritime access point for industrial activities on Piers 48 and 50. The proposed project would result in shadow on portions of Channel Wharf 365 days per year. Under the High Commercial Assumption, Channel Wharf would receive 20.8 million sfh of shadow per year. Under the High Residential Assumption, Channel Wharf would receive 21.1 million sfh of shadow per year.

In the summer, new shadows would be cast over the entirety of Channel Wharf in the late afternoon, starting between 3:45 and 4:30 p.m., with shadows from the High Residential Assumption arriving up to 30 minutes earlier than shadows cast by the High Commercial Assumption. From fall through the spring, new shadows would be cast over the entirety of Channel Wharf from the afternoon, starting around 1:30 p.m., through the end of the day, with

shadows from the High Residential Assumption arriving up to 15 minutes earlier than shadows cast by the High Commercial Assumption. In the winter, new shadows would be cast over the entirety of the park in the late afternoon, starting between 1:30 and 3:30 p.m. and growing through the end of the day, with shadows from the High Residential Assumption arriving up to 15 minutes earlier than shadows cast by the High Commercial Assumption.

Located to the east of the proposed Seawall 337 development (between Piers 48 and 50), Channel Wharf would receive no project-generated shadow at any time from the morning through early afternoon throughout the year; project buildings would cast shadow on this open space in late afternoon. Similar to Channel Lane, a large portion of users of this open space would be transitory in nature. However, the fixed seating areas would also draw visitors who would remain for some time. Users may not find the space as attractive as a destination in the afternoon when the wharf is in shade; however, as is the case with the other open spaces proposed by the project, Channel Wharf would be created at the same time as the surrounding structures that would cast shadow on it; therefore, it is unlikely that Channel Wharf users would expect greater access to sunlight at this location.

CONCLUSION OF SHADOW IMPACTS ON PROPOSED ONSITE OPEN SPACES

The Planning Department does not consider project-related shading on the proposed open spaces in the impact analysis of shadow. As such, the discussion provided is for informational purposes only. No impact conclusion is required for Mission Rock Square, Channel Lane, or Channel Wharf. Given the proposed locations of Mission Rock Square, Channel Lane, and Channel Wharf among and near tall structures, substantial shading on these open spaces would be inevitable. Coupled with the fact that these areas would be created at the same time as the surrounding structures that would cast shadow on them, it is unlikely that users would expect greater access to sunlight.

CUMULATIVE IMPACTS

The geographic context for the analysis of cumulative impacts associated with shadow considers the Mission Bay area surrounding the project site. Specifically, the cumulative shadow study considers future buildout of Mission Bay Block Lots 3E, 4E, 9, and 9A. In addition to these blocks, the Shadow Study also considers buildout of Mission Bay Block 12W. The projects considered in this analysis are listed in Table 4-1 of Chapter 4, *Environmental Setting and Impacts.*

Impact C-WS-2: The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not create new shadow in a manner that would substantially affect outdoor recreational facilities or public areas. (Less than Significant)

Mission Bay Park (P19) is the only open space in the project vicinity that would be affected by shadow cast by cumulative projects, specifically from development on Lot 9A, which is immediately adjacent to the park and to the west. Throughout the year, cumulative shading would occur on Mission Bay Park (P19), starting at midday, continuing throughout the afternoon, and expanding eastward as the day progresses. During summer months, all of Mission Bay Park (P19) would be in cumulative shadow by around 5:00 p.m. From fall through the spring, the northern three-quarters of Mission Bay Park (P19) would be shaded by the early afternoon, with the whole park being cast in shadow by around 6:00 p.m. At times when project shadows would be present, cumulative shadow would also be present, covering all locations where project shadows would fall. Therefore, when the cumulative projects are built as planned, there would be no net new shadow from the project on Mission Bay Park (P19) due to overlapping shadow cast by cumulative projects. The proposed project would not combine with past, present, and reasonably foreseeable future projects in the project vicinity to create a significant cumulative shadow impact on Mission Bay Park. This impact (P19), would be ***less than significant***.

Sidewalks in the project vicinity are already shadowed in the morning and afternoon by densely developed, multi-story buildings. Although implementation of the proposed project and nearby cumulative development projects would add net new shadow to the streets and sidewalks in the project vicinity, these shadows would be transitory in nature, would not substantially affect the use of the streets and sidewalks, and would not increase shadows above levels that are common and generally expected in a densely developed urban environment. The proposed project would not combine with past, present, and reasonably foreseeable future projects in the project vicinity to create a significant cumulative shadow impact on streets and sidewalks in the project vicinity. This impact would be ***less than significant***.

4.J PUBLIC SERVICES AND RECREATION

This section describes the regulatory and environmental setting for public services and recreation, including fire protection, police protection, schools, parks and recreation, libraries, and other public services in the city and county of San Francisco that serve the project site, and estimates changes in demand on these services that would result from the Seawall Lot 337 and Pier 48 Mixed-Use Project (Mission Rock Project or proposed project). The analysis is based on survey responses from representatives at the San Francisco Fire Department (SFFD), San Francisco Police Department (SFPD), San Francisco Unified School District (SFUSD), San Francisco Recreation and Parks Department (RPD), and San Francisco Public Library (SFPL). In addition, relevant data and policies of the Recreation and Open Space and Community Facilities Elements of the City and County of San Francisco General Plan (General Plan), and various documents published by the aforementioned agencies, are considered in this analysis.

The purpose of this section is to determine the potential for increased demand on public and recreational services as a result of the proposed project, which could require the expansion of existing facilities or construction of new facilities and trigger physical environmental effects beyond those that would directly result from the project, as examined in other sections of this Draft EIR (e.g., Sections 4.E, *Transportation and Circulation*; 4.F, *Noise*; 4.G, *Air Quality*; 4.K, *Utilities and Service Systems;* and 4.I, *Wind and Shadow,* and Chapter 5, *Other CEQA Issues*).

Issues identified in response to the notice of preparation (NOP) (Appendix 1) were considered in preparing this analysis. The City and County of San Francisco (City) received two NOP comments related to public services and recreation. One NOP comment expressed concern over a loss of green space and requested that public lands be preserved for public and recreational use. The other NOP comment requested that the Draft EIR for the proposed project discuss impacts on schools.

Information regarding the residential and employment growth in the project area that would be induced by the different development scenarios contemplated under each land use assumption is provided in the Land Use Assumptions subsection.

ENVIRONMENTAL SETTING

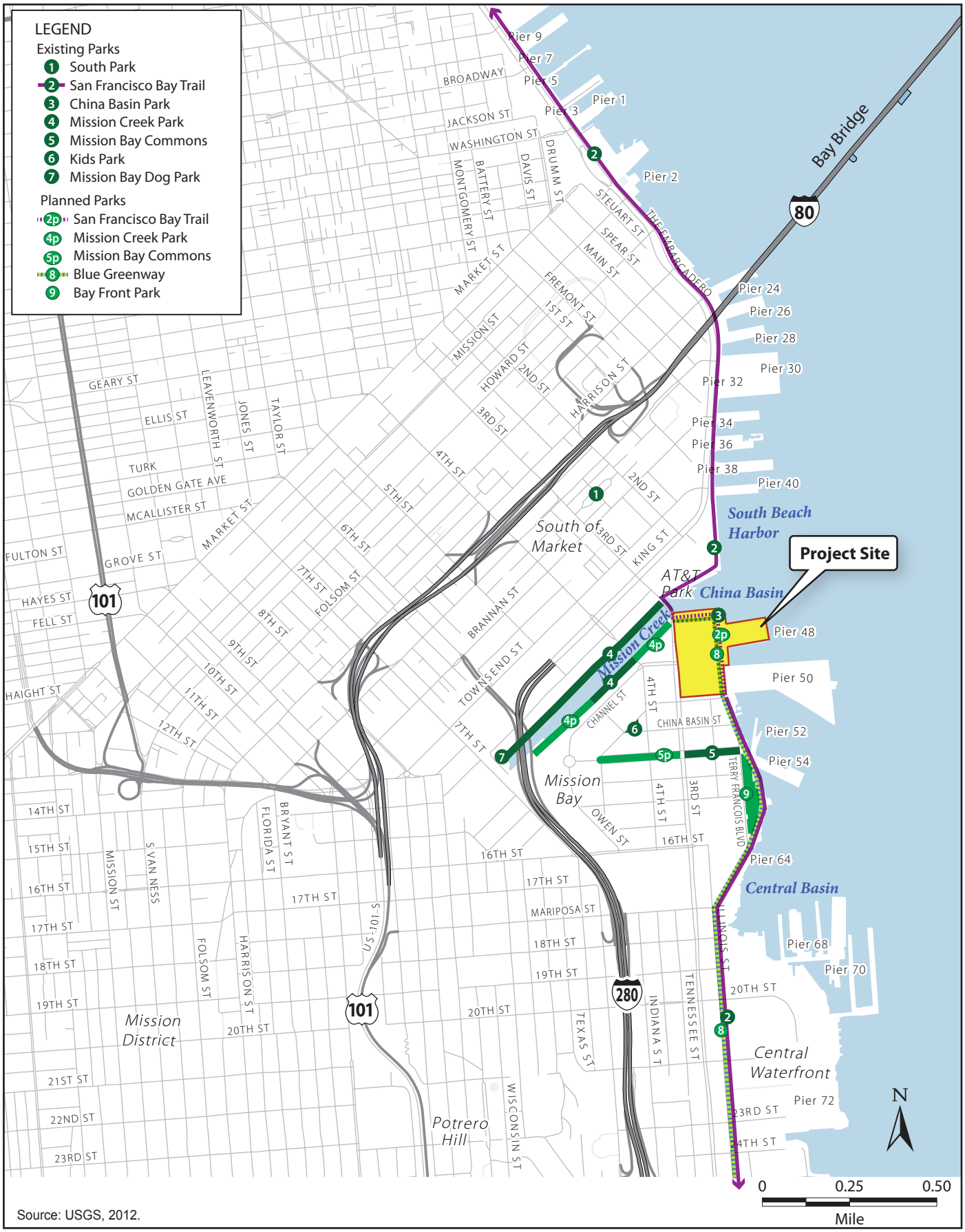
The following section discusses the current public services in the city and the immediate area in which the project site is located. Public services addressed in this section include fire protection, police protection, schools, parks and recreation, and libraries, shown in Figures 4.J-1 and 4.J-2 on the following pages.



Graphics ... 00836.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.J-1
Public Services and Facilities in the Project Vicinity



Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.J-2
Parks and Open Space in the Project Vicinity

FIRE PROTECTION SERVICES

The SFFD provides fire protection and emergency medical services to the city. Emergency medical transportation to city hospitals is provided by a fleet of both public and private ambulances.

The SFFD is headquartered at 698 Second Street, approximately 0.3 mile north of the project site. The SFFD consists of 48 facilities, including 45 fire stations and three Airport Division stations, and serves 1.5 million people.[1,2] As of January 2016, the SFFD has 757 firefighters on staff.[3]

The SFFD is organized into three divisions citywide as well as at San Francisco International Airport. The project site is in Division 3, which covers the southern portion of the city. Division 3 is bounded by Market Street to the north, San Francisco Bay (Bay) to the east, the southern border of the city to the south, and the Pacific Ocean to the west.[4] Division 3 covers a mix of land uses, including the city's primary concentration of industrial uses. Each division consists of an assemblage of battalions, and each battalion consists of four to six individual stations. Division 3 is divided into five battalions (Battalions 2, 3, 6, 9, and 10). Battalion 3 encompasses the project site and is bounded by Market Street to the north, The Embarcadero to the east, 20th Street to the south, and an irregular line that comprises several streets (Langton, Folsom, Ninth, Bryant, Florida, Alabama, and Harrison Streets) to the west. Battalion 3 is divided into four fire stations (Stations 4, 8, 35, and 48).

The City's Public Safety Building and Police Headquarters at Third and Mission Rock Streets, immediately south of the project site, including Fire Station 4 (the fire station nearest to the project site), became operational in April 2015.[5] Fire Station 4 would serve as a first responder to fire and medical incidents at the project site. Fire Station 8 (located at 36 Bluxome Street, approximately 0.4 mile west of the project site), Fire Station 1 (located at 935 Folsom Street, approximately 0.8 mile west of the project site), and Fire Station 35 (located at Pier 22½, approximately 1 mile north of the project site) would provide supplemental fire protection and emergency medical response services for the site. Table 4.J-1 on the following page provides the fire station personnel and equipment for each fire station that would serve the project site. As shown, Fire Station 4 is staffed by nine persons per shift and houses one truck and one engine.

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1 City and County of San Francisco Fire Department. 2016. *Fire Station Locations*. Available: http://sf-fire.org/fire-station-locations. Accessed: April 11, 2016.

2 City and County of San Francisco Fire Department. 2016. *About Us*. Available: http://sf-fire.org/about-us. Accessed: April 11, 2016.

3 Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

4 Conley, Nalungo. Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on October 11, 2016.

5 City and County of San Francisco Police Department. 2015. *Headquarters: San Francisco Police Department.* Available: http://sf-police.org/index.aspx?page=4764. Accessed: October 29, 2015.

TABLE 4.J-1. FIRE STATION PERSONNEL AND EQUIPMENT FOR STATIONS SERVING THE PROJECT SITE

Station	Personnel	Equipment
Fire Station 4 (first responder)	9 persons per shift	1 truck
	26 persons total	1 engine
Fire Station 8	10 persons per shift	1 truck
	29 persons total	1 engine
		1 battalion chief (Battalion 3)
Fire Station 1	7 persons per shift	1 engine
	23 persons total	1 fire boat
Fire Station 35	13 persons per shift	1 engine
	42 persons total	1 truck
		1 rescue squad

Source: Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

The SFFD received a total of 130,406 calls for service citywide in fiscal year 2014–2015, resulting in units being dispatched as shown in Table 4.J-2 on the following page. Approximately 23 percent of the SFFD's calls required a response by emergency medical services, 20 percent required a response by fire personnel only, and 57 percent required a response by both emergency medical services and fire personnel. Between March 30, 2015, and March 30, 2016, Fire Station 4 responded to 1,092 calls for service. (Note that multiple vehicles that respond to the same incident are counted as separate responses.)

The SFFD seeks to adhere to the response time standards established by the National Fire Protection Agency (NFPA). The NFPA response time standards for fire suppression incidents are[6]:

- First Arriving Engine Company Total Response Time: 5 minutes
- First Full-Alarm Assignment Total Response Time: 9 minutes

The NFPA response time standards for emergency medical incidents are:

- First-Responder Unit Total Response Time: 5 minutes
- Advanced Life Support (ALS) Unit Total Response Time: 9 minutes

[6] National Fire Protection Agency. n.d. *List of NFPA Codes and Standards.* Available: http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards. Accessed: February 21, 2017.

TABLE 4.J-2. SFFD CALLS BY TYPE AND RESPONSE TIMES (FISCAL YEAR 2014–2015 UNLESS OTHERWISE NOTED)

Call Type	Number of Calls	Average Response Time (minutes:seconds)
SFFD		
Emergency Medical Services	29,581	--
Fire	26,784	--
Emergency Medical Services and Fire	74,041	
Total	***130,406***	--
Fire Station 4[a]		
Emergency Medical Services	357	--
Fire	735	--
Total	***1,092***	***3:58***
Fire Station 8		
Emergency Medical Services	6,877	--
Fire	2,002	--
Total	***8,879***	***4:01***
Fire Station 1		
Emergency Medical Services	31,927	--
Fire	9,617	--
Total	***41,544***	***3:59***
Fire Station 35		
Emergency Medical Services	3,375	--
Fire	1,358	--
Total	***4,733***	***4:20***

Source: Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. January 20, 2016—email to Jessica Viramontes, ICF International; Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. May 12, 2016—email to Jessica Viramontes, ICF International; Hayes-White. Chief of Department. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on March 24, 2017.

Note:

a. Fire Station 4 opened in April 2015. The data are for the period between March 30, 2015, and March 30, 2016.

Across all standards, the SFFD has a response time achievement rate of 90 percent. In the city, the response time clock starts when the call is dispatched. The clock stops when the responding unit notifies the dispatcher by radio or acknowledges on the computer that it is on the scene. The SFFD standard for "turn-out" time (the time from acknowledgement of the call to leaving the station) is 1 minute, leaving 4 minutes for travel. Data for the project area show that current response times are within the NFPA standards, averaging around 4 minutes and 6 seconds.[7]

[7] Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

The SFFD formerly operated and maintained the Auxiliary Water Supply System (AWSS), which is the city's primary source of fire protection water and used exclusively for fire protection purposes. The AWSS system is now maintained by the San Francisco Public Utilities Commission. Existing AWSS facilities in the vicinity of the project site include a 12-inch main within the eastern half of Third Street between Mission Rock Street and Channel Street.[8] Fire hydrants are located along Terry A. Francois Boulevard (in the northern and eastern portions of the project site), within Pier 48, and along Third Street (at the western boundary of the project site). No fire hydrants currently exist within Seawall Lot 337. Pier 48 is currently served by fire service connections that are fed from the existing 8-inch main under Terry A. Francois Boulevard. See Section 4.K, *Utilities and Service Systems*, for more information regarding the AWSS.

The SFFD fireboats the *Phoenix* and the *Guardian*, as well as an unnamed fireboat at Station 35 on Pier 22½, can provide backup to the City's two saltwater pumping stations at 698 Second Street and at Van Ness Avenue and San Francisco Bicycle Route 2.[9] The *Phoenix* has a pumping capacity of more than 9,600 gallons per minute (gpm); the *Guardian* has the largest pumping capacity of any fireboat in the world, at 24,000 gpm. The third fireboat has a pumping capacity of 18,000 gpm.[10]

POLICE PROTECTION SERVICES

The SFPD provides law enforcement services to the city. SFPD services include responding to calls for police assistance, monitoring and managing traffic, and performing general surveillance duties. As previously discussed, the City's Public Safety Building and Police Headquarters (including the Southern District station, which would serve the project site) at Third and Mission Rock Streets, immediately south of the project site, became operational in April 2015.[11] The SFPD is mandated by the City Charter to maintain a minimum sworn staff of 1,971.[12] Although the SFPD currently has 1,716 sworn officers (a deficiency of 255 from the mandated minimum), according to SFPD, the department is on track to reach the mandated minimum through current recruiting and hiring methods.[13] The Board of Supervisors has passed a resolution to increase the mandated minimum staffing level to 2,200 sworn officers.

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8 BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

9 Conley, Nalungo. Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on October 11, 2016.

10 Conley, Nalungo. Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on October 11, 2016.

11 City and County of San Francisco Police Department. 2015. *Headquarters: San Francisco Police Department.* Available: http://sf-police.org/index.aspx?page=4764. Accessed: October 29, 2015.

12 City and County of San Francisco, Budget and Legislative Analyst. 2016. *Section 3. Minimum Sworn Staffing and Civilization.* Available: http://www.sfbos.org/index.aspx?page=3885. Accessed: April 12, 2016.

13 Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

The SFPD assigns officers to ensure that an adequate staff is available to provide minimum safety services. Officers staff special events and are deployed to meet needs during major events.[14] Patrol functions are performed by officers of the SFPD Field Operations Bureau. The officers come from the 10 district stations.

The project site is within the jurisdiction of SFPD's Southern District, which has a population of approximately 38,160 residents and a sworn staff of 146.[15,16] The Southern District police station is located within the City's Public Safety Building and Police Headquarters, immediately south of the project site. The Southern District extends south from Market Street to Mariposa Street, east to San Francisco Bay, and west to 13th Street, encompassing the South of Market, Embarcadero, and China Basin areas as well as Treasure Island.[17,18] The Southern District contains a total of seven patrol sectors, including five on the mainland and two on Treasure Island, in addition to several foot beats and officers who patrol on bicycles.[19] All sector staffing is based on available station personnel and any activities that may draw district or citywide personnel away from a regular assignment. There is no baseline for staffing a particular sector, but the goal of each district is to staff every sector with at least one patrol vehicle at all times.

The Southern District is responsible for managing law enforcement services for many events each year, including San Francisco Giants home games at AT&T Park, Oracle World, Macworld, and the Google convention.[20] The Southern District is not the primary station for the St. Patrick's Day Parade or Gay Pride Parade, but it supplements these events with officers.

The SFPD routinely increases police protection for special events. This includes assigning additional SFPD personnel (police officers and onsite command/dispatch center personnel) specifically for these events. The level of SFPD personnel required for a particular event is determined by the SFPD's Event Commander, who coordinates with the event sponsor in

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14 City and County of San Francisco Police Department. 2014. *Together We Can: San Francisco Police Department 2014 Annual Report.* Available: https://www.dropbox.com/s/mpfjb7eoy54vsrb/2014%20Annual%20Report.pdf?dl=0. Accessed: April 12, 2016.

15 Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

16 Pedrini, Chris. Captain, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on April 18, 2016.

17 City and County of San Francisco Police Department. 2016. *Southern Station.* Available: http://sanfranciscopolice.org/southern-station. Accessed: April 12, 2016.

18 City and County of San Francisco Police Department. 2016. *City and County of San Francisco Streets and Police Districts.* Available: http://sanfranciscopolice.org/sites/default/files/Citywide_District_Map.pdf. Accessed: September 28, 2016.

19 Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

20 Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

advance of the event, as well as the event security/operations plans. The San Francisco Municipal Transportation Agency's Department of Parking and Traffic typically provides traffic control services for special events.

For San Francisco Giants home games at AT&T Park, the SFPD typically enlists on-duty officers from five or more SFPD district stations to provide police protection in the vicinity of the ballpark during games as well as motorized patrol support from the SFPD Honda unit and the SFPD Southern District's radio car, as needed. In addition, the SFPD's Municipal Transportation Agency Division provides traffic control officers who assist with pedestrian traffic in San Francisco Municipal Railway (Muni) Metro areas during Giants games. Additional off-duty police officers are contracted by the SFPD to provide security within the interior of the ballpark. Also, the SFPD maintains agreements with certain parking lot operators in Mission Bay; SFPD bicycle officers provide security at lots, including Lot A, that are used by ballgame patrons during Giants games.[21]

The SFPD does not have an established response time goal. However, the SFPD strives to maintain an average response time of 3 to 5 minutes for Priority A calls, which are considered the highest priority and signal an emergency dispatch. October 2015 average response times from dispatch to arrival in the Southern District were 5:38 (minutes:seconds), 9:37, and 12:56 for Priority A (life threatening), Priority B (potential for harm to life and property), and Priority C (crime committed with no threat to life or property) calls, respectively.[22] The peak average response time (i.e., the shortest average time it took for officers to reach the location) for Priority A calls during October 2015 was 4:45.[23] The lowest average response time (i.e., the longest average time it took for officers to reach the location) for Priority A calls was 5:53.[24,25] In September 2016, police stations within the Southern District received 5,260 calls for service; there were 34,970 calls for service citywide; thus, calls to Southern District police stations represented approximately 15 percent of all citywide calls that year.[26]

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[21] Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on October 11, 2016.

[22] Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

[23] Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on October 7, 2016.

[24] Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

[25] Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on October 7, 2016.

[26] Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on October 7, 2016.

The SFPD does not have a standard for the ratio of officers to population; it bases its staffing levels on the number of service calls and crime incidents. Within the project site, five SFPD incidents (four thefts from vehicles and one stolen truck) were reported between November 2014 and October 2015.[27]

There were approximately 11,868 crimes in the Southern District in 2015.[28] The Southern District averaged about 311 crimes (including violent and property crimes) per 1,000 persons, with the majority of these crimes (about 93 percent) consisting of property crimes, such as burglary, motor vehicle theft, shoplifting, and vandalism.[29,30,31] There were approximately 60,067 crimes in the city in 2015.[32] The citywide average crime rate was approximately 71 crimes per 1,000 persons.[33] The headquarters for the Southern District was previously located in the Hall of Justice, which is where many of the walk-in crime reports were received. This could have contributed to the higher number of reported crimes for the population in the Southern District compared to the average citywide crime rate.[34]

SCHOOLS

The SFUSD provides school services to the city. As of the 2015–2016 school year, the SFUSD consisted of 143 schools, including 64 elementary schools (kindergarten through 5th grade), eight alternatively configured schools (kindergarten through 8th grade), 13 middle schools (6th through 8th grade), 19 high schools (9th through 12th grade), 12 early education schools, nine county and court schools, five continuation/alternative schools, and 13 active charter schools, which are authorized by the SFUSD.[35]

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27 Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

28 Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on April 13, 2016. Original data source: San Francisco Police Department Year-End Crime Statistics 2015, San Francisco Police Department Compstat Profile 2015.

29 Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on April 13, 2016. Original data source: San Francisco Police Department Year-End Crime Statistics 2015, San Francisco Police Department Compstat Profile 2015.

30 As stated above, the Southern District has a population of approximately 38,160 residents.

31 Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on October 7, 2016.

32 San Francisco Police Department. 2016. *Year-End Crime Statistics 2015.* Available: http://sanfranciscopolice.org/sites/default/files/Documents/PoliceDocuments/CompStat/SFPD-CompStat-YearEnd-2015.pdf. Accessed: April 12, 2016.

33 As stated in Section 4.C, *Population and Housing*, the city has a population of 852,000.

34 Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on April 13, 2016. Original data source: San Francisco Police Department Year-End Crime Statistics 2015, San Francisco Police Department Compstat Profile 2015.

35 San Francisco Public Schools. 2015. *Facts at a Glance*. Available: http://www.sfusd.edu/en/assets/sfusd-staff/about-SFUSD/files/SFUSD%20Facts%20at%20a%20Glance%20-%20June%202015.pdf. June. Accessed: April 12, 2016.

The SFUSD's current enrollment, including charter schools, is approximately 58,400 students.[36] As of the 2015–2016 school year, SFUSD employed 9,551 total permanent and temporary staff members.[37]

Table 4.J-3, on the following page, shows classroom capacity as of 2009 (the most recent published capacity data available), enrollment for the SFUSD during the 2015–2016 school year, and remaining capacity. As shown, based on 2009 capacity data, there is capacity for approximately 2,511 students in existing SFUSD elementary schools. However, the existing SFUSD middle schools are over capacity by 279 students, and the existing SFUSD high schools are over capacity by 2,022 students. According to the SFUSD, many of the schools on the west side of the city are at or above capacity; the majority of capacity available in the SFUSD is in Bayview, which is located on the east side of the city.[38] Capacity exists in Bayview because the SFUSD opened the new 550-student Willie Brown Jr. Middle School in 2015. That school is not included in the capacity estimates in Table 4.J-3.

Although neighborhoods with a high number of school-age children generate a proportionally high level of demand for nearby schools, the SFUSD assigns students to middle and high schools through a lottery system. This system ensures that students are distributed to facilities that have adequate capacity to serve their educational needs. However, the SFUSD assigns students to most elementary schools according to attendance boundaries.[39]

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[36] California Department of Education. 2015. *District and School Enrollment by Grade for 2014–15.* Last updated: March 13. Available: http://dq.cde.ca.gov/dataquest/Enrollment/GradeEnr.aspx?cChoice=DistEnrGr2&cYear=2014-15&cSelect=3868478--San%20Francisco%20Unified&TheCounty=&cLevel=District&cTopic=Enrollment&myTimeFrame=S&cType=ALL&cGender=B. Accessed: April 13, 2016.

[37] San Francisco Public Schools. 2015. *Facts at a Glance*. Available: http://www.sfusd.edu/en/assets/sfusd-staff/about-SFUSD/files/SFUSD%20Facts%20at%20a%20Glance%20-%20June%202015.pdf. June. Accessed: April 12, 2016.

[38] Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on November 13, 2015.

[39] San Francisco Unified School District. 2010. *Recommendations for Elementary Attendance Areas Prepared for September 28, 2010 Board Meeting*. Available: http://www.sfusd.edu/en/assets/sfusd-staff/enroll/files/final-elementary-attendance-areas-map.pdf. Accessed: May 2, 2016.

TABLE 4.J-3. SFUSD CLASSROOM CAPACITY AND ENROLLMENT DURING THE 2015–2016 ACADEMIC YEAR

Type of School	Number of Schools (as of 2009)	Capacity (as of 2009)[a]	Enrollment (2015–2016)[b]	Remaining Capacity
Elementary School (kindergarten–5th grade)	64	29,800	27,289	2,511
Middle School (6th–8th grade)	14	11,700	11,979	-279
High School (9th–12th grade)	18	17,575	19,597	-2,022
Alternatively Configured School	11	3,900	--	--
Charter School	7	1,400	--	--
County	3	400	--	--
Total[a]	***117***	***64,775***	***58,865***	***210***

Sources:

a. San Francisco Unified School District. 2009. *San Francisco Unified School District Capital Plan FY 2010–2019, Appendix*. September. Available: http://www.sfusd.edu/en/assets/sfusd-staff/about-SFUSD/files/capital-plan-final-2010-2019.pdf. Accessed: April 14, 2016.

b. California Department of Education. 2017. *District and School Enrollment by Grade for 2015–16*. Report generated March 13. Available: http://dq.cde.ca.gov/dataquest/Enrollment/GradeEnr.aspx?cChoice=DistEnrGr2&cYear=2014-15&cSelect=3868478--San+Francisco+Unified&TheCounty=&cLevel=District&cTopic=Enrollment&myTimeFrame=S&cType=ALL&cGender=B. Accessed: March 13, 2017.

Notes:

- The number of schools included in this table is based on the SFUSD's most recent Capital Plan, which was prepared in 2009. Subsequent to the preparation of the Capital Plan, the number of schools in the SFUSD increased from 117 to 143, as discussed above. The Capital Plan is used in this analysis because it includes the most current data regarding capacity at the SFUSD schools.
- Enrollment data for alternatively configured schools, charter schools, and county schools are included in the enrollment data for elementary schools, middle schools, and high schools.

The SFUSD experienced slow growth between 2012 (when enrollment was 52,989 students, excluding charter schools) and 2015 (when enrollment was 53,095 students, excluding charter schools), a growth of less than 1 percent over the 3 years.[40,41] Its capital facilities program has focused on replacing older schools and modernizing other facilities. The district's Capital Plan identifies a range of physical improvements that are necessary to modernize existing facilities, such as providing access that is compliant with the Americans with Disabilities Act (ADA), upgrading science and computer labs, expanding arts facilities, and other improvements. In addition, the SFUSD has a backlog of deferred maintenance needs.[42]

40 Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on November 13, 2015.

41 Tong, Rosina. Executive Director of the Educational Placement Center. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on November 28, 2016.

42 San Francisco Unified School District. 2009. *FY 2010–2019 Capital Plan.* Available: http://sfgov2.org/ftp/uploadedfiles/cpp/capital_plan/Capital%20Plan(1).pdf. Accessed: April 12, 2016.

The project site is within the vicinity of the following schools:[43]

- Daniel Webster Elementary School (kindergarten through 5th grade), located at 465 Missouri Street (approximately 1 mile south of the project site);[44]
- Bessie Carmichael Middle School (6th through 8th grades), located at 824 Harrison Street (approximately 0.6 mile northwest of the project site);
- International Studies Academy (9th through 12th grades), located at 655 De Haro Street (approximately 1 mile southwest of the project site);
- John O'Connell High School (9th through 12th grades), located at 2355 Folsom Street (approximately 1.7 mile north of the project site); and
- Downtown High School (9th through 12th grades), located at 693 Vermont Street (approximately 1.1 miles southwest of the project site).

As shown in Table 4.J-4, all five schools in the vicinity of the project site were within capacity during the 2015–2016 school year (the most recent year for which information is available).

TABLE 4.J-4. SFUSD CLASSROOM CAPACITY AND ENROLLMENT FOR SCHOOLS IN THE VICINITY OF THE PROJECT SITE (2015-2016)

School	Capacity (as of 2009)[a]	Enrollment (2015–2016)[b]	Remaining Capacity
Daniel Webster Elementary School	500	273	227
Bessie Carmichael Middle School	616[c]	612	4
International Studies Academy	825	126	699
John O'Connell High School	1,225	319	906
Downtown High School	425	167	258

Sources:

a. San Francisco Unified School District. 2009. *San Francisco Unified School District Capital Plan FY 2010–2019, Appendix*. September. Available: http://www.sfusd.edu/en/assets/sfusd-staff/about-SFUSD/files/capital-plan-final-2010-2019.pdf. Accessed: April 14, 2016.

b. California Department of Education. 2017. *District and School Enrollment by Grade for 2015–16*. Report generated March 13. Available: http://dq.cde.ca.gov/dataquest/Enrollment/GradeEnr.aspx?cChoice=DistEnrGr2&cYear=2014-15&cSelect=3868478-San+Francisco+Unified&TheCounty=&cLevel=District&cTopic=Enrollment&myTimeFrame=S&cType=ALL&cGender=B. Accessed: March 13, 2017.

c. Lim, Darlene. Executive Director of Special Projects. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on October 11, 2016. Note: The capacity is for the 2015–2016 school year.

[43] Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on November 13, 2015.

[44] The project site is within the attendance boundaries of Daniel Webster Elementary School.

Daniel Webster Elementary School provides extensive pre-kindergarten and after-school programs.[45] The International Studies Academy, John O'Connell High School, and Downtown High School have extensive after-school programs, including sports.

Although several SFUSD sites throughout the city (primarily on the east side in the Bayview area) are currently underutilized in terms of current enrollment, the number of locations where surplus space is available is expected to decline over the next 10 years as enrollment increases by 6,000 to 12,000 students, primarily due to population growth in the city, including 600 to 1,000 students within Mission Bay.[46,47,48] To accommodate anticipated growth, the SFUSD is exploring the construction of new schools in areas in which additional students are expected because of new housing developments and/or an overall increase in the number of school-age children. Areas that are under review by the SFUSD include the Candlestick Point and Shipyard development areas, Mission Bay (approximately 0.2 mile west of the project site), and Parkmerced.

PARKS[49]

Citywide and Regional Facilities. The RPD owns and maintains approximately 3,433 acres of publicly accessible recreational and open space in the city.[50] Together with approximately 2,457 acres of open space properties that are owned and managed by other City, state (255 acres, including Candlestick Point State Recreation Area and Mount Sutro), and federal (1,642 acres, including the Presidio, Ocean Beach, Fort Funston, Fort Mason, Lands End, Sutro Heights, and China Beach) agencies, approximately 5,890 acres of parkland and open space are within the city. These publicly owned open spaces make up approximately 20 percent of the city's land area and include a variety of parks, walkways, landscaped areas, recreational facilities, and unmaintained open space. Overseen by the Recreation and Park Commission, the RPD administers more than 220 parks, playgrounds, and open spaces, including two outside the city

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45 Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on November 13, 2015.

46 Leigh, Myong. Deputy Superintendent for Policy and Operations. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on May 3, 2016.

47 Lapkoff & Gobalet Demographic Research, Inc. 2015. *Demographic Analyses and Enrollment Forecasts, San Francisco Unified School District*. November 23. Available: http://www.sfusd.edu/en/assets/sfusd-staff/about-SFUSD/files/demographic-analyses-enrollment-forecast.pdf. Accessed: April 15, 2016.

48 Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on October 6, 2016.

49 This discussion of existing parks does not include any parks in Mission Bay because they are not owned or maintained by the RPD and are not city facilities.

50 City and County of San Francisco. 2014. *Recreation and Open Space Element*. April.

limits.[51] The system includes 25 recreation centers, nine swimming pools, five golf courses, and numerous tennis courts, baseball diamonds, soccer fields, and other sports venues. Included in the RPD's responsibilities are the Marina Yacht Harbor, San Francisco Zoo, and Lake Merced Complex.

City residents also benefit from the Bay Area regional open space system. Regional resources include public open spaces managed by the Midpeninsula Regional Open Space District in Santa Clara, San Mateo, and Santa Cruz Counties; East Bay Regional Park District in Alameda and Contra Costa Counties; and the National Park Service in Marin and San Mateo Counties. In addition to the state park and recreational areas throughout the area, thousands of acres of watershed and agricultural lands are preserved as open spaces by water and utility districts or in private ownership; however, these lands are not accessible to the public.

Within San Francisco, publicly accessible open spaces and recreational facilities are differentiated according to locally-serving spaces and destination spaces (see Table 4.J-5 on the following page for open space categories that apply to facilities near the project site).[52] Several larger open space areas, including Golden Gate Park (1,017 acres), the Lake Merced complex (700 acres), and John McLaren Park (317 acres), compose about 50 percent of the total City-owned acreage that is in recreational use. The previously discussed larger open spaces as well as Lincoln Park (112 acres), Glen Canyon (78 acres), and Twin Peaks (55 acres) are destination spaces. Unlike locally-serving spaces, these larger areas provide programs, activities, or recreational opportunities that serve the city as a whole. The distance between recreational and open space facilities and potential users is generally defined as the service area for the facility or open space, as dictated by the type of park (i.e., neighborhood serving or district serving). The distance correlates to how far a particular type of user would walk (i.e., a family with children will not walk as far as an adult).

As stated in Section 4.C, *Population and Housing*, the city had a population of approximately 852,000 as of 2014. As such, the 5,890 acres of parkland within the city translates to approximately 6.9 acres per 1,000 city residents. The RPD has not adopted a citywide target ratio of parkland to residents.[53] However, other resources are available that provide parkland

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[51] San Francisco Recreation and Parks. 2016. *Who We Are*. Available: http://sfrecpark.org/about/who-we-are/. Accessed: April 12, 2016.

[52] Radine Bradley, Stacy. Deputy Director of Planning, Capital and Planning Division. San Francisco Recreation and Parks Department. Email to Jessica Viramontes, ICF International. Received on November 20, 2015.

[53] Radine Bradley, Stacy. Deputy Director of Planning, Capital and Planning Division. San Francisco Recreation and Parks Department. Email to Jessica Viramontes, ICF International. Received on November 20, 2015.

TABLE 4.J-5. OPEN SPACE CATEGORIES AND PARK FACILITIES NEAR THE PROJECT SITE

Open Space Categories		
Type	**Size**	**Characteristics/Features**
Neighborhood serving (locally-serving spaces)	• 1 to 10 acres, preferably 4 to 5 acres • Serves primarily a single community or neighborhood	• Usually landscaped areas of scenic interest that are natural or man-made • Provides passive and/or active recreational space that does not require organized programs • Usually has playground areas with a play lot, apparatus area, and turf play area • Some squares, plazas, hilltop, and shoreline open spaces also act as neighborhood-serving sites
Subneighborhood serving (locally-serving spaces)	• < 1 acre in size • Used primarily by people from the immediately adjacent area	• Mini parks, including a tot lot or playground, and a small landscaped space with seating areas for all users to enjoy
Destination spaces	• Varies	• Usually possess unique amenities (e.g., natural resources, views or one-of-a-kind assets). Examples of one-of-a-kind assets include playgrounds, historic features, and theaters.

Facilities near the Project Site						
Map ID	**Park or Community Garden Facility**	**Open Space Category**	**Park Location**	**Distance from Project Site**	**Size (acres)**	**Main Characteristics**
1	South Park	Subneigh-borhood serving	64 South Park Avenue	0.4 mile northwest of the project site	0.85	• Picnic area • Playground • Hummingbird garden
2, 2p	San Francisco Bay Trail	Neighbor-hood serving	Along waterfront on Terry A. Francois Boulevard	Immediately south of project site	n/a	• Multi-use trail
3	China Basin Park	Subneigh-borhood serving	Terry A. Francois Boulevard and Third Street	Within project site	0.87	• Grassy areas • Baseball field

Facilities near the Project Site						
Map ID	**Park or Community Garden Facility**	**Open Space Category**	**Park Location**	**Distance from Project Site**	**Size (acres)**	**Main Characteristics**
4, 4p	Mission Creek Park	Neighbor-hood serving	Along Berry Street and Channel Street between Fourth Street and Interstate 280	0.12 mile west of the project site	10	• Events space • Picnic benches • Basketball courts • Sand volleyball courts • Tennis courts • Walk/run paths • Boating • Dog play area
5, 5p	Mission Bay Commons	Neighbor-hood serving	Mission Bay Boulevard North between Third Street and Terry A. Francois Boulevard	0.14 mile south of the project site	2.2	• Grassy, green open space • Walk/run sidewalk loop • Benches
6	Kids Park	Neighbor-hood serving	Long Street Bridge Street and China Basin Street	0.15 mile south west of the project site	1.06	• Playground • Benches • Picnic areas • Bike racks
7	Mission Bay Dog Park	Subneigh-borhood serving	465–479 Berry Street	0.5 mile west of the project site	0.25	• Play area for dogs • Picnic tables
8	Planned Blue Greenway	Neighbor-hood serving	Begins at China Basin Park; extends south for 13 miles along waterfront	Within and south of the project site	13 miles	• Established open spaces • New recreational opportunities • Public access through implementation of the San Francisco Bay Trail, the San Francisco Bay Water Trail, and green corridors to surrounding neighborhoods • Full waterfront access

Facilities near the Project Site						
Map ID	**Park or Community Garden Facility**	**Open Space Category**	**Park Location**	**Distance from Project Site**	**Size (acres)**	**Main Characteristics**
9	Bayfront Park (planned)	Neighborhood serving	Terry A Francois Boulevard near Pier 52	0.2 mile south of the project site	5.5	• Grass lawn • Multi-use paths along the Bay Trail for walking, biking, running, and dog walking
	Total				**20.73 Acres**	

Sources:

San Francisco Recreation and Parks. 2016. *Parks and Open Spaces*. Available: http://sfrecpark.org/parks-open-spaces/. Accessed: April 13, 2016.

Mission Bay Parks. 2016. *Mission Bay Parks Map*. Available: http://1a74hq3x1mln95w1n1r7ou21.wpengine.netdna-cdn.com/wp-content/uploads/2016/08/MBP_Map_9_1_16.pdf. Accessed: March 1. 2017.

San Francisco Parks Alliance. 2017. *Blue Greenway*. Available: http://www.sfparksalliance.org/our-work/blue-greenway. Accessed: March 1. 2017.

provision goals. The San Francisco Sustainability Plan recommends an open space capacity of 5.5 acres per 1,000 residents.[54] The San Francisco Department of Public Health, in its Healthy Development Measurement Tool (HDMT) Development Checklist, includes a benchmark for publically accessible open space (10 acres per 1,000 residents) that is based on National Parks and Recreation Association (NPRA) guidelines.[55] However, considering the city's high density and the confined nature of its land mass (28,918 acres), this ratio is difficult to achieve within the city. The HDMT recognizes that other indicators, such as accessibility, safety, park maintenance, and usability, are also appropriate measures for measuring open space.[56] Objective 1.1 of the adopted RPD Strategic Plan establishes a performance target for additional open space in San Francisco: "Continue to exceed the mean of the five densest US cities."[57] This performance target balances the need to increase the supply of open space as the population grows with the reality of limited availability of land in the city.

Facilities near the Project Site. Open space designated in the Recreation and Open Space Element of the San Francisco General Plan[58] as Active Use/Sports Field or Passive Use/Tranquil Spaces is considered walkable (a 10-minute walk) to users within a 0.5-mile radius. It is assumed that all parks and recreational facilities within a 0.5-mile radius could be used. Playgrounds, on the other hand, are considered walkable (a 5-minute walk) within only a 0.25-mile radius. As shown in Table 4.J-5, page 4.J-16, and Figure 4.J-2, page 4.J-3, park and recreational space in the vicinity of the project site includes both neighborhood- and subneighborhood-serving facilities, including China Basin Park (within project site), Mission Creek Park (0.12 mile west of the project site), Mission Bay Commons (0.14 mile south of the project site), Kids Park (0.15 mile south west of the project site), San Francisco Bay Trail (Immediately south of project site), South Park (0.4 mile northwest of the project site), and Mission Bay Dog Park (0.5 mile west of the project site). There is also one planned park near the project site, Bayfront Park, 0.2 mile south of the project site.

Mission Creek Park is the closest neighborhood-serving park to the project site. The 10-acre park includes grass lawns and a tree-lined esplanade, walking and biking pathways, a small amphitheater for outdoor events, sports courts, a boat launch, and an off-leash dog play area at

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54 The City of San Francisco Commission on the Environment. 1997. *The Sustainability Plan for the City of San Francisco*.

55 San Francisco Department of Public Health. 2012. *Healthy Development Measurement Tool Development Checklist*. Version 4.03. December.

56 The NPRA no longer recommends a single absolute "average" of park acreage per population. Other factors are now considered to be of greater importance, such as location and walking distance and whether a facility provides needed services to the population it is intended to serve.

57 San Francisco Recreation and Park Department. *Strategic Plan 2016-2020*. Available: http://sfrecpark.org/wp-content/uploads/RPD-Strategic-Plan-FY16-20.pdf. Accessed: April 17, 2017.

58 San Francisco Planning Department. 2014. *San Francisco General Plan*, Recreation and Open Space Element. April. Available: http://openspace.sfplanning.org/. Accessed: March 10, 2017.

the end of Berry Street.[59] There is no recreation center within 0.5 mile of the project site. The nearest recreation center is Gene Friend Recreation Center, 1 mile west of the project site. In addition, the San Francisco Bay Trail, also known as the Blue Greenway, runs along the eastern and northern portions of the project site. The Bay Trail is a planned 500-mile hiking and biking path that will encircle San Francisco and San Pablo Bays and follow the shoreline of nine counties, pass through 47 cities, and cross 4.5 toll bridges. Approximately 345 miles of the Bay Trail have been completed, including off-street paved trails, dirt/gravel trails, and on-street pathways. The Bay Trail provides scenic recreation for hikers, joggers, bicyclists, skaters, and wheelchair users. It also offers a setting for wildlife viewing and environmental education and serves as a commute alternative for bicyclists. Within San Francisco, several segments of the Bay Trail are complete, including a segment along McCovey Cove Promenade, just north of the project site, and a segment that runs in a north–south direction along Terry A. Francois Boulevard from Mission Rock Street to Illinois Street where it crosses the Islais Creek Channel and continues south.

Privately owned public open spaces (POPOS) within the city are publicly accessible areas such as plazas, terraces, atriums, and small parks and landscaped areas (some with few pedestrian amenities) that are provided and maintained by private developers.[60] In the city, POPOS mostly appear in the downtown office district. The POPO at 303 Second Street is closest to the project site, at 0.7 mile away.[61]

Open space areas throughout the city also include "green connections," or heavily landscaped pathways or roadways, that serve as connections between open space, parks, and recreational facilities or otherwise provide access to scenic points of interest. These can include streets that are heavily landscaped and attractive to bicyclists and pedestrians. Such areas are known as bicycle boulevards, neighborhood greenways, or green streets. Currently, a total of 24 routes are within the city's green connections network. Within 1 mile of the project site, there are six routes. Route 24, Shoreline: Western Snowy Plover and Salt Marsh Harvest Mouse, is within the project site. The five other routes are within a 1-mile radius of the project site: Route 3, Market to Beach: Anna's Hummingbird (0.8 mile northwest of the project site); Route 6, Mission to Peaks: Anise Swallowtail (0.6 mile south of the project site); Route 18, Tenderloin to Potrero: Western Tiger Swallowtail (0.7 mile west of the project site); Route 19, Downtown to Mission Bay: Western Gull (0.2 mile northwest of the project site); and Route 20, Folsom, Mission Creek to McLaren: Pollinators (0.7 mile northwest of the project site).[62]

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[59] Mission Bay Parks. 2017. *Mission Creek Park.* Available: http://missionbayparks.com/mission-creek-park/. Accessed: March 10, 2017.

[60] San Francisco Planning Department. n.d. *Privately Owned Public Open Space and Public Art.* Available: http://sf-planning.org/privately-owned-public-open-space-and-public-art-popos#map. Accessed April 13, 2016.

[61] San Francisco Planning Department. 2012. San Francisco Privately Owned Public Open Spaces. December 24. Available: http://208.121.200.84/ftp/files/gis/POPOS/SF_POPOS.pdf. Accessed April 13, 2016.

[62] San Francisco Planning Department. 2014. Green Connections. Available: http://208.121.200.84/ftp/files/Citywide/green_connections/GC_Final_Network_Map_03-2014.pdf. Accessed: April 12, 2016.

LIBRARIES

The SFPL provides library services to the city. The SFPL system includes 28 neighborhood branches throughout the city as well as mobile outreach services. The Main Library is located in the Civic Center at 100 Larkin Street. Both the Main Library and branch libraries provide information and accessibility services, book and multimedia lending, reading and meeting rooms, citizenship and technological resources, and library-sponsored exhibitions and programs. During fiscal year 2015–2016, the SFPL collection[63] totaled 3,946,841 items. The SFPL had a total of 429,633 patrons.[64]

The project site is served by the 7,500-gross-square-foot (gsf) Mission Bay branch of the SFPL at 960 Fourth Street, approximately two blocks west of the project site, although SFPL patrons can use any library branch in the city.[65] During fiscal year 2015–2016, the Mission Bay branch collection totaled 43,441 items; the branch had a total of 125,121 patrons.[66] The Potrero branch at 1616 20th Street (approximately 1 mile southwest of the project site) and the Main Library (approximately 1.5 miles west of the project site) are the next-closest SFPL locations. The Mission Bay branch, Potrero branch, and Main Library have adequate facilities for meeting the existing local demand for library services.[67]

The Branch Library Improvement Program (BLIP) was launched as a result of a bond measure that was passed in November 2000, providing $106 million in funding for upgrading San Francisco's branch library system; Proposition D, which passed in November 2007, authorized additional funding for improving the branches. The BLIP was intended to provide the public with seismically safe, accessible, technologically updated, and code-compliant City-owned branch libraries in every neighborhood.[68] The BLIP was completed in 2014.[69]

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63 Includes books, CDs, DVDs, sheet music, bound periodical volumes, government documents, and software.

64 San Francisco Public Library. 2016. *Statistics System-wide, FY 2015–2016*. Available: http://sfpl.org/pdf/about/administration/statistics-reports/systemwideFY15-16.pdf. Accessed: April 17, 2017.

65 San Francisco Public Library. 2016. *Mission Bay Branch Library Facts and Figures*. Available: http://sfpl.org/pdf/blip/missionbayfaq.pdf. Accessed: April 15, 2016.

66 San Francisco Public Library. 2016. *Statistics System-wide, FY 2015–2016, Statistics by Location*. Available: http://sfpl.org/pdf/about/administration/statistics-reports/Statisticsbylocation2015-16.pdf. Accessed: April 17, 2017.

67 Lambert, Michael. Deputy City Librarian. San Francisco Public Library. Email to Jessica Viramontes, ICF International. Received on September 30, 2015.

68 San Francisco Public Library. 2016. *Branch Library Improvement Program*. Frequently Asked Questions. Available: http://sfpl.org/pdf/blip/blipfaq.pdf. Accessed: April 15, 2016.

69 San Francisco Public Library. 2015. *Reinvesting and Renewing for the 21st Century*. September. Available: http://sfpl.org/pdf/about/commission/ReinvestingRenewing.pdf. Accessed: April 15, 2016.

There are no current plans to build new branches in the city; however, budget planning for fiscal years 2017 and 2018 could include resource allocation related to renovation work at the Chinatown, Mission, and/or the Ocean View branch libraries. These library locations would not receive renovations until fiscal year 2019 or later.[70]

REGULATORY FRAMEWORK

STATE

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) and standards (such as those for high-rise buildings and child care facilities), and fire suppression training. California Fire Code Section 403.2 addresses public safety for both indoor and outdoor gatherings, including emergency vehicle ingress and egress, fire protection, emergency medical services, public assembly areas (e.g., directing both attendees and vehicles), vendor and food concession distribution, and the need for the presence of law enforcement and fire and emergency medical services personnel at the event.

California Health and Safety Code. State fire regulations are set forth in Sections 13000 et seq. of the California Health and Safety Code, including regulations pertaining to building standards (also found in the California Building Code [CBC]), fire protection and notification systems, fire protection devices (e.g., extinguishers and smoke alarms), and fire suppression training.

California Master Mutual Aid Agreement. The California Master Mutual Aid Agreement is a framework agreement between the state and local governments for aid and assistance through an interchange of services and facilities, including, but not limited to, fire, police, medical and health, communication, and transportation services and facilities, to cope with rescue, relief, evacuation, rehabilitation, and reconstruction efforts.

California Senate Bill 50. Under the provisions of Senate Bill (SB) 50, school districts may collect Level Two and Level Three fees to offset costs related to increasing school capacities in response to growing student enrollments associated with development. Level Two fees require a project developer to provide one-half the costs of accommodating students in new schools while the state provides the other half. Level Three fees require a project developer to pay the full cost of accommodating the students in new schools. Fees would be implemented at the time

[70] Lambert, Michael. Deputy City Librarian. San Francisco Public Library. Email to Jessica Viramontes, ICF International. Received on September 30, 2015.

the funds from Proposition 1A (approved by the voters in 1998) are expended. School districts must demonstrate to the state their long-term facilities needs and costs, based on long-term population growth, to qualify for Level Two or Level Three fees. This is also codified in Section 65996 of the State Government Code.

REGIONAL

San Francisco Bay Plan. The San Francisco Bay Conservation and Development Commission (BCDC) San Francisco Bay Plan (Bay Plan) contains policies pertaining to the development of parks and recreational facilities in or near San Francisco Bay and public access to San Francisco Bay. The Bay Plan includes specific policies related to the San Francisco Waterfront as well as general policies related to recreation and public access. Bay Plan policies call for the preservation of scenic Bay views; the provision of diverse and accessible water-oriented recreational facilities, such as marinas, launch ramps, beaches, and fishing piers, around the Bay; and encouragement for the development of water-oriented commercial recreational establishments, such as restaurants, specialty shops, private boatels, recreational equipment concessions, and amusements in urban areas adjacent to the Bay. In addition, the Bay Plan encourages the preservation of historic districts and structures, including public access to the exterior and, where appropriate, the interior of these structures.[71]

One of the plan's major conclusions is that shoreline areas that are suitable for priority uses (ports, water-related industry, airports, wildlife refuges, and water-related recreation) exist only in limited amounts and should be reserved for these purposes. One of its major proposals is that new shoreline parks, beaches, marinas, fishing piers, scenic drives, and hiking or biking pathways should be provided in many areas. The Bay Plan notes that San Francisco Bay and its shoreline offer particularly important opportunities for recreational development in urban areas where large concentrations of people now live close to the water but do not have a publicly accessible shoreline nearby. As such, it proposes that the highest priority should be given to recreational development in these areas as a means of providing immediate help to relieve urban tensions.

General recreation and public access policies of the Bay Plan that are relevant to development of the proposed project are summarized below.[72]

- **Recreation Policy IV.2** encourages preserving waterfront land for parks and beaches to meet future needs, with the understanding that recreational facilities need not be built all at once. Interim use of a waterfront park priority use area prior to its development as

[71] San Francisco Bay Conservation and Development Commission. n.d. *San Francisco Bay Plan*. Available: http://www.bcdc.ca.gov/laws_plans/plans/sfbay_plan#3. Accessed: December 22, 2016.

[72] San Francisco Bay Conservation and Development Commission. n.d. *San Francisco Bay Plan*. Available: http://www.bcdc.ca.gov/plans/sfbay_plan#25. Accessed: December 22, 2016.

a park should be permitted, unless the use would prevent the site from being converted to park use or would involve investment in improvements that would preclude the future use of the site as a park.

- **Recreation Policy IV.3** encourages the development of a variety of recreational facilities, such as waterfront parks, trails, marinas, live-aboard boats, nonmotorized small boat access, fishing piers, launching lanes, and beaches. These recreational facilities should be located, improved, and managed consistent with detailed standards for the different type of recreational facilities (e.g., general recreation facilities should be as close to major population centers as is feasible and marina facilities should include viewing areas, restrooms, and nonmotorized small boat launching facilities).
- **Public Access Policy IV.1** encourages the development of infill projects that increase public access to the Bay to the maximum extend feasible, in accordance the policies for public access to the Bay.
- **Public Access Policy IV.2** ensures public access to San Francisco Bay via waterfront parks, beaches, marinas, and fishing piers and encourages, to the maximum extent feasible, the provision of public access to and along the waterfront through every new development in San Francisco Bay or on the shoreline, whether it be for housing, industry, port, airport, public facility, wildlife area, or other use. For infill projects, in-lieu access to another location, preferably near the project site, should be provided.
- **Public Access Policy IV.2** directs public access to be sited, designed, managed, and maintained to avoid significant adverse impacts from sea-level rise and shoreline flooding.
- **Public Access Policy IV.9** encourages access to and along the waterfront by walkways, trails, or other appropriate means as well as connections to the nearest public thoroughfare where convenient parking or public transportation may be available.
- **Public Access Policy IV.11** encourages coordination between federal, state, regional, and local jurisdictions, special districts, and BCDC to provide appropriately sited, designed, and managed public access, especially to link the entire series of shoreline parks, regional trail systems (such as the Bay Trail), and existing public access areas to the extent feasible without additional San Francisco Bay filling and without significant adverse effects on San Francisco Bay natural resources. State, regional, and local agencies that approve projects should ensure that provisions for public access to and along the shoreline are included as conditions of approval and that the access is consistent with BCDC's requirements and guidelines.

The Bay Plan identifies priority uses for the San Francisco Bay shoreline. These priority uses are identified on the Bay Plan maps and defined as ports, water-related industry, water-oriented recreation, airports, or wildlife refuges. According to Bay Plan Map No. 5 (Central Bay),[73] Mission Rock is part of the "China Basin" and identified as a water-related industry priority use area. Policies related to this area are further specified in the San Francisco Waterfront Special Area Plan, as described below. The proposed project includes development that would be consistent with Bay Plan recreation and public access policies (see Chapter 3, *Plans and Policies*).

San Francisco Waterfront Special Area Plan. The San Francisco Waterfront Special Area Plan was adopted by BCDC on April 3, 1975, to provide detailed planning and regulatory guidelines for the waterfront of San Francisco, from the east side of Hyde Street Pier to the south side of India Basin. The San Francisco Waterfront Special Area Plan, an element of the Bay Plan, applies the requirements of the McAteer-Petris Act[74] and the provisions of the Bay Plan to the San Francisco waterfront in greater detail. Among many goals and policies, the primary recreational purpose of the San Francisco Waterfront Special Area Plan is to increase public use and enjoyment of San Francisco Bay and the waterfront through the completion of a system of integrated public parks, plazas, pier public access areas, and promenades. Mission Rock is located along the Port of San Francisco's (Port's) Southern Waterfront, which stretches between China Basin and Earl Street at India Basin and contains most of the current maritime activity of the Port.[75] General policies related to public access and open space include the following:

- **Policy 6a.** In accordance with general Bay Plan policies, maximum feasible public access should be provided in conjunction with any development in the area covered by this Special Area Plan. Public access should be located at ground or platform level, but minor variations in elevation intended to enhance design of open space may be permitted. Public access should also be open to the sky, although some covering may be allowed if it serves the public areas and does not support structures. Particular attention should be given to the provision of perimeter public access along the platform edge. Other uses may extend to the platform edge subject to the following conditions:

  i) Such uses should enhance the total design of the project, should serve to make the public access more interesting, and should not divert the public way along more than 20 percent of the total platform edge;

  ii) Deviations of the public way from the platform edge should be limited to short distances.

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[73] San Francisco Bay Conservation and Development Commission. n.d. *San Francisco Bay Plan*. Available: http://www.bcdc.ca.gov/pdf/bayplan/Plan_Map_5.pdf. Accessed: December 22, 2016.

[74] The McAteer-Petris Act serves as the key legal provision under California state law to preserve San Francisco Bay from indiscriminate filling. Available: http://www.bcdc.ca.gov/laws_plans/mcateer_petris.shtml. Accessed: September 11, 2015.

[75] San Francisco Bay Conservation and Development Commission. n.d. *San Francisco Waterfront Special Area Plan*, Available: http://www.bcdc.ca.gov/sfwsap/SFWSAP_Final_2012.pdf. Accessed: December 22, 2016.

- **Policy 6b.** Development of public access should be required as a condition of permits for new maritime and nonmaritime development. The location of such access obtained as a condition of maritime development between Channel Street and India Basin should be guided by the designations for public recreation, open space, and public access, as found on Special Area Plan Maps 5 and 6.

According to Special Area Plan Map 5 of the San Francisco Waterfront Special Area Plan, the portion of the project site (bounded by China Basin to the north, Terry A. Francois Boulevard to the south, Third Street to the west, and the San Francisco Bay to the east) is specifically designated as a public recreation and access area. This area is encompassed by the existing China Basin Park. The proposed Mission Rock project would retain and expand China Basin Park, consistent with the San Francisco Waterfront Special Area Plan.

Bay Trail Plan. The Association of Bay Area Governments (ABAG) Bay Trail Plan (Bay Trail Plan) proposes development of a 500-mile regional hiking and biking trail around the perimeter of San Francisco and San Pablo Bays. The Bay Trail Plan was prepared by ABAG pursuant to Senate Bill 100, which mandated that the Bay Trail provide connections to existing park and recreational facilities, create links to existing and proposed transportation facilities, and be planned in such a way as to avoid adverse effects on environmentally sensitive areas.[76] The Bay Trail Plan also contains five categories of policies to guide selections of the trail route and implementation of the trail system, comprising trail alignment, trail design, environmental protection, transportation access, and implementation policies.

The Enhanced Water Trail Plan. Led by the State Coastal Conservancy, the Enhanced Water Trail Plan strives to create a network of launch and landing sites, or "trailheads," to allow people in nonmotorized boats and beachable sail craft to enjoy San Francisco Bay.[77] The Enhanced Water Trail Plan is a guide to trail implementation for the agencies and organizations that will develop and manage water trail access points and programs as well as trail proponents and other stakeholders who are also involved in implementation. Recommended policies and procedures in the Enhanced Water Trail Plan define how the trail will take shape over time by guiding planning, development, and management on organizational, programmatic, and trailhead project–specific levels.

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[76] San Francisco Bay Trail. 1999. *Bay Trail Plan Summary*. Available: http://baytrail.org/wp-content/uploads/2015/12/San-Francisco-Bay-Trail_-Bay-Trail-Plan-Summary.pdf. Accessed: December 22, 2016.

[77] California State Coastal Conservancy. 2011. *Enhanced San Francisco Bay Area Water Trail Plan*. December. Available: http://sfbaywatertrail.org/wp-content/uploads/2015/05/Enhanced-Water-Trail-Plan-Dec2011.pdf. Accessed: December 22, 2016.

LOCAL

San Francisco General Plan. The General Plan provides long-term guidance and policies for maintaining and improving the quality of life as well as the man-made and natural resources of the community. The following objectives and policies from the Recreation and Open Space Element of the General Plan are applicable to the proposed project:

- Objective 1: Ensure a well-maintained, highly utilized, and integrated open space system.
- Policy 1.1: Encourage the dynamic and flexible use of existing open spaces and promote a variety of recreation and open space uses, where appropriate.
- Policy 1.5: Prioritize the better utilization of McLaren Park, Ocean Beach, the Southeastern Waterfront, and other underutilized significant open spaces.
- Policy 1.7: Support public art as an essential component of open space design.
- Policy 1.9: Preserve sunlight in public open spaces.
- Policy 1.10: Ensure that open space is safe and secure for the city's entire population.
- Policy 1.12: Preserve historic and culturally significant landscapes, sites, structures, buildings, and objects.
- Policy 1.13: Preserve and protect character-defining features of historic resources in city parks when it is necessary to make alterations to accommodate new needs or uses.
- Objective 2: Increase recreation and open space to meet the long-term needs of the city and bay region.
- Policy 2.1: Prioritize acquisition of open space in high-needs areas.
- Policy 2.2: Provide and promote a balanced recreation system that offers a variety of high-quality recreational opportunities for all San Franciscans.
- Policy 2.4: Support the development of signature public open spaces along the shoreline.
- Policy 2.8: Consider repurposing underutilized City-owned properties as open space and recreational facilities.
- Objective 3: Improve access and connectivity to open space.
- Policy 3.2: Establish and implement a network of green connections that increases access to parks, open spaces, and the waterfront.
- Policy 3.3: Develop and enhance the city's recreational trail system, linking to the regional hiking and biking trail system, and consider restoring historic watercourses to improve stormwater management.

- Policy 3.4: Encourage nonauto modes of transportation (transit, bicycle, and pedestrian) to and from open spaces while reducing automobile traffic and parking in public open spaces.
- Policy 3.5: Ensure that, where feasible, recreational facilities and open spaces are physically accessible, especially for those with limited mobility.
- Objective 4: Protect and enhance the biodiversity, habitat value, and ecological integrity of open spaces and encourage sustainable practices in the design and management of our open space system.
- Policy 4.3: Integrate the protection and restoration of local biodiversity into open space construction, renovation, management, and maintenance.
- Policy 4.4: Include environmentally sustainable practices in construction, renovation, management, and maintenance of open space and recreational facilities.

The following objectives and policies from the Community Facilities Element of the General Plan are applicable to the proposed project:

- Policy 1.2: Provide the number of district stations that balances service effectiveness with community desires for neighborhood police facilities.
- Objective 5: Develop a system of firehouses that will meet the operating requirements of the fire department for providing fire protection services and be in harmony with related public service facilities and all other features and facilities of land development and transportation provided for other sections of the General Plan.
- Objective 6: Develop a public library system in San Francisco that will make adequate and efficient library service freely available to everyone within the city and be in harmony with related public service facilities and all other features and facilities of land development and transportation provided for in other sections of the General Plan.
- Objective 8: Ensure that public school facilities are distributed and located in a manner that will enhance their efficient and effective use.
- Objective 8.1: Provide public school facilities for education in accordance with the need for such facilities, as defined by the Unified School District and Community College District. Locate such facilities according to the Public School Facilities Plan and, wherever possible, make available for community use.

San Francisco Fire Code. The San Francisco Fire Code incorporates by reference the California Fire Code, with certain local amendments. The Port Building Code adopts the San Francisco Fire Code by reference. The San Francisco Fire Code regulates and governs the safeguarding of life and property from fire and explosion hazards arising from the storage, handling, and use of hazardous substances, materials, and devices as well as conditions that are hazardous to life or

property in the occupancy of buildings and premises; provides for the issuance of permits, inspections, and other SFFD services; and allows for the assessment and collection of fees for those permits, inspections, and services.

The SFFD reviews building plans to ensure that certain fire and life safety features are provided and maintained in the buildings that fall under its jurisdiction. In coordination with the San Francisco Department of Building Inspection, the SFFD conducts plan checks to ensure that all structures, occupancies, and systems are designed in accordance with the San Francisco Fire Code and the governing building code.

Section 511 (Local Fire Safety Feature Requirements) of the San Francisco Fire Code requires buildings that are 200 feet or more in height to provide at least one elevator that has been approved by the fire department for firefighter use under fire conditions (San Francisco Fire Code Ordinance No. 200-13). The system must be tested and maintained pursuant to Fire Department Administration Bulletin 5.07. San Francisco Fire Code Section 503 (Fire Apparatus Access Roads) and the San Francisco Public Works 2015 Subdivision Regulations (Order No. 183447) establish requirements for minimum street widths to facilitate emergency equipment access.

San Francisco Police Code. The San Francisco Police Code contains regulations for various types of activities, such as automobile use, permitting and licensing, and disorderly conduct. The San Francisco Noise Ordinance (Noise Ordinance) is also part of the San Francisco Police Code (Article 29, San Francisco Police Code, Section 2900). See Section 4.F, *Noise*, for more information regarding the San Francisco Noise Ordinance.

Open Space 2100. The Planning Department, in conjunction with the RPD, the mayor's office, and the Neighborhood Parks Council, is currently evaluating the open space needs of the entire city for the next 100 years. As part of Open Space 2100, a draft open space framework is being developed that includes three components: Citywide Vision for Open Space, which provides a broad outline of the city's ideal open space network over the next 100 years; the recent update to the Recreation and Open Space Element of the General Plan, adopted in April 2014; and the short-term Action Plan, which will be a set of 5- and 10-year implementation programs.[78]

San Francisco Planning Code. Seawall Lot 337 and Parcel P20, both of which are part of the project site, are in a Mission Bay Open Space (MB-OS) Use District. The MB-OS Use District was established in connection with the previously superseded Mission Bay Plan, which, unlike the current plan, included Seawall Lot 337. The principal or exclusive purpose for land in the MB-OS district is to provide open space, with additional development strictly limited. Only recreational uses and those uses that are incidental to and supportive of recreational use are

[78] San Francisco Parks Alliance. n.d. *Open Space San Francisco: 2100*. Available: http://oldsite.sfnpc.org/programs/openspace2100/. Accessed: March 14, 2017.

permitted in these districts. Pier 48, also part of the project site, is within a Heavy Industrial (M-2) Use District, which requires at least 36 gsf of usable open space per dwelling unit if the open space is private and 48 gsf of usable open space per dwelling unit if the open space is public. Proposition D, the Mission Rock Affordable Housing, Parks, Jobs, and Historic Preservation Initiative, which was approved by San Francisco voters on November 3, 2015, amended the height and bulk restrictions for the project site by establishing the Mission Rock Height and Bulk District. As described in Chapter 2, *Project Description*, the project sponsor would seek approval to rezone the project site through a Special Use District (SUD) that would be codified in the Zoning Map to reflect the proposed boundaries of the SUD. Approval of the proposed SUD would bring the proposed project into conformance with the Planning Code and Zoning Map, as previously amended by Proposition D.

San Francisco Recreation and Parks 2016-2020 Strategic Plan. The RPD Strategic Plan sets forth RPD's core strategies and objectives, and lays out specific initiatives for RPD to achieve. The strategies of the RPD Strategic Plan include: inspire public space, inspire play, inspire investment, inspire stewardship, and inspire our team.[79]

San Francisco Public Library Strategic Plan. The SFPL Strategic Plan, adopted in 2003 as part of the BLIP, is the library's guiding policy and planning document. The SFPL Strategic Plan does not set a standard for library service but does provide every library with a unifying organizational vision and system-wide goals. Some of the overarching goals are to develop and maintain library programs that are community based, provide programming of interest to neighborhoods, and renovate facilities to reflect the unique characteristics of the neighborhoods they serve and enhance the library, making it an inviting and useful place to visit.[80]

San Francisco Blue Greenway Planning and Design Guidelines. The Blue Greenway is a City project to improve a 13-mile-long portion of the 500-mile-long, nine-county, region-wide Bay Trail as well as the newly established San Francisco Bay Area Water Trail and associated waterfront open space system.81 The alignment of the Blue Greenway generally follows the alignment of the Bay Trail and Bay Area Water Trail north to south from China Basin Channel to the San Francisco county line.

The Blue Greenway Planning and Design Guidelines document presents the following elements: Linking and Connector Streets; Signage, Interpretation and Art; Site Furnishings; Planting and Landscape Plan; Port Open Space Use and Program Concepts; and Project Costs

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[79] San Francisco Recreation and Park Department. *Strategic Plan 2016-2020*. Available: http://sfrecpark.org/wp-content/uploads/RPD-Strategic-Plan-FY16-20.pdf. Accessed: April 17, 2017.

[80] San Francisco Public Library. 2003. *San Francisco Public Library Strategic Plan 2003–2006*. Available: https://archive.org/details/sanfranciscopubl2200sanf. Accessed: April 13, 2016.

[81] Port of San Francisco, *Blue Greenway – Planning and Design Guidelines*. 2012. July. Available: http://www.sf-port.org/modules/showdocument.aspx?documentid=8344. Accessed: December 22, 2016.

and Implementation. The guidelines include objectives, conceptual designs, and use criteria for proposed Port open spaces, including China Basin Park. 82 The guidelines prescribe the following objectives for China Basin Park:

- Develop an open space program that provides substantial visitor-serving public open space and other neighborhood-oriented open spaces to serve the recreational needs of the residential uses developed on the site and key components of the Bay Trail and Blue Greenway. These two types of open spaces are not mutually exclusive and may overlap but must serve discreet needs.
- Expand China Basin Park and create other public open space amenities that increase public enjoyment and views of San Francisco Bay, AT&T Park, Mission Creek Channel, East Bay hills, Yerba Buena Island, and the Bay Bridge and create a unique and complementary addition to the network of parks and open space along the San Francisco waterfront and in Mission Bay.

The following use concepts were identified as appropriate and compatible for China Basin Park: a waterfront promenade, passive recreation, seating and viewing areas, family-oriented picnic areas, launches for small nonmotorized craft, public art, large public gathering areas, cafés/food kiosks, and restrooms.[83] These concepts were developed through a public planning process and suitability analysis, as conducted under and described in the Blue Greenway Design Standards. The intent is that, as the planning and design of this open space are refined, the program of uses would also be refined and updated.

Port of San Francisco Waterfront Land Use Plan and Waterfront Design and Access Element. The Port of San Francisco Waterfront Land Use Plan (WLUP) applies goals and policies to guide development and revitalization of the city's 7.5-mile-long waterfront area within the jurisdiction of the San Francisco Port Commission.[84] The Port, as trustee of these public lands, is required to promote maritime commerce, navigation, and fisheries; protect natural resources; and develop recreational facilities for public use. Goals set forth by the WLUP include the following:[85]

- New investment should stimulate the revitalization of the waterfront, providing new jobs, revenues, public amenities, and other benefits to the port, the city, and the state.

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82 Port of San Francisco, *Blue Greenway – Planning and Design Guidelines*. 2012. July. Available: http://www.sf-port.org/modules/showdocument.aspx?documentid=8344. Accessed: December 22, 2016.

83 Port of San Francisco, *Blue Greenway – Planning and Design Guidelines*. 2012. July. Available: http://www.sf-port.org/modules/showdocument.aspx?documentid=8344. Accessed: December 22, 2016.

84 Port of San Francisco. n.d. *Waterfront Land Use Plan*. Available: http://sfport.com/ftp/uploadedfiles/about_us/divisions/planning_development/ch1.pdf. Accessed: December 22, 2016.

85 Port of San Francisco. n.d. *Waterfront Land Use Plan*. Available: http://sfport.com/ftp/uploadedfiles/about_us/divisions/planning_development/ch1.pdf. Accessed: December 22, 2016.

- Port lands should host a diverse and exciting array of maritime, commercial, entertainment, civic, open space, recreational, and other waterfront activities for all San Franciscans and visitors to enjoy.
- A network of parks, plazas, walkways, open space, and integrated transportation improvements should improve access to, and enhance the enjoyment and appreciation of, the Bay environment.
- Improvement should respect and enhance the waterfront's historic character while also creating new opportunities for San Franciscans to integrate port activities into their daily lives.
- The design of new developments should be of exemplary quality and should highlight visual and physical access to and from the Bay while respecting the waterfront's rich historic context and the character of neighboring development.

Policies applicable to recreation and open space are as follows:[86]

- **Policy 1:** Ensure a diversity of open spaces and public access, which may be achieved in different ways, depending on location (e.g., places that provide access to water, quiet places, contemplative places for passive enjoyment, active places for civic gatherings and other urban events that draw large crowds, places for biking and foot races, places that restore the environment and support wildlife habitats, places to learn about waterfront activities and the Bay environment, places that appeal to children and seniors).
- **Policy 4:** Provide public access around the perimeter of piers wherever safe and feasible, as indicated in the Waterfront Design and Access Element and the BCDC Special Area Plan.

The South Beach/China Basin Waterfront subarea of the WLUP extends from Pier 22½ to Mariposa Street, encompassing the project site. An objective of the South Beach/China Basin subarea plan that is applicable to recreation and open space calls for the promotion of activities and public access to make the waterfront inviting and safe and improve the living environment of the new and emerging Rincon Hill, South Beach, and Mission Bay neighborhoods.

The WLUP strongly encourages that, where feasible and consistent with the Bay Plan and the public trust,[87] new commercial development on piers should be a part of mixed-use developments that include maritime uses, open space, and public access activities that bring daytime and nighttime activity to the waterfront.

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[86] Port of San Francisco. n.d. *Waterfront Land Use Plan, Subarea Plan for South Beach/China Basin Waterfront.* Available: http://sfport.com/ftp/uploadedfiles/about_us/divisions/planning_development/ch4SBCB.pdf. Accessed: December 22, 2016.

[87] The public trust imposes certain use restrictions on historical tidal and submerged lands along the waterfront to protect the interests of the people of the state of California for commerce, navigation, and fisheries as well as other public benefits recognized to further trust purposes, such as recreation and environmental preservation.

In concert with the WLUP, the Port's Waterfront Design and Access Element sets forth policies to direct the locations and types of public access, open spaces, public view corridors, and historic resources and provide site-specific design criteria for San Francisco's waterfront. The element provides specific design and access criteria and objectives for the Mission Bay waterfront, including open space, historic preservation, massing, orientation, and architectural details.[88]

ENVIRONMENTAL IMPACTS

This section provides the impact analysis related to public services and recreation for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

SIGNIFICANCE CRITERIA

The proposed project would have a significant effect if it would:

- Result in substantial adverse physical impacts associated with the provision of or the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times, or other performance objectives for any public services (e.g., fire protection, police protection, schools, parks, or other services).
- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.
- Physically degrade existing recreational resources.

METHODS FOR ANALYSIS

Impacts on public services and recreation would occur if the proposed project were to result in (1) substantial adverse physical impacts associated with the provision of or a need for new or physically altered public service facilities, the construction of which could cause significant environmental impacts, related to maintaining acceptable levels of service as a result of increased demand; (2) increased use of existing parks or recreational facilities such that

[88] Port of San Francisco. 2009. *Waterfront Design and Access – An Element of the Waterfront Land Use Plan*. Available: http://www.sf-port.org/index.aspx?page=293. Accessed: December 22, 2016.

substantial physical deterioration/physical degradation would occur; or (3) adverse physical environmental impacts associated with the construction of public service facilities. Other effects that could result from the proposed project, such as increased crime, public drinking, vandalism, and activities that may diminish the quality of life for residents in the project area, are not considered CEQA impacts unless they meet the above criteria. These quality-of-life issues would be considered as part of the City's project planning and approval process, not as part of the CEQA environmental review process.

This analysis considers whether the proposed project would require the construction of new governmental or recreational facilities or alterations to such facilities to maintain acceptable performance standards for public services. If it is determined that new or altered facilities would be required to serve the proposed project, then the analysis evaluates whether the construction of such facilities would have a substantial adverse physical impact on the environment. If the proposed project were to result in increased demand for fire protection, police protection, schools, parks, or other public services, there could be economic impacts unrelated to the construction of new or altered facilities. However, costs that are incurred by the agencies that provide these services would not be considered environmental impacts under CEQA; therefore, mitigation measures to compensate public service agencies for such costs are not addressed in the CEQA environmental review.

For the purpose of this analysis, it is assumed that project improvements would be designed and constructed in compliance with all applicable building and fire codes.

LAND USE ASSUMPTIONS

Impacts on public services and recreation occur because of increased demand from the increased population in the service area. Population changes induced by the proposed project are analyzed in Section 4.C, *Population and Housing*.

Compared with existing conditions, development under the High Commercial (see Table 4.J-6 on the following page) and High Residential (see Table 4.J-7 on the following page) land use assumptions would involve both residential growth and employment growth in the project area following the construction period. However, because of the different development scenarios contemplated under each land use assumption, the number of employees and residents would differ. As shown in Table 4.J-6, the High Commercial Assumption would generate 2,350 residents and 6,050 employees onsite. Based on the percent of city employees who live in the city (50.4 percent), the average number of workers per household in the city (1.35), and the average number of persons per household in the city (2.35), the 6,050 employees associated with the High Commercial Assumption would indirectly induce an additional 5,310 residents in the city, for a total of 7,660 residents. As shown in Table 4.J-7, the High Residential Assumption would generate 3,760 residents and 4,510 employees onsite. Applying the same factors noted

TABLE 4.J-6. PROPOSED ONSITE RESIDENTS AND EMPLOYEES—HIGH COMMERCIAL ASSUMPTION

Land Use	Gross Square Footage (gsf)/Units	Generation Rate	Estimated Residents/Employees[a]
Onsite Residents			
Residential	1,100,000 gsf/1,000 units	2.35 persons/household	2,350 residents
Total Project Residents			*2,350 residents*
Employees			
Commercial	1,400,000 gsf	276 gsf/employee	5,070 employees
Active Retail	244,800 gsf	327 gsf/employee	750 employees
Residential	1,000 units	1 employee/32 units	30 employees
Pier 48	242,500 gsf	—	200 employees
Total Project Employees			*6,050 employees*
Employee-Induced City Residents			
Employees Who Also Live in the City		50.4%	3,050 employee/residents
Employee-Induced Housing Demand		1.35 employees/household	2,260 households
Employee-Induced Residents		*2.35 persons/household*	*5,310 residents*
Total Project-Induced Population Growth in City			***7,660 residents***

Sources: Adavant Consulting, 2015; U.S. Census Bureau. 2014. ACS. One-year estimate. IDs B08406, B08008, S0501.

TABLE 4.J-7. PROPOSED ONSITE RESIDENTS AND EMPLOYEES—HIGH RESIDENTIAL ASSUMPTION

Land Use	Gross Square Footage/Units	Generation Rate	Estimated Residents/ Employees[a]
Onsite Residents			
Residential	1,600,000 gsf/1,600 units	2.35 persons/household	3,760 residents
Total Project Residents			*3,760 residents*
Employees			
Commercial	972,200 gsf	276 gsf/employee	3,520 employees
Active Retail	241,000 gsf	327 gsf/employee	740 employees
Residential	1,600 units	1 employee/32 units	50 employees
Pier 48	242,500 gsf	—	200 employees
Total Project Employees			*4,510 employees*
Employee-Induced City Residents			
Employees Who Also Live in the City		50.4%	2,270 employee-residents
Employee-Induced Housing Demand		1.35 employees/household	1,680 households
Employee-Induced Residents		*2.35 persons/household*	*3,960 residents*
Total Project Population Growth in City			***7,720 residents***

Sources: Adavant Consulting 2015; U.S. Census. 2014. ACS. One-year estimate, IDs B08406, B08008, S0501.

above, the 4,510 employees associated with the High Residential Assumption would indirectly induce an additional 3,960 residents in the city, for a total of 7,720 residents. The special-event/assembly areas at China Basin Park and Mission Rock Square would be able to hold about 5,000 people and 2,000 people, respectively. Special events would be held in these areas occasionally throughout the year.

Unless specified otherwise, general references to the proposed project refer to either land use assumption because the total number of residents is similar and would not affect the conclusions presented in this section.

IMPACTS AND MITIGATION MEASURES

Impact PS-1. The proposed project would increase demand for fire protection services but not to such an extent that construction of new or expanded facilities would be required. (Less than Significant)

The proposed project would include new residential and commercial development that could increase demand for fire protection services.

CONSTRUCTION IMPACTS

Construction activities have the potential to result in accidental onsite fires from such sources as the operation of mechanical equipment and the use of flammable construction materials. However, in compliance with Occupational Safety and Health Administration (OSHA) and fire and building code requirements, construction managers and personnel would be trained in emergency response and fire safety operations, which include the monitoring and management of life safety systems and facilities. Additionally, fire suppression equipment (e.g., fire extinguishers) would be maintained onsite. Furthermore, construction would occur in compliance with all applicable federal, state, and local requirements concerning the handling, disposal, use, storage, and management of hazardous waste. Thus, impacts to fire protection during construction would be temporary and ***less than significant***.

OPERATIONAL IMPACTS

Calls for Service and Response Times. The SFFD anticipates that the proposed project, under either the High Commercial Assumption or the High Residential Assumption, would increase the number of calls for service directed to Fire Station 4, adding approximately 1,200 calls per year, which would approximately double the number of calls placed to Fire Station 4 between March 30, 2015, and March 30, 2016.[89] Therefore, the proposed project would cause a

[89] Hayes-White, Joanne. Chief of Department. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on March 24, 2017.

substantial increase in the call volume for Fire Station 4. The additional resources that would be required to alleviate the estimated increase in demand, according to the SFFD, are discussed below.

Under either the High Commercial Assumption or the High Residential Assumption, the 11 blocks on Seawall Lot 337 could be developed with buildings that would range in height from 90 feet (approximately six stories) to a maximum of 240 feet (approximately 23 stories), excluding mechanical and other accessory penthouse roof enclosures, which would extend up to 20 feet (40 feet on Block F) above the roofline heights. Buildings that are taller than three stories generally increase emergency response times (i.e., up to twice as long compared with average response times for single-occupancy residences or buildings that are three stories or less). Response times may, however, be substantially improved if responders are accommodated on arrival or have access to an "emergency mode" of elevator transport (preventing noncritical elevator stops).

Because the City and Port incorporate the latest CBC requirements in their respective building codes, new buildings and facilities in the project area are required to be sited and designed in accordance with the most current life-safety standards, including those buildings with towers. These standards would apply to the proposed project, and adherence to all applicable CBC and fire code provisions would ensure that the project would allow for efficient emergency response. Requirements pertaining to the water volume and pressure needed for fire suppression onsite, as well as fire-flow volume and duration, would vary depending on the specific area of the project site in question. As part of the proposed project, new fire hydrants would be provided and spaced in accordance with City requirements. As discussed in Section 4.K, *Utilities and Service Systems*, if the SFFD determines that improvements to the AWSS are necessary to serve the proposed project, such improvements would be coordinated with and subject to approval by the SFFD during the design review and permitting process. The project sponsor would work with the SFFD to determine utility and access requirements for fire protection and emergency services at the project site during construction and operation.

One NOP comment expressed concern over access for emergency vehicles at the City's Public Safety Building and Police Headquarters at Third and Mission Rock Streets, immediately south of the project site. As discussed in Section 4.E, *Transportation and Circulation*, adequate emergency access throughout the project site and at surrounding properties would be maintained under the proposed project, including during events at the project site and at the adjacent AT&T Park; thus, the proposed project would not affect access for emergency vehicles at the Public Safety Building and Police Headquarters.

As previously discussed, data for the project area indicate that current response times average around 4 minutes and 6 seconds.[90] The City's Public Safety Building and Police Headquarters (including Fire Station 4, which would serve the project site) is located at Third and Mission Rock Streets, immediately south of the project site. As such, the proximity of the City's Public Safety Building and Police Headquarters to the project site would reduce the distance responders would need to travel to respond to emergencies on the site, and, therefore, would contribute to minimizing the response time associated with the additional demand on fire services generated by the project. However, longer-than-average response times could result with project implementation when more than one call is in the system for Fire Station 4. According to the SFFD, although the proposed project would provide adequate emergency access to the project site and within the proposed high-rise buildings, Battalion 3, which would serve the project site, could become strained as a result of the project.[91] As such, according to the SFFD, battalions would need to be redistricted, an additional battalion chief would be needed (as discussed below), and an additional ambulance would need to be staged in the project area (as discussed below) to alleviate the project-related fire protection coverage strain and maintain the state's response-time standard of 5 minutes for fire suppression and emergency medical incidents.[92]

Personnel, Equipment, and Facilities. The SFFD has a service ratio of approximately 0.89 fire personnel per 1,000 residents, based on the city's existing population.[93] This analysis conservatively considers the High Residential Assumption because it would generate more residents and, thus, have a greater potential impact on the SFFD's personnel-to-resident ratio.

Operation under the High Residential Assumption could result in approximately 7,720 new residents in the city, which would only slightly degrade the existing SFFD service ratio to 0.88 fire personnel per 1,000 residents with current staffing levels.[94] Thus, seven additional SFFD employees would be needed to maintain the existing citywide service ratio. The seven additional SFFD employees could be located at fire stations throughout the city.[95] In addition, as discussed above, the SFFD has indicated that the fire protection demand associated with the proposed project could place a strain on current staffing levels, requiring additional resources to

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[90] Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

[91] Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

[92] Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

[93] 0.89 = (757 fire safety personnel/service population [852,000]) × 1,000 residents.

[94] 0.88 = (757 fire safety personnel/[service population [852,000]) + new city residents generated by the project (7,720)] × 1,000 residents.

[95] Cofflin, Ken. Port Fire Marshal. San Francisco Fire Department. Personal communication with Jessica Viramontes, ICF International. Received on December 7, 2016.

provide adequate fire and emergency medical service protection.[96] Specifically, an additional battalion chief would be needed, and an additional ambulance would need to be staged in the project area. As discussed below, the project would contribute additional revenue to the City's General Fund, which provides funding for SFFD personnel and equipment. According to the SFFD, the redistricting of the battalions would alleviate the strain on the SFFD.[97]

As discussed in Section 4.E, *Transportation*, the project site can accommodate the parking needs of ambulances and emergency vehicles; therefore, according to the SFFD, no physical changes are necessary to stage an ambulance in the project area.[98] Thus, the proposed project would not represent an increase in demand for fire protection or emergency services that would be substantial enough to warrant the construction of a new facility or expansion of an existing station.

As discussed above, response times from existing facilities to the project site would not be affected substantially with the increased project-related demand for fire and emergency medical services, although, as noted above, longer-than-average response times could result with project implementation when more than one call is in the system for Fire Station 4. Although the increase in call volumes due to the proposed project would most likely result in increased wear and tear on vehicles, additional maintenance, and the eventual replacement of equipment at a faster rate, the project would contribute additional revenues to the City's General Fund, which supports SFFD's ongoing personnel, equipment, and maintenance needs. Because the proposed project would not result in the need to construct or expand facilities for fire or emergency services, no substantial adverse environmental impacts associated with the construction or alteration of fire or emergency service facilities to maintain acceptable service ratios, response times, or other performance objectives would occur. Based on the above, fire protection service impacts as a result of the proposed project would be ***less than significant***.

Impact PS-2. The proposed project would increase demand for police services but not to such an extent that construction of new or expanded facilities would be required. (Less than Significant)

The proposed project would include new residential and commercial development, which could increase demand for police services. The SFPD bases its assessment of the need for services not just on population growth but also on calls for service, the types and times of traffic and pedestrian flow patterns, and the operational hours of uses within the Southern District.

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[96] Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

[97] Kennedy, Jessica. Senior Analyst/Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

[98] Conley, Nalungo. Support Services. San Francisco Fire Department. Email to Jessica Viramontes, ICF International. Received on October 10, 2016.

The increase in population on the site would increase the number of calls for service to the site, modify traffic and pedestrian flow patterns, and increase daytime and nighttime activity in and around the project site. This analysis conservatively considers the High Residential Assumption because it would generate more residents than the High Commercial Assumption and, thus, have a greater potential impact on police service.

CONSTRUCTION IMPACTS

When not properly secured, construction sites can attract theft and vandalism and contribute to a temporary increase in demand for police protection services. The construction contractor would implement temporary security measures including security fencing, lighting, and locked entry to secure the project site during construction, in accordance with standard construction practices. Impacts to police protection during construction would be temporary and ***less than significant***.

OPERATIONAL IMPACTS

Calls for Service and Crime Rate. The Southern District, with a population of 38,160 residents, experienced 11,868 crimes in 2015, about 0.311 crimes per person. The SFPD anticipates that the proposed project, under either the High Commercial Assumption or the High Residential Assumption, would increase the number of calls for service within the Southern District. The proposed project would add an estimated 7,720 or 7,660 residents to the city under the High Commercial Assumption or High Residential Assumption, respectively. In addition, the proposed retail space may increase the number of calls for service because of theft or other types of crimes[99] as well as the addition of employees to the project site (approximately 6,050 employees under the High Commercial Assumption and 4,510 employees under the High Residential Assumption).

Personnel, Equipment, and Facilities. The SFPD has a Southern District service ratio of approximately 3.83 sworn officers per 1,000 residents and a citywide service ratio of 2.01 sworn officers per 1,000 residents.[100][101] This analysis conservatively considers the High Residential Assumption because it would generate more residents and, thus, would have a greater potential impact on police service. Operations under the High Residential Assumption could result in approximately 7,720 new residents in the city. This analysis conservatively assumes that all of the new residents would live in the Southern District, which would only slightly degrade the existing SFPD service ratio for the Southern District to 3.18 sworn officers per 1,000 residents

[99] Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

[100] 3.83 = (146 police personnel/service population [38,160]) × 1,000 residents.

[101] 2.01 = (1,716 police personnel/service population [852,000]) x 1,000 residents.

with current staffing levels.[102] Thus, 30 additional SFPD sworn officers would be needed to maintain the existing service ratio within the Southern District. They would be housed both across the street and in nearby areas, depending on the locations of the service calls. Of the 7,720 new residents in the city, 3,960 would be employee-induced city residents and could live outside of the Southern District, which would only slightly degrade the existing SFPD service ratio for the city to 2.00 sworn officers per 1,000 residents with current staffing levels.[103] Thus, four additional SFPD sworn officers would be needed to maintain the existing service ratio within the Southern District. In addition, the SFPD has indicated that demands associated with the proposed project could place a strain on current staffing levels, requiring additional staffing because of the increase in calls for service.[104] Although the SFPD is currently experiencing a deficiency of 255 sworn officers from the mandated minimum of 1,971 officers citywide, the SFPD is on track to reach the mandated minimum through current recruiting and hiring efforts.[105] In addition, the Board of Supervisors has passed a resolution to increase the mandated minimum staffing level to 2,200 sworn officers. Thus, it is anticipated that the additional staffing needed as a result of the proposed project (i.e., 30 officers) would be accommodated within the SFPD's efforts to reach its mandated minimum staffing levels and would not represent an increase that would be substantial enough to warrant the construction of a new facility or expansion of an existing station. Furthermore, the SFPD indicated that it will meet the increased demand with data-driven deployments, which involve continuous analysis of crime trends and incident data, to remain flexible and efficient.[106,107] In addition, the City's Public Safety Building and Police Headquarters (including the Southern District, which would serve the project site) is located at Third and Mission Rock Streets, immediately south of the project site. As such, the proximity of the City's Public Safety Building and Police Headquarters to the project site would reduce the distance officers would need to travel to calls for service on the site, and, therefore, would minimize the response time associated with the additional demand on police services generated by the project. Finally, the SFPD stated that no new additional facilities are planned or necessary as a result of the proposed project.[108]

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[102] 3.18 = (146 police personnel/[service population (38,160) + new residents generated by the project (7,720)] × 1,000 residents.

[103] 2.00 = (1,716 police personnel/[service population (852,000) + new employee-inducted city residents generated by the project (3,960)] × 1,000 residents.

[104] Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

[105] Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

[106] Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

[107] Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on October 7, 2016.

[108] Pedrini, Chris. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF. Received on March 15, 2017.

The SFPD recognizes the need to expand some facilities as the population of the city increases, including, but not limited to, the Crime Lab Facility/Traffic Division and Evidence Storage, and increase equipment procurement. Collectively, these efforts, which are not specifically in response to the proposed project, are designed to respond to the needs of the city on a program-wide basis and ensure that adequate response times and distributions for police officers are achieved.

The SFPD will continue to evaluate its performance, based on response times, and, when appropriate, reallocate resources to accommodate the need for services in specific parts of the city if and when conditions warrant. Furthermore, although the proposed project would increase the resident and daytime population at the project site, it would not result in unplanned population growth. As discussed in Section 4.C, *Population and Housing*, the population, housing, and employment generated by the proposed project would fall within Association of Bay Area Governments projections for the city; therefore, this growth has already been factored into SFPD forecasts, and the SFPD will increase staffing accordingly. As such, the proposed project would not result in substantial adverse environmental impacts associated with the construction or alteration of police service facilities to maintain acceptable service ratios, response times, or other performance objectives. Thus, based on the foregoing, police protection service impacts as a result of the proposed project would be ***less than significant***.

Impact PS-3. The proposed project would increase demand for school services but not to such an extent that construction of new or expanded facilities would be required. (Less than Significant)

The proposed project would include new residential development, which could generate students who would attend local public schools. To analyze project demand on schools, estimates of the number of students generated by the proposed project were made by using student generation rates that varied by unit size, housing price, type, affordability, and the nature of the neighborhood.

At this time, the types and locations of the housing units that project employees would occupy are unknown. Therefore, this analysis assumes a breakdown in housing units similar to that of existing unit types within the city. For the 1,600 onsite units proposed, 40 percent, or 640 units, would be below market rate, and the remaining 960 units would be at market rate. Based on the student generation rates identified in Table 4.J-6, page 4.J-35, it is estimated that the onsite units included in the proposed project would result in up to 208 school-age children who could attend schools in the SFUSD.

For the additional 1,680 housing units anticipated to be induced by the project (refer to Table 4.J-6, page 4.J-35), assumptions for the rate of affordable units, based on the City's 2014 Housing Element, were used. This equates to approximately 34.5 percent of the housing units constructed between 2004 and 2013 being affordable units.[109] Therefore, for the purposes of this analysis, it is assumed that 580 of the 1,680 induced housing units generated by the proposed project would be affordable, and the remaining 1,100 would be market-rate dwelling units. Based on the student generation rates identified in Table 4.J-6, it is estimated that induced offsite units related to the proposed project would result in up to 200 school-age children who could attend schools in the SFUSD.

Table 4.J-8, on the following page, summarizes the anticipated number of SFUSD students as a result of the proposed project, using the High Residential Assumption as a "worst-case" scenario because it would generate more students than the High Commercial Assumption. As shown, it is estimated that the proposed project, for both onsite and offsite units, would result in up to 408 school-age children who could attend schools in the SFUSD. The 408 school-age children generated by the High Residential Assumption, if evenly distributed between the brackets (elementary [kindergarten through 5th grade], middle [6th through 8th grade], and high [9th through 12th grade]), would result in approximately 188 new students at elementary schools in the city, 94 new students at the middle schools in the city, and 126 new students at the high schools in the city.[110] In the city, approximately 25 percent of students attend private schools. Therefore, this represents a conservative analysis because it does not account for student enrollment at private schools.[111] As previously discussed, most elementary schools in the SFUSD have attendance boundaries. The SFUSD currently uses a diversity index lottery system to assign students to other schools, which are based on a number of factors.[112] Under the diversity index lottery system, students generated by the proposed project may attend a SFUSD school other than the nearest school; however, that school would have to have the needed capacity. Thus, the assumption that all students generated by the proposed project would attend the nearest school is a conservative assumption of the impact on the students' default school assignment.

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[109] City and County of San Francisco. 2014. *Housing Element, Part I: Data Needs Analysis*. Adopted April 27, 2015.

[110] The 408 total students, distributed evenly by grade (13 total grades) = 31.4 students per grade. 31.4 × 6 grades = 188 elementary school students; 31.4 × 3 grades = 94 middle school students, and 31.4 x 4 grades = 126 high school students.

[111] Lapkoff & Gobalet Demographic Research, Inc. 2015. *Demographic Analyses and Enrollment Forecasts San Francisco Unified School District.* Draft. November 6.

[112] San Francisco Unified School District. 2012. *Fact Sheet*. March 26. Available: http://www.sfusd.edu/en/assets/sfusd-staff/enroll/files/2012-13/Assignment-Transfer%20process%20explained.pdf. Accessed: March 14, 2016.

TABLE 4.J-8. PROJECT SFUSD ENROLLMENT FOR THE HIGH RESIDENTIAL ASSUMPTION

Type of Unit	Total Units	Student Generation Rate	Estimated Student Growth Due to Project
Proposed Onsite Units			
Market-Rate Units	960[b,c]	0.05	48
Below-Market-Rate Units	640[b,c]	0.25	160
Total Onsite Units	1,600[b,c]	--	208
Employee-Induced Housing Demand			
Market-Rate Units	1,100[d]	0.05	**55**
Below-Market-Rate Units	580[d]	0.25	**145**
Total Employee-Induced Units	***1,680***	--	***200***
Total Students Generated by the Project in the City		--	***408***

Source: Lapkoff & Gobalet Demographic Research, Inc. 2015. *Demographic Analyses and Enrollment Forecasts, San Francisco Unified School District*. Table I-9. Draft. November 6.

Notes:

a. The modified yield student generation rate provided by the SFUSD, which is higher than the historical yield generation rate, was used to provide a conservative analysis.

b. This analysis considers the High Residential Assumption, which would include more residential units (and thus generate more students) than the High Commercial Assumption. Therefore, this represents a conservative analysis.

c. As stated in the Chapter 2, *Project Description*, the project sponsor has agreed to restrict 40 percent of the onsite units to inclusionary affordable housing targets.

d. Data regarding the number of affordable units in the city before 2004 are not available.

As shown in Table 4.J-3, page 4.J-12, there is capacity for approximately 2,511 students in existing SFUSD elementary schools. The existing SFUSD middle schools are over capacity by approximately 279 students, and the existing SFUSD high schools are over capacity by approximately 2,022 students. Thus, the SFUSD would have the capacity to accommodate the approximately 188 elementary school students generated by the proposed project. However, the SFUSD would not have the capacity to accommodate the 94 middle school students or the approximately 126 high school students generated by the proposed project. As discussed below, SFUSD is exploring the construction of new schools in areas in which additional students are expected because of new housing developments and/or an overall increase in the number of school-age children, such as the Mission Bay neighborhood. A new school in the Mission Bay neighborhood, which has been dedicated under the Mission Bay South Plan, would increase capacity for students in the SFUSD.

The project site is served by, or within the vicinity of, Daniel Webster Elementary School, Bessie Carmichael Middle School (6th through 8th grades), the International Studies Academy (9th through 12th grades), John O'Connell High School (9th through 12th grades), and Downtown High School (9th through 12th grades). As discussed above, it is not known where project employees would live within the city. Thus, this portion of the analysis considers only the

proposed onsite housing units. Assuming that SFUSD student generation as a result of the proposed project (208 students) is distributed evenly among the grade levels, the project's proposed onsite units could result in approximately 96 new elementary students, 48 new middle school students, and 64 new high school students.[113] As discussed previously, the assumption that all students generated by the project's proposed onsite units would attend the nearest school is a conservative assumption of the impact because of the SFUSD's diversity index lottery system.

As shown in Table 4.J-9 on the following page, Daniel Webster Elementary School, the International Studies Academy, John O'Connell High School, and Downtown High School could accommodate the students that could be generated by the proposed project. However, the proposed project would generate 48 middle school students, which is not within the remaining capacity of Bessie Carmichael Middle School. As previously stated, although many of the schools on the west side of the city are at or beyond capacity, according to the SFUSD, the majority of available capacity is in Bayview, which is located on the east side of the city.[114] As such, other schools in the project area have capacity (including Starr King Elementary School in Potrero Hill, Bryant Elementary School in the Mission District, Cesar Chavez Elementary School in the Mission, and Buena Vista Horace Mann K–8 Community School in the Mission District) and could accommodate students generated by the proposed project.[115] Furthermore, to accommodate anticipated growth, SFUSD is exploring the construction of new schools in areas in which additional students are expected because of new housing developments and/or an overall increase in the number of school-age children, such as the Mission Bay neighborhood. Areas under review by the SFUSD include the Candlestick Point (approximately 0.2 mile west of the project site) and Shipyard development areas, Mission Bay, and Parkmerced.[116] It is anticipated that the SFUSD will authorize a new school in Mission Bay in Spring 2017.[117] The new schools could serve the project site and, thus, reduce the number of students generated by the proposed project who would attend Bessie Carmichael Middle School.

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[113] The 208 total students, distributed evenly by grade (13 total grades), = 16 students per grade. The 16 × 6 grades = 96 elementary school students, 16 × 3 grades = 48 middle school students, and 16 x 4 grades = 64 high school students.

[114] Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on November 13, 2015.

[115] Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on October 6, 2016.

[116] Leigh, Myong. Deputy Superintendent for Policy and Operations. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on May 3, 2016.

[117] Tucker, Jill. 2017. *SF school officials ready to start project in booming Mission Bay*. Available at: http://www.sfusd.edu/en/news/media-coverage/2017-media-coverage-archive/03/sf-school-officials-ready-to-start-project-in-booming-mission-bay.html. March 12, 2017

TABLE 4.J-9. PROJECT SFUSD ENROLLMENT AT SCHOOLS NEAR THE PROJECT SITE

School	Remaining Capacity	Estimated Student Growth Due to Project	Within Capacity?
Daniel Webster Elementary School	227	96	Yes
Bessie Carmichael Middle School	4	48	No
International Studies Academy	699	22	Yes
John O'Connell High School	906	21	Yes
Downtown High School	258	21	Yes

Notes:

[a.] Remaining capacity is based on Table 4.J-4.

[b.] This analysis assumes the 64 new high school students that could be generated by the proposed project would be distributed evenly between the three high schools that serve the project site.

Over the next 10 years, SFUSD anticipates the enrollment will increase by 6,000 to 12,000 students, including 600 to 1,000 students within Mission Bay.[118,119] The students generated by the proposed project would represent a small portion (3 percent) of the anticipated increase in enrollment citywide but 35 percent of the anticipated increase in enrollment within Mission Bay. As previously discussed, SFUSD is exploring the construction of new schools in areas where additional students are expected because of new housing developments and/or an overall increase in the number of school-age children. According to the SFUSD, new schools would be built regardless of the proposed project.[120] New school projects would be subject to separate CEQA review, which would analyze the environmental impacts of constructing new school facilities.

The Leroy F. Greene School Facilities Act of 1998, or SB 50, restricts the ability of local agencies to deny land use approvals on the basis that public school facilities are inadequate. SB 50, however, permits the levying of developer fees to address local school facility needs resulting from new development. Local jurisdictions are precluded under state law from imposing school enrollment-related mitigation beyond the school development fees. The SFUSD collects these fees for all construction and building permits issued within the city and county. Developer fee revenues are used, in conjunction with other SFUSD funds, to support efforts to complete capital improvement projects. The school impact fees to be collected for residential, commercial,

[118] Leigh, Myong. Deputy Superintendent for Policy and Operations. San Francisco Unified School District. Email to Jessica Viramontes, ICF International. Received on May 3, 2016.

[119] Lapkoff & Gobalet Demographic Research, Inc. 2015. *Demographic Analyses and Enrollment Forecasts, San Francisco Unified School District*. November 23. Available: http://www.sfusd.edu/en/assets/sfusd-staff/about-SFUSD/files/demographic-analyses-enrollment-forecast.pdf. Accessed: April 15, 2016.

[120] Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Personal communication with Jessica Viramontes, ICF International. Received on October 13, 2016.

and retail developments are set at $3.480 per square foot for new residential construction, $0.388 per square foot for retail space, $0.540 per square foot for office space, and $0.478 per square foot for industrial/warehouse/manufacturing development.[121]

New residential development that may indirectly result from the increase in employment and generate students would be subject to separate CEQA review as well as residential school impact fees, which are higher than nonresidential school impact fees. The estimated increase of approximately 96 new elementary students, 48 new middle school students, and 64 new high school students under the Maximum Residential Scenario would not result in the need for new facilities because of the existing available capacity within the SFUSD system. Furthermore, the proposed project would pay school impact fees. As such, the proposed project would not result in substantial adverse environmental impacts because construction of new or expanded facilities would not be required. School service impacts as a result of the proposed project would be ***less than significant***.

Impact PS-4. The proposed project would increase demand for park and open space services but not to such an extent that construction of new or expanded facilities would be required. (Less than Significant)

The proposed project would include new residential and commercial development, which could increase demand for park and open space services. This analysis conservatively considers the High Residential Assumption because it would generate more residents and, thus, have a greater potential impact on park and open space services. Operations under High Residential Assumption would accommodate an onsite residential population of 3,760.

As discussed in more detail in Chapter 2, *Project Description*, the proposed project's approximately 8.0 acres of new and expanded open spaces would include the 4.4-acre China Basin Park, 1.1-acre Mission Rock Square, 0.5-acre Channel Wharf, 0.2-acre Channel Lane, and 1.1-acre Waterfront Promenade, along with 0.6 acre of pedestrian paseos and a new public access area on the apron of Pier 48. The parks would be connected to a new pedestrian-oriented street network, including the pedestrian-privileged Shared Public Way, which would connect China Basin Park to Long Bridge Street and areas south of the project site. These areas would also provide access to the city's proposed Blue Greenway. The proposed parks and open spaces are illustrated in Figure 2-4, page 2-21, in Chapter 2.

The public parks and open spaces would remain under Port ownership but could be programmed and managed by the project sponsor. The design and programming of this open space would be subject to Port approval and Bay Conservation and Development Commission

[121] San Francisco Planning Department. n.d. *San Francisco Citywide Development Impact Fee Register.* Updated: December 1, 2016. Effective: January 1, 2017. Available: http://forms.sfplanning.org/Impact_Fee_Schedule_2017_final.pdf. Accessed: March 13, 2017.

major permit conditions, as applicable. It is expected that ongoing maintenance of the new and expanded parks and open spaces would be the responsibility of the onsite neighborhood association that would be associated with the proposed development once operational. Alternatively, special taxes for maintenance could be levied by a Mello-Roos Community Facilities District.[122]

The hours of operation for the proposed parks would be similar to the hours at other parks under Port jurisdiction, which generally open at 5:00 a.m. and close at 12:00 a.m. Special events or assembly uses, including small concerts, picnics in the park, Sunday Streets, and cultural events, could occur at the proposed parks on a year-round basis.

As previously discussed, Seawall Lot 337 and Parcel P20, both of which are part of the project site, are in an MB-OS Use District. The principal or exclusive purpose for land in MB-OS districts is to provide open space, with additional development strictly limited. Pier 48, also part of the project site, is within a Heavy Industrial (M-2) Use District, which requires at least 36 gsf of usable open space per dwelling unit if the open space is private and 48 gsf of usable open space per dwelling unit if the open space is public. However, the only existing open space within the project site is the 2.2-acre China Basin Park.

As described in Chapter 2, *Project Description*, the project sponsor would seek approval to rezone the project site through an SUD that would be codified in the Zoning Map to reflect the proposed boundaries of the SUD. As described in detail on page 2-64 of Chapter 2, *Project Description*, and illustrated in Figure 2-4, on page 2-21, flexible zoning would allow for a mixed-use development that responds to future market conditions; incorporates specific development controls, such as height limits, allowed development densities, bulk limits, and building setbacks on upper floors within Seawall Lot 337; and requires all development on the project site to comply with the Design Controls under a design review process that would be referenced in the Planning Code text amendment. Approval of the SUD, which would be required in order for the proposed project to be developed as proposed, would bring the proposed project into conformance with the Planning Code and Zoning Map, as previously amended by Proposition D. Although the project site would not be zoned for open space, the proposed project would increase the total amount of onsite public open space to approximately 8.0 acres. In addition to the parks developed for the project, common usable open space areas such as courtyards, rooftop terraces, and public passages would be provided at a ratio of 48 square feet per residential unit. Private usable open space would be provided at a ratio of 36 feet per residential unit in the form of private setback areas, balconies, and decks. As such, with approval of the SUD, the proposed project would meet the onsite demand for park and open space services generated by new residents and workers, as defined by the Planning Code.

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[122] A Mello-Roos Community Facilities District is established by a county, city, special district, school district, or joint powers authority to allow financing of public improvements and services.

Based on accessibility, future residents would most likely choose to use nearby onsite facilities provided as part of the proposed project instead of other, more-distant parks and recreational facilities. Furthermore, local residents who use existing parks and recreational facilities may choose to visit the new facilities that would be provided with the proposed project, which could alleviate the rate of deterioration at the existing and additional baseline parks and recreational facilities within a 0.5-mile radius of the project site. An increase in population, and therefore an increase in park users, is expected as a result of the proposed project; however, such an increase is not the single factor that leads to increased deterioration or physical degradation of recreational resources. Other factors that contribute to physical degradation of recreational resources may include park design, age of infrastructure, how the park is used, and level of maintenance. The proposed project's approximately 8.0 acres of new and expanded open spaces, especially the 4.4-acre China Basin Park, would offset demand on other facilities in the project area, such as Mission Creek Park, Mission Bay Commons, and others, that could otherwise experience deterioration. Overall, existing and future residents would have more opportunities to engage in recreational activity in their neighborhood with the range of open spaces that would be developed as part of the proposed project.

The proposed project would not result in substantial adverse environmental impacts associated with the construction or alteration of park or open space facilities, beyond those impacts associated with construction of the proposed project that are discussed elsewhere in this EIR in Section 4.E, *Transportation and Circulation*, Section 4.F, *Noise*, Section 4.G, *Air Quality*, 4.K, *Utilities and Service Systems*, and Section 4.I, *Wind and Shadow*, in order to meet project demand. Thus, project impacts related to the provision of open space would be ***less than significant*** (refer to Impact PS-5 for a discussion of existing neighborhood parks and recreational facilities and the related less-than-significant impact associated with the potential physical deterioration of such facilities that would occur with implementation of the project).

Impact PS-5. The proposed project would not increase the use of existing neighborhood parks, regional parks, or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated. (Less than Significant)

The proposed project would include new residential and commercial development, which could increase demand for neighborhood parks or other recreational facilities. As analyzed in Impact PS-4, the proposed project would meet the onsite demand for open space set forth by the SUD. However, new residents and workers may choose to use offsite parks and recreational services, thereby increasing the use of these facilities.

Workers often use local plazas and parks for lunch breaks or other light-impact activities; these activities are not considered to be substantial contributors to the deterioration of recreational facilities and open space. Thus, this analysis conservatively considers the High

Residential Assumption because it would generate more residents and, thus, have a greater potential impact on neighborhood parks or other recreational facilities. Operations under the High Residential Assumption would result in an additional residential population of 7,720.

As shown in Table 4.J-5, page 4.J-16, and Figure 4.J-2, page 4.J-3, there are many parks in the vicinity of the project site: China Basin Park (within project site), Mission Creek Park (0.12 mile west of the project site), Mission Bay Commons (0.14 mile south of the project site), Kids Park (0.15 mile south west of the project site), San Francisco Bay Trail (Immediately south of project site), South Park (0.4 mile northwest of the project site), and Mission Bay Dog Park (0.5 mile west of the project site). There is also one planned park near the project site, Bayfront Park (0.2 mile south of the project site). In addition, the San Francisco Bay Trail, also known as the Blue Greenway, runs along the eastern and northern portions of the project site. The closest POPO is at 303 Second Street, 0.7 mile away.

Project residents and, to a lesser extent, project workers would utilize the aforementioned nearby public parks and open spaces. These facilities are designed to serve the population density found in this portion of the city. Nonetheless, according to the RPD, there is a deficit of recreational services with active uses (e.g., multi-use playfields, sport courts, fitness stations) as well as dog play areas and community gardens.[123] Additional demand for the aforementioned types of recreational services could exacerbate the demand for these services.

As previously discussed, there are approximately 6.9 acres of parkland per 1,000 city residents. Operations under the High Residential Assumption would increase the number of residents by 7,720, which would only slightly degrade the existing parkland-to-resident service ratio (which would be 6.8 acres per 1,000 residents) with the current inventory of parkland.[124] In addition to offsite open space areas, residents and workers would use the private and shared onsite open spaces that would be provided by the proposed project, which are discussed in Impact PS-4. Because the proposed project would provide the required square footage for open space within the project site, as discussed in Impact PS-4, it is not anticipated that residents would need to seek open space opportunities elsewhere within the city to such a degree that overuse of existing facilities would result.

Given the wide variety and quantity of nearby public parks, plazas, and recreational opportunities, as well as the provision of adequate onsite open space, the anticipated increase in demand generated by the proposed project would not increase the use of adjacent or nearby

[123] Radine Bradley, Stacy. Deputy Director of Planning, Capital and Planning Division. San Francisco Recreation and Parks Department. Email to Jessica Viramontes, ICF International. Received on November 20, 2015.

[124] 6.8 = (5,890 acres of parkland/service population [852,000+7,720]) × 1,000 residents.

recreational facilities such that substantial physical deterioration of existing facilities would occur or be accelerated. Therefore, project impacts related to the use of adjacent or nearby recreational facilities would be ***less than significant***.

Impact PS-6. The proposed project would include recreational facilities or require the construction or expansion of recreational facilities, but they would not have an adverse physical effect on the environment beyond that analyzed and disclosed in this EIR. (Less than Significant)

The proposed project would include approximately 8 acres of new and expanded open spaces, including China Basin Park, Mission Rock Square, Channel Wharf, Channel Lane, Waterfront Promenade, pedestrian paseos, and new public access on the apron of Pier 48, as part of the overall program of development analyzed in this Draft EIR. Landscaping and trees on the open spaces and streetscapes would reduce the heat-island effect, reduce wind, and provide shelter for birds. In addition, stormwater treatment gardens would be integrated within the programmatic land uses. Open space would generally require minimal construction, mainly for trails and other hardscapes, the installation of irrigation infrastructure, and landscaping. Drilling and pile driving (to an average depth of 145 feet) associated with project construction for streets and the promenade and boardwalk at China Basin Park could affect geologic units that could contain significant paleontological remains or traces of paleontological remains. Implementation of Mitigation Measure M-GE-5 would reduce the impact to less than significant (see Section 4.M, *Geology*). Other project-related impacts related to construction of the various park and recreational facilities are summarized below and discussed in detail in the appropriate topical sections of this Draft EIR (e.g., Sections 4.E, *Transportation and Circulation*; 4.F, *Noise*; and 4.G, *Air Quality*) as part of the assessment of overall project impacts.

Construction of parks and recreational facilities, as a component of the proposed project, could result in impacts on the transportation and circulation network. As discussed in Section 4.E, *Transportation and Circulation,* construction of the proposed project would not cause significant impacts on the transportation and circulation network because construction activities would be of limited duration and temporary. However, Improvement Measure I-TR-1.1 is identified to further reduce the potential less-than-significant conflicts between construction activities and pedestrians, bicyclists, transit and other vehicles, and nearby businesses and residents.

As described in Section 4.F, *Noise and Vibration*, construction of the proposed project, including construction of the various park and recreational facilities, would result in temporary noise increases in excess of standards in the Noise Ordinance (Article 29 of the Police Code), even with implementation of applicable mitigation measures. Thus, construction of the proposed project could cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity, above levels existing without the proposed project, and could expose people and structures to or generate excessive ground-borne vibration levels.

Construction of the proposed project, including construction of the various park and recreational facilities, would generate fugitive dust and criteria air pollutants, which would violate an air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. Mitigation Measures M-AQ-1a through M-AQ-1e, M-AQ-2a, and M-AQ-2b, as discussed in Section 4.G, *Air Quality*, are proposed to minimize emissions. However, although implementation of Mitigation Measures M-AQ-1a through M-AQ-1e would substantially reduce construction and operations-related emissions, impacts would remain significant and unavoidable during construction and operation of the proposed project.

In summary, the effects related to construction of the proposed project, including the proposed parks and recreational facilities for the proposed project, are addressed as part of the analysis of construction impacts for the proposed project as a whole. Mitigation measures are proposed to reduce significant environmental effects; however, there would be significant and unavoidable construction impacts related to air quality, noise, and vibration. Construction of the proposed project's parks and recreational facilities would not result in additional significant impacts that were not otherwise disclosed elsewhere in this EIR; therefore, the physical environmental impacts as a result of construction of parks and recreational facilities as part of the proposed project would be considered ***less than significant***, and no additional mitigation beyond that identified elsewhere in this EIR is necessary.

Impact PS-7. The proposed project would not increase demand for library services to the extent that construction of new or expanded library facilities would be required. (Less than Significant)

The proposed project would include new residential and commercial development, which could increase demand for library services. The number of new residents at the project site under the High Residential Assumptions (the most conservative analysis, because it would introduce the greatest number of residents) would represent an approximate 41 percent increase in the total number of residents located in Census Tract 607, the census tract in which the project site would be located. Although this increase would be large for the project area, it would be not be substantial for the city as a whole, because it would represent 4.3 percent of total citywide population growth from 2015 to 2025 (see Table 4.C-4 in Section 4.C, *Population and Housing*).

The BLIP resulted in expanded and updated services in each neighborhood that is currently served by a branch library, including a facility in Mission Bay that serves the project site. In addition, according to the SFPL, the library service needs of patrons are being met by the SFPL;

there is not a citywide service gap.[125] Furthermore, nine branch libraries are currently open only 5 or 6 days per week, giving the SFPL the option of responding to increased population growth citywide by increasing service to 7 days per week.[126]

There are no current plans to build new branches in the city, but budget planning for fiscal years 2017 and 2018 could include resource allocation related to renovation work at the Chinatown, Mission, and/or the Ocean View branch libraries.[127] Renovation work at these library locations could alleviate the demand for library services in those respective neighborhoods and citywide.

As previously discussed, the project site is served by the Mission Bay branch, which would be the library that would be most affected by the proposed project. The Potrero branch and the Main Library are the next closest SFPL locations; these facilities could also serve residents and workers generated by the proposed project.

Given the analysis above, it is anticipated that the existing libraries in the city would be able to accommodate the increase in residents and workers at the project site. As such, the proposed project would not result in substantial adverse environmental impacts associated with the construction or alteration of library facilities in order to maintain acceptable service ratios or other performance objectives. Based on the foregoing, library service impacts as a result of the proposed project would be ***less than significant***.

CUMULATIVE IMPACTS

The geographic scope of the potential cumulative impacts of the proposed project related to public services includes the areas served by the SFFD, SFPD, SFUSD, RPD, and SFPL. For the most part, these areas consist of the entire city. Future development projects considered in the cumulative impact analysis of public services include all of the projects listed in Table 4-1, Reasonably Foreseeable Projects in the Site Vicinity, in Chapter 4, *Environmental Setting and Impacts*, because all of the projects would require fire protection, police protection, schools, parks, libraries, or other public services. The cumulative impact analysis assumes that construction and operation of other projects in the immediate vicinity would be in compliance with applicable regulations regarding the provision of public services.

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[125] Lambert, Michael. Deputy City Librarian. San Francisco Public Library. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

[126] San Francisco Public Library. 2016. *All Library Hours*. Available: http://sfpl.org/index.php?pg=2000185701. Accessed: April 15, 2016.

[127] Lambert, Michael. Deputy City Librarian. San Francisco Public Library. Email to Jessica Viramontes, ICF International. Received on September 30, 2015.

Impact C-PS-1: The proposed project, in combination with other development in the city, would not result in significant adverse cumulative impacts on fire protection, police protection, schools, parks, libraries and other services. (Less than Significant)

FIRE PROTECTION AND EMERGENCY RESPONSE SERVICES

The proposed project would add to the demand for fire response and emergency medical services within Battalion 3, but the cumulative contribution of the proposed project's impact combined with other development projects in the city would not be considerable. The SFFD has not identified a citywide service gap, and the incremental increase in the demand for fire and emergency medical services as a result of the proposed project and other development projects would not be beyond levels anticipated and planned for by the SFFD. If necessary, Fire Stations 1, 8, and 35, along with other nearby stations, could respond to calls in the event that Fire Station 4 personnel and equipment are unavailable or require additional support. For these reasons, the proposed project's contribution to cumulative demand on fire and emergency medical services citywide would not be cumulatively considerable. The proposed project, in combination with other development, would have a ***less-than-significant*** cumulative impact on fire and emergency services.

POLICE SERVICES

Population and employment growth associated with implementation of other development projects in the city would increase the number of service calls and could create a need for additional facilities to maintain existing SFPD service levels. This would be considered a significant cumulative impact if such growth were to result in the need for physically expanded facilities, which could result in physical environmental impacts.

The proposed project would add to the demand for police services in the Southern District, but the cumulative impact of the proposed project's impact combined with reasonably foreseeable development projects would not be considerable. The SFPD will meet the increased demand with data-driven deployments to remain flexible and efficient.[128] In addition, the Board of Supervisors has passed a resolution to increase the mandated minimum staffing level to 2,200 sworn officers. Based on Board of Supervisors legislation, the police district boundaries would be reanalyzed every 10 years, with consideration given to workload, district boundaries, response times, and facilities. The SFPD also recognizes the need to expand some facilities as the population of the city increases, including, but not limited to, the Crime Lab Facility/Traffic Division and Evidence Storage, and increase equipment procurement. As previously stated, these efforts are designed to respond to the

[128] Walsh, Peter. Lieutenant, Administration Bureau. San Francisco Police Department. Email to Jessica Viramontes, ICF International. Received on November 6, 2015.

needs of the city on a program-wide basis and ensure that adequate response times and distributions of police officers are achieved. However, the anticipated increase in the number of residents as a result of the proposed project would not be beyond the service level anticipated and planned for by the SFPD. For these reasons, the proposed project's contribution to cumulative demand on police services citywide would be ***less than cumulatively considerable***.

SCHOOL SERVICES

Population and employment growth associated with implementation of other development projects in the city would generate students and increase demand on schools in the SFUSD.

As previously discussed, Section 65996 of the State Government Code explains that the payment of school impact fees established by the Leroy F. Greene School Facilities Act of 1998 is deemed to constitute full and complete mitigation for school impacts. The SFUSD has enacted development fees in accordance with the Leroy F. Greene School Facilities Act and levies these fees on development projects within its service area. Development projects would be required to pay the school impact fees, which are based on the amount of proposed residential and commercial space. This process, including fee payment, would ensure that school services that accommodate current and future citywide growth could be reasonably provided within the cumulative context. As previously discussed, according to the SFUSD, new schools would be built regardless of the proposed project.[129] New school projects would be subject to separate CEQA review, which would analyze the environmental impacts of constructing new school facilities. Therefore, other development is not expected to result in a significant cumulative impact on schools, and overall cumulative impacts would be considered ***less than significant***.

PARKS SERVICES

Population and employment growth associated with implementation of other development projects in the city would increase demand on RPD parks and open space. This would be considered a significant cumulative impact if such growth were to result in the need for physically expanded facilities, which could result in physical environmental impacts.

The City is currently meeting or exceeding the established parkland-to-resident ratio established by the Sustainable Communities Index of 5.5 acres per 1,000 residents, and each individual development project is responsible for providing a sufficient amount of onsite open space, per the Planning Code or guiding development controls.

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[129] Goldin, David. Chief Facilities Officer. San Francisco Unified School District. Personal communication with Jessica Viramontes, ICF International. Received on October 13, 2016.

The increase in the number of residents as a result of the proposed project and reasonably foreseeable projects would not be beyond the service level anticipated and planned for by the RPD. Current planning efforts for the provision of parks and open space, including Open Space 2100, will consider the city's need for parks and open space over the next 100 years; projected population growth will be factored into the planning framework. The growth in San Francisco's open space system that has occurred as a result of the passage of the 2008 and 2012 Clean and Safe Neighborhood Parks General Obligation Bonds, which included a focus on the development of new open spaces in the eastern portions of San Francisco, reflects the City's efforts to continually assess and improve its open space system and match recreational facilities and services provided to the population served. Development of new and upgraded open space acreage as a result of these bond measures has also led to improvements in the delivery of recreational programs, facilities, and services to a growing population.

In addition to the parks developed for the project, common usable open space areas such as courtyards, rooftop terraces, and public passages would be provided at a ratio of 48 square feet per residential unit. Private usable open space would be provided at a ratio of 36 feet per residential unit in the form of private setback areas, balconies, and decks. Approval of the SUD, which would be required in order for the proposed project to be developed as proposed, would bring the proposed project into compliance with the development regulations for the project site set forth in the Planning Code. Therefore, other development is not expected to result in a significant cumulative impact on park services, and overall cumulative impacts would be considered ***less than significant*** (refer to Impact C-PS-2 for a discussion of cumulative impacts associated with recreational resources).

LIBRARY SERVICES

Population and employment growth associated with implementation of other development projects in the city would increase demand on SFPL facilities. This could be a significant cumulative impact because such growth could result in the need for physically expanded facilities, which could result in physical environmental impacts.

The proposed project would add to the cumulative effects of other reasonably foreseeable development projects on library services and facilities, but the project's contribution to these effects would not be considerable. According to the SFPL, the library service needs of patrons are being met by the SFPL, and there is not a citywide service gap.[130] Therefore, an additional increase in citywide population would most likely not have a considerable impact on the library system. For these reasons, the proposed project's contribution to cumulative demand on library services citywide would not be cumulatively considerable, and the cumulative impact would be considered ***less than significant***.

[130] Lambert, Michael. Deputy City Librarian. San Francisco Public Library. Email to Jessica Viramontes, ICF International. Received on January 20, 2016.

Impact C-PS-2: The proposed project, in combination with other development in the city, would not increase the use of existing neighborhood parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated. (Less than Significant)

Population and employment growth associated with implementation of other development projects in the city would increase demand on neighborhood parks and recreational facilities. The cumulative recreation demand would be met by existing adjacent parks and recreational facilities provided at China Basin Park, Mission Creek Park, Mission Bay Commons, Kids Park, South Park, and Mission Bay Dog Park. In addition, the San Francisco Bay Trail, also known as the Blue Greenway, runs along the eastern and northern portions of the project site. Park and open space acreage in this area of the city and along the waterfront is proposed to be augmented as development projects, such as Central SOMA, Mission Bay, and the Transit Center District Plan, move toward approval or completion. Specifically, as discussed above under Environmental Setting, Parks, the Mission Bay project plans to include, create, and improve public open space along the channel, which is located adjacent to the project site to the west. Although other development projects would also increase the number of residents in the area, due to the provision of the additional public spaces discussed above it is not anticipated that increased use would result in physical degradation of existing facilities, and overall cumulative impacts would be considered ***less than significant***.

4.K UTILITIES AND SERVICE SYSTEMS

This section provides background information on utilities and service systems, including water supply, wastewater and stormwater systems, solid waste, and energy. The analysis considers whether increased demand on water supply, wastewater and stormwater treatment and disposal systems, and solid waste collection and disposal systems that would result from the Seawall Lot 337 and Pier 48 Mixed-Use Project (Mission Rock Project or proposed project) would result in the need to construct new or expanded facilities, the construction of which could trigger physical environmental effects beyond those that would result from the project, as examined in other sections of this Draft Environmental Impact Report (Draft EIR) (e.g., Sections 4.E, *Transportation*; 4.F, *Noise*; and 4.G, *Air Quality*). In addition, the analysis considers whether the project would result in the wasteful use of energy.

For further information regarding the project's impact on greenhouse gas (GHG) emissions and the use of renewable energy, refer to Section 4.H, *Greenhouse Gas Emissions*. For further information regarding the topics of hydrology and water quality, including the National Pollutant Discharge Elimination System (NPDES) stormwater permitting program, refer to Section 4.N, *Hydrology and Water Quality*.

Issues identified in response to the Notice of Preparation (NOP) (Appendix 1) were considered in preparing this analysis. The City and County of San Francisco (City) received one NOP comment related to utilities and service systems. The NOP comment requested that the EIR discuss the Water Supply Assessment for the project and the adequacy of the water and sewer systems that serve the project site to accommodate project-related demand.

Information regarding residential and employment growth in the project area that would be induced by the different development scenarios contemplated under each land use assumption is provided in the Land Use Assumptions subsection.

ENVIRONMENTAL SETTING

WATER SUPPLY AND DEMAND

San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS). Water is supplied to the project site by the SFPUC. The SFPUC's most recent Urban Water Management Plan (UWMP), the 2015 UWMP, which was adopted by the SFPUC on June 14, 2016, relied on the City's 2012 Land Use Allocation (LUA) projections of housing and employment growth in the city to estimate future retail water demands. The LUA 2012 forecasts are a city-specific refinement of Association of Bay Area Government's (ABAG's) growth forecasts, ABAG

Projections 2013, which reflect the growth that is assumed in ABAG's Plan Bay Area and Sustainable Community Strategy Jobs-Housing Connections Scenario.[1] The SFPUC's 2015 UWMP describes San Francisco's long-term strategy for ensuring that adequate water supplies are available to meet existing and future water demand over the 20-year planning horizon between 2015 and 2035.[2]

The SFPUC serves its retail and wholesale customers through integrated operation of local Bay Area water production facilities and the Hetch Hetchy Regional Water System (RWS). The City owns and operates the RWS, a public asset that plays a key role in delivering high-quality drinking water to 2.6 million residents and businesses in the San Francisco Bay Area. The system collects water from the Tuolumne River in the Sierra Nevada and from protected local watersheds in the East Bay and Peninsula. According to the 2015 UWMP, approximately 198 million gallons per day (mgd) was delivered to SFPUC retail and wholesale customers in 2015. Of these deliveries, approximately 70 mgd was delivered to retail customers, with 65 mgd for customers in San Francisco.[3] According to the 2015 UWMP, the RWS consists of more than 280 miles of pipeline, more than 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plants located outside the city and more than 1,250 miles of pipeline, 10 reservoirs, eight storage tanks, and 17 pump stations located within the city limits.[4]

The local watershed facilities are operated to conserve local runoff for delivery, and to maintain enough stored water to meet demands in the event of an emergency that affects the supply of water from Hetch Hetchy. Demands that are not met by local runoff are met with water diverted from the Tuolumne River through the Hetch Hetchy System. On average, the Hetch Hetchy System provides approximately 85 percent of the water delivered by the SFPUC. During dry years, the water received from the Hetch Hetchy System can amount to over 90 percent of the total water delivered.[5]

The current surface water supplies available to the RWS include the Tuolumne River and supplies from local Bay Area reservoirs. The majority of the water supply originates in the upper Tuolumne River watershed high in the Sierra Nevada, away from human development and pollution centers. This water has been approved as a drinking source without requiring

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1 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

2 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

3 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June. Figure 4-1.

4 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

5 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

filtration at a treatment plant. However, local water from the local watersheds requires filtration to meet drinking water quality requirements. The filtered and treated water from the local watersheds is blended with Hetch Hetchy water, and most customers receive this blended water supply. System water quality, including both raw water and treated water, is continuously monitored and tested to assure that water delivered to customers meets or exceeds federal and state drinking water and public health requirements.[6]

The RWS provides more than 97 percent of the city's retail water supplies, while the remaining portion is from locally produced groundwater, recycled water, and nonpotable water. The SFPUC plans to augment existing local water supplies for retail customers by extracting up to 4 mgd of groundwater from new and existing wells in the Westside Groundwater Basin, which is located in on the west side of the city. The program, known as the San Francisco Groundwater Supply Project (SFGSP), is anticipated to provide an additional 2.8 mgd of potable water though four new wells (Phase I), with the remaining 1.2 mgd provided by the conversion of two existing irrigation wells to drinking water facilities (Phase II). Construction is anticipated to be completed in the fall of 2017.[7] The SFGSP is a component of the Water System Improvement Program (WSIP), a multi-billion-dollar capital improvement program to improve and enhance the regional water system's water quality, seismic reliability, delivery reliability, and water supply. WSIP would implement water supply projects to provide additional water supply sources and meet the future water needs of SFPUC retail customers during years with normal rainfall and during years of drought. According to the SFPUC, as of June 30, 2016, approximately 91 percent of the WSIP projects have been implemented.[8] The SFPUC's water supply would be further augmented by the planned Westside and Eastside Recycled Water Projects. The Westside and Eastside Recycled Water Projects would provide an estimated 4 mgd of recycled water for uses that do not require potable water (e.g., landscape irrigation, toilet flushing and industrial uses). The provision of additional recycled water supplies would increase the availability of potable water for retail customers. Construction of the Westside Recycled Water Project is anticipated to be complete in March 2020.[9] The Eastside Recycled Water Project is in the planning phase, with construction estimated to start in January 2026 and finish December 2029.[10]

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6 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

7 San Francisco Public Utilities Commission. n.d. *San Francisco Groundwater Supply.* Available: http://sfwater.org/bids/projectDetail.aspx?prj_id=322. Accessed: December 28, 2016.

8 San Francisco Public Utilities Commission. n.d. *WSIP Overview.* Available: http://sfwater.org/index.aspx?page=115. Accessed: December 28, 2016.

9 San Francisco Public Utilities Commission. n.d. *San Francisco Westside Recycled Water Project.* Available: http://sfwater.org/bids/projectDetail.aspx?prj_id=310. Accessed: December 28, 2016.

10 San Francisco Public Utilities Commission. n.d. *San Francisco Eastside Recycled Water Project.* Available: http://sfwater.org/bids/projectDetail.aspx?prj_id=311. Accessed: December 28, 2016.

Water use within San Francisco (i.e., the in-city retail service area) continues to be among the lowest in the state and below historic consumption. Both total consumption and per capita water use (i.e., gallons of water consumed per person per day [GPCD]) have been on a general decline since the mid-1970s. Many factors have contributed to this reduction in water use, including substantial changes to the mix of industrial and commercial businesses, as well as their associated decline in water demand, and the general characteristics of water use by city residents. In particular, the severe droughts of 1976–77 and 1987–92, changes in plumbing codes, and conservation programs (either voluntarily embraced by residents and businesses or mandated by the City), have affected water demands. The magnitude and duration of the effects of the current drought on demands are unknown. However, per capita water use is expected to increase when the drought ends and discretionary water use rebounds.[11]

Table 4.K-1, on the following page, summarizes the projected retail supplies and demands during normal, single dry, and multiple dry years. Table 4.K-1 demonstrates that during normal precipitation years, the SFPUC will have adequate supplies to meet the projected demand of its service area. In single dry years, SFPUC would have sufficient supplies to meet retail demands. In multiple dry years, SFPUC would experience shortages in RWS deliveries in 2040 during years two and three without development of additional supply concepts. During that time, a shortfall of approximately 1.1 mgd, or 1.2 percent, of demand would be experienced.[12]

DROUGHT-RELATED WATER USE REDUCTIONS

California is currently experiencing record wet conditions following five consecutive years of drought.[13] The dry weather conditions prompted Governor Jerry Brown to declare a drought state of emergency in January 2014, which is still in effect to date (and is discussed further below). As a result, SFPUC requested that all customers of the RWS voluntarily reduce water use by at least 10 percent. Soon after, the San Francisco Mayor's Office issued a formal executive directive requiring that all City departments develop individual water conservation plans and take immediate steps to achieve a mandatory 10 percent reduction in their water consumption.[14]

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11 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

12 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

13 Department of Water Resources. 2017. *California Must Prepare for Flood and Drought*. Available: http://www.water.ca.gov/waterconditions/index.cfm. February 21.

14 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

TABLE 4.K-1. SFPUC PROJECTED RETAIL SUPPLY AND DEMAND COMPARISON

Year	Retail Supply and Demand	Normal Year	Single Dry Year	Multiple Dry Years		
				Year 1	Year 2	Year 3
2020	Total Retail Demand	77.5	77.5	77.5	77.5	77.5
	RWS Supply	70.5	70.5	70.5	70.5	70.5
	Groundwater Supply	5.0	5.0	5.0	5.0	5.0
	Recycled Water Supply	1.9	1.9	1.9	1.9	1.9
	Nonpotable Water Supply	0.1	0.1	0.1	0.1	0.1
	Total Retail Supply	77.5	77.5	77.5	77.5	77.5
	Difference (Surplus or Shortfall)	**0**	**0**	**0**	**0**	**0**
	Difference as % of Demand	**0%**	**0%**	**0%**	**0%**	**0%**
2025	Total Retail Demand	79.0	79.0	79.0	79.0	79.0
	RWS Supply	71.9	71.9	71.9	71.9	71.9
	Groundwater Supply	5.0	5.0	5.0	5.0	5.0
	Recycled Water Supply	1.9	1.9	1.9	1.9	1.9
	Nonpotable Water Supply	0.2	0.2	0.2	0.2	0.2
	Total Retail Supply	79	79	79	79	79
	Difference (Surplus or Shortfall)	**0**	**0**	**0**	**0**	**0**
	Difference as % of Demand	**0%**	**0%**	**0%**	**0%**	**0%**
2030	Total Retail Demand	82.3	82.3	82.3	82.3	82.3
	RWS Supply	73.2	73.2	73.2	73.2	73.2
	Groundwater Supply	5.0	5.0	5.0	5.0	5.0
	Recycled Water Supply	3.9	3.9	3.9	3.9	3.9
	Nonpotable Water Supply	0.2	0.2	0.2	0.2	0.2
	Total Retail Supply	82.3	82.3	82.3	82.3	82.3
	Difference (Surplus or Shortfall)	**0**	**0**	**0**	**0**	**0**
	Difference as % of Demand	**0%**	**0%**	**0%**	**0%**	**0%**
2035	Total Retail Demand	85.9	85.9	85.9	85.9	85.9
	RWS Supply	76.7	76.7	76.7	76.7	76.7
	Groundwater Supply	5.0	5.0	5.0	5.0	5.0
	Recycled Water Supply	3.9	3.9	3.9	3.9	3.9
	Nonpotable Water Supply	0.3	0.3	0.3	0.3	0.3
	Total Retail Supply	85.9	85.9	85.9	85.9	85.9
	Difference (Surplus or Shortfall)	**0**	**0**	**0**	**0**	**0**
	Difference as % of Demand	**0%**	**0%**	**0%**	**0%**	**0%**

Year	Retail Supply and Demand	Normal Year	Single Dry Year	Multiple Dry Years		
				Year 1	Year 2	Year 3
2040	Total Retail Demand	89.9	89.9	89.9	89.9	89.9
	RWS Supply	80.6	80.6	80.6	80.6	80.6
	Groundwater Supply	5.0	5.0	5.0	5.0	5.0
	Recycled Water Supply	3.9	3.9	3.9	3.9	3.9
	Nonpotable Water Supply	0.4	0.4	0.4	0.4	0.4
	Total Retail Supply	89.9	89.9	89.9	89.9	89.9
	Difference (Surplus or Shortfall)	**0**	**0**	**0**	**-1.1**	**-1.1**
	Difference as % of Demand	**0%**	**0%**	**0%**	**-1.2%**	**-1.2%**

Source: San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June. Table 7-4.

In July 2014, new emergency conservation regulations issued by the State Water Resources Control Board (State Water Board) prompted the SFPUC to implement outdoor water waste restrictions and require a mandatory 10 percent reduction in outdoor water use. Additional emergency conservation regulations issued by the State Water Board in the spring of 2015 established more water use restrictions, a mandatory statewide water reduction of 25 percent compared to 2013 water use, and conservation standards for individual urban water suppliers to meet the statewide 25 percent reduction. Per these regulations, the SFPUC retail service area was assigned a conservation standard of 8 percent. The retail service area includes residents, businesses, and industries located in the city as well as various customers located outside of the city (e.g., the Town of Sunol and San Francisco International Airport).

Following the additional State Water Board regulations in the spring of 2015, the SFPUC increased the mandatory reduction on retail outdoor irrigation from 10 percent to 25 percent starting in July 2015. After publication of the 2015 UWMP, the SFPUC lifted the 25 percent mandatory reduction for retail outdoor irrigation, effective July 2016. The SFPUC has not declared a water shortage emergency and imposed subsequent mandatory system-wide rationing and shortage allocations because its customers exceeded the 10 percent voluntary system-wide reduction in conjunction with the statewide mandatory reductions assigned by the State Water Board. According to the 2015 UWMP, if current drought conditions worsen between 2015 and 2018 and the SFPUC determines that system-wide rationing will need to be imposed, then the SFPUC will issue a declaration of water shortage emergency, in accordance with California Water Code Section 350, and implement rationing in accordance with the SFPUC's Water Shortage Allocation Plan (WSAP). The WSAP requires an annual evaluation of anticipated water storage within the RWS and prescribes procedures for

adjusting the available water supply and allocating water from the regional system among its retail and wholesale customers during periods when shortages are estimated to be less than 20 percent.[15]

In May 2016, the State Water Board adopted a statewide conservation approach that allowed urban water suppliers to replace their prior state-assigned percentage target reduction with a localized "stress test" approach, based on a showing of whether they have at least a 3-year water supply under extended drought conditions. The revised emergency regulations followed significantly improved water supply conditions in most of the state and recognition that urban water suppliers are now better positioned to respond to drought impacts, following their experience from conserving upwards of 24 percent of their water use since mid-2015. Under the updated regulations, the State Water Board adjusted water reduction targets to zero for agencies such as the SFPUC that demonstrate their ability to cover another 3 years of drought. In April 2017, the SFPUC lifted its call for a 10 percent voluntary system-wide reduction due to wet conditions. However, all permanent water waste restrictions remain in effect.[16]

Water Treatment Facilities. In 2013, the SFPUC completed expansion of the Sunol Valley Water Treatment Plant (WTP), which has the sustainable capacity[17] to treat up to 160 mgd.[18] The Harry Tracy WTP has a sustainable capacity of approximately 140 mgd. In addition, completed in September 2013, SFPUC's Tesla Water Treatment Facility in Tracy, California, is the largest ultraviolet disinfection treatment plant in California, capable of treating approximately 315 mgd.[19] Therefore, in total, SFPUC is able to treat up to 615 mgd.

Existing Water Distribution Infrastructure. The SFPUC currently owns and operates the existing low-pressure potable water infrastructure that serves the project site.[20] Potable water is currently delivered to the project vicinity by an existing 12-inch main beneath Third Street, an

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15 San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco*. June.

16 San Francisco Public Utilities Commission. n.d. *Frequently Asked Questions about Water Use Restrictions.* Available: http://sfwater.org/index.aspx?page=872. Accessed: April 17, 2016.

17 *Sustainable capacity* is the highest flow rate at which a treatment plant can be expected to operate, given normal source water conditions, while meeting regulatory water quality and routine maintenance requirements.

18 San Francisco Public Utilities Commission. 2013. *Sunol Valley Water Treatment Plan (SVWTP) Expansion and Treated Water Reservoir.* Available: http://216.119.104.145/bids/projectDetail.aspx?prj_id=244. Accessed: May 23, 2016.

19 San Francisco Public Utilities Commission. 2011. *Tesla Treatment Facility Fact Sheet*. July. Available: http://www.sfwater.org/bids/projectDetail.aspx?prj_id=215. Accessed: May 23, 2016.

20 BKF Engineers, Surveyors, Planners. 2016. *Draft Mission Rock Infrastructure Plan*. September 20.

existing 12-inch main beneath Terry A. Francois Boulevard, and an existing 12-inch main beneath Mission Rock Street. Fire hydrants and Pier 48 are currently served by the existing 12-inch main beneath Terry A. Francois Boulevard.

The City maintains an Auxiliary Water Supply System (AWSS) for fire protection purposes only. Existing AWSS facilities include a 12-inch main adjacent to the project site, located beneath Third Street between Mission Rock Street and Channel Street.[21]

Pipelines for recycled water exist in the project vicinity. An 8-inch recycled water main is located in Mission Rock Street, between Third Street and Terry A. Francois Boulevard; in Terry A. Francois Boulevard, south of Mission Rock Street; and in Third Street, south of Channel Street. Note that the existing recycled water infrastructure does not currently have a recycled water source; rather, it is currently fed from potable water sources. As of the date of this report, there are no plans in place to change the source from potable water to recycled water.

WASTEWATER/STORMWATER COLLECTION AND TREATMENT

Wastewater at Seawall Lot 337 is collected and treated by the SFPUC. Most stormwater runoff from the site is collected separately and discharged directly or indirectly to the San Francisco Bay (Bay). This system, operated by SFPUC, consists of approximately 1,000 miles of underground pipes, which serve most of San Francisco. The project site is located in the Bayside drainage basin and sanitary sewer flows are collected separate from stormwater and flow to the Southeast Water Pollution Control Plant (SEP) for treatment. Under existing conditions, as discussed further below, stormwater from the project site discharges directly or indirectly into San Francisco Bay (Bay).

The SFPUC maintains and operates three wastewater treatment facilities for the city: the Oceanside Water Pollution Control Plant (OSP), the SEP, and the North Point Wet-Weather Facility. These facilities combined can treat up to 575 mgd of combined wastewater and stormwater runoff.[22] The project site is served by the SEP, which treated an average dry weather flow of about 52 mgd in 2015 and can treat up to 250 mgd when it rains.[23]

During wet weather, the capacity at the SEP is supplemented by the North Point Wet-Weather Facility and a series of storage/transport boxes located around the perimeter of the city. If wet-weather flows exceed the capacity of the overall system, the excess (primarily stormwater) is discharged from one of the 36 combined sewer overflow structures located along the waterfront.

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[21] BKF Engineers, Surveyors, Planners. 2016. *Draft Mission Rock Infrastructure Plan*. September 20.

[22] San Francisco Public Utilities Commission. 2014. *San Francisco's Wastewater Treatment Facilities.* Available: http://www.sfwater.org/modules/showdocument.aspx?documentid=5799. Accessed: March 21, 2016.

[23] Eickman, Kent. Engineer, Wastewater Division. San Francisco Water Power Sewer. Email to Jessica Viramontes, ICF International. Received on February 25, 2016.

The SFPUC's Sewer System Improvement Program (SSIP) is a long-term plan that was initiated in 2011 to address issues pertaining to the entire wastewater system citywide. One component of this program is to improve the SEP, the facility that treats wastewater from the majority of the project site before it gets discharged into the San Francisco Bay, through operational renovations and seismic upgrades to ensure reliability of the sewer system. In a parallel effort to address more immediate wastewater needs, the SFPUC in 2005 initiated a capital improvement program (CIP) to, among other things, reduce the potential for on-street flooding during heavy rains that can occur. The original CIP had 36 projects and, over time, additional work was identified and funded through supplemental appropriations. As of December 2016, the wastewater CIP had 72 projects and approximately $400 million in an approved budget; the projects are anticipated to be complete in mid-2017.[24]

In July 2005, the SFPUC began imposing a Wastewater Capacity Charge pursuant to SFPUC Resolution No. 05-0045.[25] This Wastewater Capacity Charge is applicable to residential, nonresidential and mixed-use types of construction that place new or additional demands on the system. All funds raised through the capacity charge are to be used to offset the cost of future wastewater capital improvement projects and repairs.

Existing Wastewater and Stormwater Infrastructure. As discussed above, the majority of the project site is located within the separated sewer area, with the exception of the stormwater system on Third Street that currently discharges into the combined system.[26] Currently, no sanitary sewer facilities serve Seawall Lot 337.[27] Pier 48 is served by a 15-inch sanitary sewer main that drains to the south, beneath Terry A. Francois Boulevard. Sanitary flows within Terry A. Francois Boulevard are conveyed to a low spot in the main south of the intersection at Mission Rock Street where there is pump station. A 6-inch force main from the San Francisco Port Pump Station at this location lifts the sanitary flows into a 12-inch gravity sewer main beneath Mission Rock Street where they are conveyed west into a 15-inch main as it reaches Third Street. Existing separated sanitary sewer facilities beneath Third Street include an 8-inch main north of Channel Street that connects to a 21-inch main between Channel Street and Mission Rock Street. The flows from the 21-inch main beneath Third Street and the 15-inch main beneath Mission Rock Street (neither of which serve the project site) converge at the intersection of Third Street and Mission Rock Street where they are conveyed through gravity sewer mains

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[24] San Francisco Public Utilities Commission. 2016. *Wastewater Enterprise Capital Improvement Program, 1st Quarter/Fiscal Year 2016–2017*. December 5. Available: http://sfwater.org/modules/showdocument.aspx?documentid=10224. Accessed: March 1, 2017.

[25] San Francisco Public Utilities Commission. 2016. Capacity Charge: Fiscal Year 2015-16. Available: http://sfwater.org/index.aspx?page=171. Accessed: March 21, 2016.

[26] BKF. 2016. Mission Rock DEIR Hydrology Description. July 1.

[27] BKF Engineers, Surveyors, Planners. 2016. *Draft Mission Rock Infrastructure Plan*. September 20.

to Sanitary Sewer Pump Station No. 3 and ultimately to the SEP prior to treatment and discharge to the Bay. The existing storm drain system is shown in Figure 4.N-1 in Section 4.N, *Hydrology and Water Quality*.

The existing storm drain infrastructure within the vicinity of the project site includes a separated storm sewer system to the west, south, and east.[28] The west side of the project site is served by an existing separated storm drain system within Third Street that will be routed to the future Mission Bay Stormwater Pump Station (SWPS) No. 3 for discharge to Mission Creek. Until SWPS No. 3 is constructed in 2018, stormwater flows will continue past the SWPS No. 3 site to an existing combined sewer box that drains to the existing Channel Street Pump Station.[29] Mission Rock Street, to the south, has a separated storm drain system that conveys stormwater to SWPS No. 6 to the south, that discharges to the Bay adjacent to the Radiance Development at the corner of Mission Bay Boulevard and Terry A. Francois Boulevard and Block P18.

Both China Basin Park and Terry A. Francois Boulevard have storm drain systems that discharge directly to the Bay through existing Port of San Francisco (Port) outfalls.[30] Specifically, stormwater runoff from these areas is collected by series of inlets connected by 10-inch to 12-inch storm drain mains. Once collected, runoff then discharges directly to China Basin through an existing 12-inch outfall within the slope revetment and the San Francisco Bay through an existing 30-inch outfall. In addition, record utility data provided by the Port indicate that runoff generated at Pier 48 directly discharges to the Bay within the Pier 48 structure.

SOLID WASTE

Recology provides collection, recycling, compost, and disposal services for the project site. San Francisco operating companies include:

- Recology Sunset Scavenger—Provides collection services in the residential districts of San Francisco;
- Recology Golden Gate—Provides collection services in the Financial District, North Beach, South of Market (including the project site), and the Marina; and
- Recology San Francisco—Operates the Transfer Station at 501 Tunnel Avenue, and Recycle Central on Pier 96.[31]

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[28] BKF Engineers, Surveyors, Planners. 2016. *Draft Mission Rock Infrastructure Plan*. September 20.

[29] Miller, Don. San Francisco Department of Public Works. Email to Jessica Viramontes, ICF International. Received on December 9, 2016.

[30] BKF. 2016. Mission Rock DEIR Hydrology Description. July 1.

[31] Recology. 2016. *Contact Us*. Available: http://www.recologysf.com/index.php/contact-us. Accessed: February 25, 2016.

Waste generated at the project site is transported by Recology Golden Gate to the Recology Transfer Station in San Francisco; from there, it is conveyed to the Recology Hay Road Landfill in Solano County. San Francisco uses a three-cart collection program: residential and business customers sort solid waste into recyclables, compostable items, such as food scraps and yard trimmings, and garbage. Recyclable materials are sent to Recology's Recycle Central facility, which is located at Pier 96, where they are separated and sold to manufacturers that turn the materials into new products.[32] Compostable items and garbage are taken to the Recology Transfer Station.[33] The total demand on Recycle Central is approximately 1,000 tons per day (tpd) and the total demand on the Recology Transfer Station is approximately 2,000 tpd.[34]

San Francisco created the first large-scale urban program for collection of compostable materials in the country. After being taken to the Recology Transfer Station, food scraps and other compostable material from residents, restaurants, and other businesses is sent to Recology's Jepson-Prairie composting facility in Solano County or the Recology Grover composting facility in Stanislaus County.[35] Food scraps, plant trimmings, soiled paper, and other compostables are turned into a nutrient-rich soil amendment, or compost.

In September 2015, the City approved an agreement with Recology for the transport and disposal of the city's municipal solid waste (MSW) at the Recology Hay Road Landfill. The city began disposing its MSW at Recology Hay Road Landfill in January 2016, and that practice is anticipated to continue for approximately nine years, with an option to renew the agreement thereafter for an additional six years. The Hay Road Landfill is permitted by Solano County and the California Department of Resources Recycling and Recovery (CalRecycle) to accept up to 2,400 tons per day of MSW for disposal and to operate up to 24 hours per day, seven days per week. The landfill has 30,433,000 cubic yards of remaining capacity and has a closure date of 2077.[36]

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[32] Stewart, Ken. Operations Manager. Recology Transfer Station. Phone call with Jessica Viramontes, ICF International. Received on February 25, 2016.

[33] Stewart, Ken. Operations Manager. Recology Transfer Station. Phone call with Jessica Viramontes, ICF International. Received on February 25, 2016.

[34] Stewart, Ken. Operations Manager. Recology Transfer Station. Phone call with Jessica Viramontes, ICF International. Received on February 25, 2016.

[35] U.S. Composting Council. *Recology Environmental Solutions, Inc.* 2010. Available: http://compostingcouncil.org/wp/compostmap_detail.php?mem_id=919&multiple_location_id=58. Accessed: February 25, 2016.

[36] California Department of Resource Recycling and Recovery. 2017. Facility/Site Summary Details: Recology Hay Road (48-AA-0002). Available: http://www.calrecycle.ca.gov/SWFacilities/Directory/48-aa-0002/Detail/. Accessed: March 10, 2017.

The City estimates that it diverted 80 percent of its waste from landfills in 2011.[37] The City's per resident disposal target rate is 6.6 pounds per person per day (PPD), and its per employee disposal target rate is 10.6 PPD. The per capita disposal rate is one of several factors used in determining a jurisdiction's compliance with the intent of Assembly Bill 939, discussed below, allowing CalRecycle and the jurisdictions it oversees to make successful implementation programs their primary focus. In 2015, which is the most recent year for which data are available, the measured disposal rate was 3.7 PPD for residents and 4.9 PPD for employees, thereby meeting the City's target rates.[38]

Hazardous waste, including household hazardous waste, is handled separately from other solid waste. The Recology Transfer Station allows for people to safely dispose of the hazardous waste generated from their homes.[39]

Construction and demolition (C&D) debris in the city must be transported by a registered transporter to a registered facility that can process mixed C&D debris pursuant to the City and County of San Francisco C&D Ordinance. The ordinance requires that at least 65 percent of C&D debris from a site go to a registered C&D recycling facility (e.g., the Recology Transfer Station).[40]

NATURAL GAS AND ELECTRICITY

Pacific Gas and Electric (PG&E) provides electric service and natural gas to the project site; SFPUC currently provides electric service to Pier 48 using PG&E overhead lines. With a relatively mild Mediterranean climate and strict energy-efficiency and conservation requirements, California has lower energy consumption rates than other parts of the country. According to the Department of Energy (DOE), California's per capita energy consumption

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[37] San Francisco Office of the Mayor. 2012. *Mayor Lee Announces San Francisco Reaches 80 Percent Landfill Waste Diversion, Leads All Cities in North America*, Press Release: October 5. Available: http://www.sfenvironment.org/news/press-release/mayor-lee-announces-san-francisco-reaches-80-percent-landfill-waste-diversion-leads-all-cities-in-north-america. Accessed: February 26, 2016.

[38] California Department of Resources Recycling and Recovery (CalRecycle). 2016. *Per Capita Disposal Rates Trends: San Francisco*. Available: http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=JurisdictionID%3d438%26BeginYear%3d2014%26EndYear%3d2015%26ReportName%3dARDRPopEmpTrendExternal%26ShowParameters%3dfalse%26AllowNullParameters%3dFalse. Accessed: May 23, 2016.

[39] Recology SF. 2016. *The San Francisco Dump (Transfer Station)*. Available: http://sunsetscavenger.com/sfDump.htm. Accessed: February 25, 2016.

[40] SF Environment. 2012. *City and County of San Francisco Construction and Demolition Debris Recovery Program Ordinance No. 27-06*. Available: http://sfenvironment.org/sites/default/files/fliers/files/cd_information_rev_01.03.12.pdf. Accessed: February 25, 2016.

ranked 48th in the nation as of 2013.[41] California has among the lowest annual electrical consumption rates per person of any state, and its residential uses consume 31 percent less energy compared with the national average.[42]

PG&E provides natural gas within 70,000 square miles of northern and central California, including San Francisco and the project site. PG&E's service area extends north to south from Eureka to Bakersfield and east to west from the Sierra Nevada to the Pacific Ocean. PG&E purchases gas from a variety of sources, including other utility companies.

San Francisco is located in a coastal climate zone (Climate Zone 3 in the Title 24 Climate Zone designation mapping), and with the moderating influence of the Bay, it requires less energy for heating and cooling than other parts of the state. In 2014, PG&E delivered 220 million therms of natural gas to San Francisco, with about 44 percent, or approximately 96 million therms of natural gas, sold to nonresidential customers.[43]

The SFPUC is San Francisco's municipal power utility. The SFPUC also provides electrical services to select local residential and business communities. The Hetch Hetchy Power System, which is owned and operated by the SFPUC, supplies clean energy to all of San Francisco's municipal facilities, services, and customers. The Hetch Hetchy Power System is composed of three hydroelectric powerhouses, with a combined total of nearly 400 megawatts.[44] This electricity is transmitted to San Francisco along City-owned transmission lines. Within San Francisco, the SFPUC also generates more than 10 megawatts of renewable energy from 19 solar arrays and two biogas cogeneration facilities.

REGULATORY FRAMEWORK

FEDERAL

WATER SUPPLY AND DEMAND

Clean Water Act (33 United States Code Section 1251 et seq.). The 1972 amendments to the federal Water Pollution Control Act, Section 402, established the NPDES permit program to control discharges of pollutants from point-source discharges, or discharges from a single,

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41 U.S. Department of Energy and U.S. Energy Information Administration. 2012. *State Profile and Energy Estimates – California.* Available: http://www.eia.gov/state/?sid=CA. Accessed: February 26, 2016.

42 U.S. Energy Information Administration. 2015. *Household Energy Use in California*. Available: http://www.eia.gov/consumption/residential/reports/2009/state_briefs/pdf/CA.pdf. Accessed: February 26, 2016.

43 California Energy Commission. 2014. *Electricity Consumption by County*. Available: http://www.ecdms.energy.ca.gov/gasbycounty.aspx. Accessed: February 26, 2016.

44 San Francisco Public Utilities Commission. 2017. *About the Power Enterprise*. Available: http://sfwater.org/index.aspx?page=391. Accessed: March 10, 2017.

identifiable source of pollutants (e.g., a pipe or drain). NPDES is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States. The 1987 amendments to the Clean Water Act (CWA) created a new section, which is devoted to stormwater permitting (Section 402). The U.S. Environmental Protection Agency (EPA) has granted California primacy in administering and enforcing the provisions of the CWA and NPDES within state boundaries. NPDES permits are issued by one of the nine Regional Water Quality Control Boards.

The proposed project is required to comply with both construction and municipal NPDES stormwater requirements. More information is provided in the *State Regulations* section, below.

A description of several other sections of the CWA is provided in Section 4.N, *Hydrology and Water Quality*.

Safe Drinking Water Act (42 United States Code Section 300f et seq.). The EPA administers the Safe Drinking Water Act (SDWA), the primary federal law that regulates the quality of drinking water and establishes standards to protect public health and safety. The Department of Health Services (DHS) implements the SDWA and oversees public water system quality statewide. DHS establishes legal drinking water standards for contaminates that could threaten public health.

STATE

WATER SUPPLY AND DEMAND

California Senate Bill 610 (Water Code Sections 10910 to 10915, SB 610). California Senate Bill 610 (SB 610) requires that water retailers demonstrate whether their water supplies are sufficient to meet the projected demand of certain large development projects. A Water Supply Assessment (WSA) under SB 610 is required if a project meets one of the following criteria:

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 gross square feet (gsf) of floor space;
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 gsf of floor space;
- A hotel or motel, or both, having more than 500 rooms;
- An industrial, manufacturing, or processing plant or an industrial park housing more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 gsf of floor area;
- A mixed use project that includes one or more of the projects specified above; or
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

The project meets several of the criteria listed above. As such, a WSA was prepared for the project by the SFPUC (approved January 10, 2017).[45]

Subdivision Map Act (California Government Code Section 66473.7). The Subdivision Map Act requires a condition to be included in any tentative subdivision map or development agreement for a residential subdivision of 500 or more units, mandating that a "sufficient water supply" be available to serve the subdivision in addition to other existing and planned future water uses. The water provider must submit water supply verification to the city or county to document whether such a water supply exists, based on substantial evidence. If verification of a sufficient water supply cannot be provided, a final subdivision map cannot be issued for the subdivision, and the subdivision cannot be built.

Urban Water Management Planning Act (California Water Code Sections 10610 to 10656). In 1983, the California Legislature enacted the Urban Water Management Planning Act. This act, Division 6, Part 2.6, of the California Water Code, requires an understanding of urban water demands and efficient use of water by suppliers. Section 10610.4 of the act requires water suppliers to actively pursue efficient use of available water supplies, and Section 10620 establishes the requirement for every urban water supplier to prepare and adopt a UWMP. The act states that every urban water supplier that provides water to 3,000 or more customers, or that provides more than 3,000 acre-feet of water annually, should make every effort to ensure the appropriate level of reliability in its water service (i.e., able to meet the needs of its various categories of customers during normal, dry, and multiple dry years). The act describes the contents of the UWMP and how urban water suppliers should adopt and implement the plans. The plan must be updated at least every 5 years for years ending in 5 or 0. The SFPUC prepared the 2015 UWMP, as required by the California Water Code, which was adopted on June 14, 2016.

Senate Bill x7-7 2009 (Water Conservation Act of 2009, Section 10631.5, Part 2.55 of Division 6, Part 2.8 of Division 6, of the Water Code). Effective January 1, 2010, Senate Bill x7-7 (SB x7-7) requires the state to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. In addition, SB x7-7 requires agricultural water management plans and efficient water management practices for agricultural water suppliers and promotes expanded development of sustainable water supplies at the regional level. The portion of SB x7-7 focused on urban water management establishes processes for urban water suppliers to meet the statewide water conservation targets. Further, SB x7-7 requires California Department of Water Resources (DWR) review and reporting on UWMPs; creates a Commercial, Industrial, and Institutional (CII) Task Force to develop best management practices (BMPs) for water use in this sector; requires DWR to promote implementation of regional water resource management practices

[45] San Francisco Public Utilities Commission. 2016. *Water Supply Assessment for the Seawall Lot 337 and Pier 48 Mixed-Use Project*. December 20. The WSA is included as Appendix 8-1 to this Draft EIR.

through increased incentives; and requires DWR, in consultation with the State Water Board, to develop or update statewide targets for recycled water, brackish groundwater desalination, and urban stormwater runoff.

Executive Order B-37-16. Effective May 9, 2016, Executive Order B-37-16 proclaimed that the provisions contained in Governor Brown's January 17, 2014, Proclamation; April 25, 2014, Proclamation; and Executive Orders B-26-14, B-28-14, B-29-15, and B-36-15, which direct state officials to take necessary actions to prepare for drought conditions, remain in full force, with some modifications. Governor Brown's January 17, 2014, Proclamation declared a state of emergency and directed state officials to take all necessary actions to prepare for drought conditions. The April 25, 2014, Proclamation is an executive order that strengthened the state's ability to manage water and habitat effectively in drought conditions and called on Californians to redouble their efforts to conserve water. Executive Order B-26-14 streamlined efforts to provide water to families in dire need. Executive Order B-28-14 extended the waiver of CEQA and Water Code Section 13247 in paragraph 9 of the January 17, 2014, Proclamation. Executive Order B-29-15 proclaimed that the provisions contained in Governor Brown's January 17, 2014, Proclamation; April 25, 2014, Proclamation; and Executive Orders B-26-14 and B-28-14 remain in full force, with some modifications.

As discussed above, one of the additional modifications in Executive Order B-29-15 concerns the water restrictions imposed by the State Water Board to achieve a statewide 25 percent reduction in potable urban water usage through February 28, 2016. These restrictions required water suppliers to California's cities and towns to reduce usage compared with the amount used in 2013. Under Executive Order B-37-16, new water use targets shall build upon existing state law that requires California to achieve a 20 percent reduction in urban water usage by 2020 (SB x7-7).

WASTEWATER AND STORMWATER COLLECTION AND TREATMENT

Porter-Cologne Water Quality Control Act (Water Code Division 7). The Porter-Cologne Water Quality Act provides the basis for water quality regulation in California and establishes the authority of the State Water Board and the nine Regional Water Quality Control Boards. The act also authorizes waste discharge requirements for municipal wastewater treatment facilities through the NPDES program. The State Water Board grants and administers NPDES permits under a provision of the act, which established effluent limitations and water quality requirements for wastewater plant discharges. In 2000, the Regional Water Quality Control Boards began to require new construction to include "post-construction controls" in project design, and as of December 2010, projects within the jurisdiction of NPDES permittees are required to implement additional post-construction stormwater management requirements for new development and redevelopment projects. As discussed in Section 4.N, *Hydrology and Water Quality*, San Francisco's combined sanitary sewage and stormwater system operates under wastewater NPDES permits.

SOLID WASTE

California Integrated Waste Management Act of 1989 (Public Resources Code Section 40000 et seq., AB 939). Effective January 1990, all cities and counties in California were required to divert 25 percent of all solid waste from landfill or transformation facilities by January 1, 1995, and 50 percent by January 1, 2000. In 2011, San Francisco achieved 80 percent landfill diversion rates, the highest of any city in North America.[46]

State Model Ordinance, California Solid Waste Reuse and Recycling Access Act of 1991 (Chapter 18 to Part 3 of Division 30 of the Public Resources Code, AB 1327). AB 1327 requires development projects to reserve adequate areas for collecting and loading recyclables.

California Assembly Bill 341 (Chapter 12.8 to Part 3 of Division 30 of the Public Resources Code, AB 341). AB 341 requires all businesses and public entities that generate 4 cubic yards or more of waste per week to have a recycling program in place. The purpose of the law is to reduce GHG emissions by diverting commercial solid waste to recycling efforts and expand the opportunity for additional recycling services and recycling manufacturing facilities in California.[47]

California Assembly Bill 1826 (Chapter 12.9 to Part 3 of Division 30 of the Public Resources Code, Commercial Organic Waste Recycling Law). AB 1826 became effective on January 1, 2016 and requires businesses and multi-family complexes (with 5 or more units) that generate specified amounts of organic waste (compost) to arrange for organics collection services. The law phases in the requirements on businesses with full implementation realized in 2019:

- First Tier: Commencing in April 2016, the first tier of affected businesses included those that generate eight or more cubic yards of organic materials per week.
- Second Tier: In January 2017, the affected businesses expanded to include those that generate four or more cubic yards of organic materials per week.
- Third Tier: In January 2019, the affected businesses are further expanded to include those that generate four or more cubic yards of commercial solid waste per week.

NATURAL GAS AND ELECTRICITY

Building Energy Efficiency Standards (California Code of Regulations [CCR] Title 24, Part 6 [last amended in 2013, effective July 1, 2014]). Buildings constructed after June 30, 1977, must comply with standards identified in CCR Title 24, which requires the inclusion of state-of-the-art energy conservation features in building design and construction, including the incorporation of

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[46] San Francisco Department of the Environment. 2015. *Zero Waste FAQ*. Available: http://www.sfenvironment.org/zero-waste/overview/zero-waste-faq. Accessed: February 26, 2016.

[47] California Department of Resources Recycling and Recovery. 2015. *Mandatory Commercial Recycling*. Available: http://www.calrecycle.ca.gov/recycle/commercial/. Accessed: February 26, 2016.

specific energy-conserving design features, use of nondepletable energy resources, or a demonstration that buildings would comply with a designated energy budget. Part 11 of the Title 24 Building Standards Code is referred to as the California Green Building Standards Code (CALGreen Code). Unless otherwise noted in the regulation, all newly constructed buildings in California are subject to the requirements of the CALGreen Code.

LOCAL

WATER SUPPLY AND DEMAND

Water Efficient Irrigation Ordinance (Ordinance No. 301-10, Chapter 63 of the San Francisco Administrative Code). To ensure the efficient use of water within all San Francisco landscapes, projects with 500 square feet or more of new or modified landscape area are required to comply with the Water Efficient Irrigation Ordinance (effective January 1, 2011). To reduce landscape water use, projects must design, install, and maintain efficient irrigation systems, utilize low-water-use plantings, and set a maximum applied water allowance, also known as an annual water budget. The requirements of the Water Efficient Irrigation Ordinance apply to owners of residential, commercial, municipal, and mixed-use properties with a new construction or modified landscape project greater than or equal to 500 square feet. The San Francisco Green Landscaping Ordinance has additional guidelines and recommendations related to reducing stormwater runoff, stormwater treatment strategies, and improving local and regional water quality.

Recycled Water Ordinance (Ordinance Nos. 390-91 and 391-91, Article 22 of the San Francisco Code of Public Works). The City and County of San Francisco's Recycled Water Ordinance requires property owners to install recycled water systems in new construction, modified construction, or remodeling projects totaling 40,000 square feet or more as well as new or existing landscapes totaling 10,000 square feet or more that were not constructed in conjunction with a development project. The goal of the ordinance is to maximize the use of recycled water. Buildings and facilities that are located within the designated recycled water use areas are required to use recycled water for all uses authorized by California. The project site is within a designated recycled water use area and therefore must comply with the Recycled Water Ordinance. As discussed under Impact UT-1, below, in compliance with the City's recycled-water ordinances, the proposed project would include the installation of an onsite looped recycled water distribution system, which could consist of 8-inch main lines.

Mandatory Use of Alternate Water Supplies in New Construction Ordinance (Ordinance No. 109-15, Article 12C of the San Francisco Health Code). This ordinance amends Article 12C of the San Francisco Health Code to require new buildings larger than 250,000 square feet to be constructed, operated, and maintained using available alternate water sources for toilet and urinal flushing as well as irrigation. In addition, new buildings larger than 40,000 square feet are required to prepare water budget calculations. Approvals from the SFPUC and permits

from both the Department of Public Health and Department of Building Inspection will be needed for the proposed project to verify compliance with the requirements and local health and safety codes. In compliance with Article 12C of the San Francisco Health Code, the proposed project would include a new graywater treatment and collection system, which could consist of 8-inch main lines.

Soil Compaction and Dust Control Ordinance (Ordinance No. 175-91, Article 21 of the San Francisco Public Works Code). This ordinance restricts the use of potable water for soil compaction and dust control activities undertaken in conjunction with any construction or demolition project occurring within the boundaries of the city, unless permission is obtained from the SFPUC. Nonpotable water must be used for soil compaction and dust control activities during project construction or demolition. Recycled water is available from the SFPUC for dust control on roads and streets. However, per state regulations, recycled water cannot be used for demolition, pressure washing, or dust control through aerial spraying.

Mandatory Irrigation Allocation Program. The SFPUC implemented a Mandatory Irrigation Allocation Program in 2015, in accordance with SFPUC Resolution 15-0119.[48] This program requires all potable irrigation customers to reduce their irrigation water use by 25 percent, effective July 1, 2015. The SFPUC has provided irrigation account holders with their water use allocations, using 2013 baseline water use data. If potable water use exceeds the allocation, an excess use charge of 100 percent is charged for each unit of water exceeding the allocation.

WASTEWATER AND STORMWATER COLLECTION AND TREATMENT

San Francisco Public Utilities Commission Water Pollution Prevention Program (Public Works Code, Articles 4, 4.1, and 4.2). The City has a Water Pollution Prevention Program to avoid and minimize pollutants entering the city's sewer system and storm drains, thereby reducing pollutant loading to San Francisco Bay and the Pacific Ocean. The program includes education components for businesses, residents, and City employees. The program also includes several initiatives that are meant to reduce water pollution, including initiatives to reduce toxic chemicals used for landscaping, reduce dental mercury, reduce fats/oils/greases, minimize construction-related water pollution, minimize stormwater pollution, minimize pet-waste-related water pollution, dispose of medications properly, and support green design and operation measures for businesses and households. Articles 4, 4.1, and 4.2 of the San Francisco Public Works Code contain many components of the program.

[48] San Francisco Public Utilities Commission. 2015. *Resolution No. 15-0119.* May 26.

The City has been working for many years to reduce fats, oil, and grease in the wastewater stream from commercial and residential kitchens, especially from restaurants. These materials clog pipes and treatment processes. The City has recently adopted a new fats, oil, and grease ordinance (Ordinance No. 18-11), which has been incorporated into Article 4.1.

Sewer System Management (San Francisco Public Works Code, Article 4.2). In April 2010, San Francisco passed an ordinance (San Francisco Public Works Code, Article 4.2, Section 147–147.6) that requires stormwater controls to be implemented for development projects that discharge stormwater to either the combined sewer system or a separate stormwater system. If a large project creates and/or replaces 5,000 gsf or more of impervious surface, that project is subject to San Francisco's stormwater management requirements, as outlined in the Stormwater Management Ordinance (Ordinance No. 64-16) and the San Francisco Stormwater Management Requirements and Design Guidelines (SMR).[49] The SFPUC and the Port developed the SMR[50] in accordance with the requirements of the NPDES Phase II General Municipal Separate Storm Sewer Systems (MS4) Permit and San Francisco's Stormwater Ordinance to govern post-construction stormwater runoff and quality. The 2016 SMR updated the former 2010 Stormwater Design Guidelines to include new requirements, based on modifications to the NPDES Phase II General MS4 Permit, with which the SFPUC and the Port must comply. The SMR requires compliance with specified stormwater management requirements and provides tools to help project developers achieve compliance with stormwater management requirements. This ordinance is discussed further in Section 4.N, *Hydrology and Water Quality*.

SOLID WASTE

San Francisco Construction and Demolition Waste Ordinance (Ordinance No. 27-06). Per this ordinance, no construction or demolition material may be taken to a landfill or placed in the garbage. All mixed debris must be transported by a registered hauler to a registered facility to be processed for recycling. Source-separated material must be taken to a facility that recycles or reuses those materials. Additionally, projects that include full demolition of an existing structure must submit a waste diversion plan to the director of the San Francisco Department of the Environment for approval. Under the plan, a minimum of 65 percent of construction and demolition debris must be diverted from the landfill, including materials that were source separated for reuse or recycling.

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[49] San Francisco Public Utilities Commission. 2016. *San Francisco Stormwater Management Requirements and Design Guidelines.* City and County of San Francisco. May. Available: http://sfwater.org/modules/showdocument.aspx?documentid=9025. Accessed: September 19, 2016.

[50] San Francisco Public Utilities Commission. 2016. *San Francisco Stormwater Management Requirements and Design Guidelines.* City and County of San Francisco. May. Available: http://sfwater.org/modules/showdocument.aspx?documentid=9025. Accessed: September 19, 2016.

Trash Management (San Francisco Health Code, Article 6). Article 6 of the San Francisco Health Code, Garbage and Refuse, requires properties to have appropriate containers placed in appropriate locations for the collection of refuse. In accordance with this article, the refuse containers must be constructed with tight-fitting lids or sealed enclosures, and the contents of the container may not extend above the top of the rim. The property owner must also have adequate refuse collection service. Article 6 also prohibits the dumping of refuse onto any streets or lands within San Francisco.

Solid Waste Diversion Goal. In 2002, the Board of Supervisors adopted a goal to divert 75 percent of waste by 2010 and 100 percent by 2020.

Garbage and Recycling Enclosures. The City and Port, in its building code, similarly has requirements for including garbage and recycling enclosures in site design, including space for recycling containers and access for recycling and garbage collection trucks to allow for recovery of 100 percent of the facility's solid waste materials.

San Francisco Food Service Waste Reduction Ordinance (Ordinance No. 295-06, San Francisco Environment Code, Chapter 16). This ordinance requires restaurants and food vendors to use food storage ware that is made of compostable or recyclable material rather than styrofoam.

San Francisco Checkout Bag Ordinance (San Francisco Environment Code, Chapter 17). This ordinance requires the use of compostable plastic, recyclable paper, and/or reusable checkout bags by supermarkets and drugstores.

WATER SUPPLY AND DEMAND, WASTEWATER, SOLID WASTE, AND NATURAL GAS AND ELECTRICITY

Green Building Ordinance (City and County of San Francisco Building Code, Chapter 13C, and the 2016 Port of San Francisco Green Building Standards Code). In November 2008, the City passed the San Francisco Green Building Ordinance (SFGBO), which is included as Chapter 13C of the City and County of San Francisco Building Code and in the 2016 Port of San Francisco Green Building Standards Code.[51] Last amended in 2013 (effective January 1, 2014), the SFGBO incorporates all mandatory elements of the 2013 CALGreen and Title 24 energy efficiency standards but includes stricter local requirements. The Green Building Code requires green building practices and Leadership in Energy and Environmental Design (LEED) certification for all new residential and commercial construction in the city, unless otherwise indicated in the SFGBO, as well as alterations to existing buildings. The purpose of the requirements is to promote the health, safety, and welfare of San Francisco's residents,

[51] Port of San Francisco. 2016. *Port of San Francisco Green Building Standards Code*. Available: http://sfport.com/sites/default/files/Business/Docs/Permit%20Services/2016%20Port%20Building%20Codes/2016%20Port%20Green%20Building%20Code.pdf. Accessed: March 9, 2017.

workers, and visitors by minimizing the use and waste of energy, water, and other resources in the construction and operation of the city's buildings and provide a healthy indoor environment.

San Francisco General Plan. The following objectives and policies from the Environmental Protection Element of the San Francisco General Plan are applicable to the project.

- Policy 5.1: Maintain an adequate water distribution system within San Francisco.
- Policy 5.2: Exercise controls over development to correspond to the capabilities of the water supply and distribution system.
- Objective 6: Conserve and protect the fresh water resource.
- Policy 6.1: Maintain a leak detection program to prevent the waste of fresh water.
- Objective 10: Locate wastewater facilities in a manner that will enhance the effective and efficient treatment of storm and wastewater.
- Policy 12.1: Incorporate energy management practices into building, facility, and fleet maintenance and operations.
- Objective 13: Enhance the energy efficiency of housing in San Francisco.
- Policy 13.4: Encourage the use of energy conserving appliances and lighting systems.
- Objective 14: Promote effective energy management practices to maintain the economic vitality of commerce and industry.
- Policy 14.3: Expand the environmental review process to encourage the use of additional measures to save energy in new commercial buildings.
- Policy 14.4: Promote commercial office building design appropriate for local climate conditions.
- Objective 16: Promote the use of renewable energy sources.

ENVIRONMENTAL IMPACTS

This section describes the impact analysis related to utilities and service systems for the project. It describes the methods used to determine the impacts of the project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

The project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Have insufficient water supply available to serve the project from existing entitlements and resources or require new or expanded water supply resources or entitlements.
- Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.
- Fail to comply with federal, state, and local statutes and regulations related to solid waste.
- Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner.

By way of background, Appendix F of the State CEQA Guidelines and PRC Section 21100(b)(3) state that a project would have a significant effect if it would result in "wasteful, inefficient, or unnecessary energy use." Neither of those provisions offers a precise threshold of significance for determining whether a project would result in wasteful, inefficient, or unnecessary energy use. This lack of a threshold of significance has made it difficult for lead agencies to conduct the analysis contemplated in Appendix F and Section 21100(b)(3). In 2014, the decision in *California Clean Energy Committee v. City of Woodland*, 225 Cal. App. 4th 173, held that an EIR had not discussed energy use in sufficient detail. However, that case also did not establish a threshold for determining what constitutes wasteful, inefficient or unnecessary energy. Considering the implications of the *City of Woodland* decision, this EIR applies a "common sense" threshold, whereby a project's energy usage would be considered wasteful, inefficient, and unnecessary if

the project were to violate CCR Title 24,[52] be inconsistent with the energy-related measures in the City's Climate Action Strategy or SFGBO, or otherwise consume a substantially greater amount of energy, in either the construction or operational phase, than similar projects of a similar size that did not incorporate the project's design features and mitigation. This analysis will employ such metrics to assess significance.

METHODS FOR ANALYSIS

A significant impact with regard to utilities and service systems could occur if the utilities that serve the project area could not meet anticipated project demand and construction of new or expanded utility facilities would be required, which could cause significant environmental impacts beyond those analyzed in this Draft EIR. The information used to assess the impacts on water, wastewater, and stormwater treatment capacity; water supply; and solid waste disposal capacity was obtained directly from the SFPUC and Recology as well as from available public information. Energy demand analyses were based, in part, on the calculations that were used to conduct the air quality and GHG emissions analyses. To estimate water demand associated with the project, a WSA was prepared.[53] In addition, Appendix 8-2, *Draft Mission Rock Infrastructure Plan,* was also considered in this analysis. The project's potential contribution to cumulative impacts is evaluated in the context of existing, proposed, and reasonably foreseeable future development, using projections prepared by utility providers for planning purposes and assuming compliance with applicable regulations, as described in the Cumulative Impacts discussion, below.

Current day-to-day operation of the project site under existing conditions generates minimal demand for utilities and service systems because the site is used primarily for parking, pop-up retail, food vendors' operations, and occasional special events. For the purposes of this analysis, it is conservatively assumed that there is no existing demand for water, wastewater, solid waste, electricity, or natural gas services from existing uses on the project site. That is, the analysis of the project's net demand with respect to these utilities does not take "credit" for existing onsite consumption/generation that would no longer occur with implementation of the project.

LAND USE ASSUMPTIONS

Compared with existing conditions, development under the High Commercial (see Table 4.K-2, on the following page) and High Residential (see Table 4.K-3, on the following page) land use assumptions would result in both residential growth and employment growth in the project

[52] No other federal or state regulatory energy-efficiency standards apply to the project.

[53] San Francisco Public Utilities Commission. 2016. *Water Supply Assessment for the Seawall Lot 337 and Pier 48 Mixed-Use Project*. December 20. The WSA is included as Appendix 8-1 to this Draft EIR.

TABLE 4.K-2. PROPOSED ONSITE RESIDENTS AND EMPLOYEES—HIGH COMMERCIAL ASSUMPTION

Land Use	Gross Square Footage (gsf)/Units	Generation Rate	Estimated Residents/Employees[a]
Onsite Residents			
Residential	1,100,000 gsf/1,000 units	2.35 persons/household	2,350 residents
Total Project Residents			*2,350 residents*
Employees			
Commercial	1,400,000 gsf	276 gsf/employee	5,070 employees
Active Retail	244,800 gsf	327 gsf/employee	750 employees
Residential	1,000 units	1 employee/32 units	30 employees
Pier 48	242,500 gsf	—	200 employees
Total Project Employees			*6,050 employees*
Employee-Induced City Residents			
Employees Who also Live in the City		50.4%	3,050 employee/residents
Employee-Induced Housing Demand		1.35 employees/household	2,260 households
Employee-Induced Residents		*2.35 persons/household*	*5,310 residents*
Total Project-Induced Population Growth in City			***7,660 residents***

Sources: Adavant Consulting, 2015; U.S. Census Bureau. 2014. ACS. One-year estimate. IDs B08406, B08008, S0501.

TABLE 4.K-3. PROPOSED ONSITE RESIDENTS AND EMPLOYEES—HIGH RESIDENTIAL ASSUMPTION

Land Use	Gross Square Footage/Units	Generation Rate	Estimated Residents/ Employees[a]
Onsite Residents			
Residential	1,600,000 gsf/1,600 units	2.35 persons/household	3,760 residents
Total Project Residents			*3,760 residents*
Employees			
Commercial	972,200 gsf	276 gsf/employee	3,520 employees
Active Retail	241,000 gsf	327 gsf/employee	740 employees
Residential	1,600 units	1 employee/32 units	50 employees
Pier 48	242,500 gsf	—	200 employees
Total Project Employees			*4,510 employees*
Employee-Induced City Residents			
Employees Who also Live in the City		50.4%	2,270 employee-residents
Employee-Induced Housing Demand		1.35 employees/household	1,680 households
Employee-Induced Residents		*2.35 persons/household*	*3,960 residents*
Total Project Population Growth in City			***7,720 residents***

Sources: Adavant Consulting 2015; U.S. Census. 2014. ACS. One-year estimate, IDs B08406, B08008, S0501.

area following the construction period. However, because of the different development scenarios contemplated under each land use assumption, the number of employees and residents would differ. As shown in Table 4.J-2, on the previous page, the High Commercial Assumption would generate 2,350 residents and 6,050 employees onsite. Given the percentage of city employees who live in the city (50.4 percent), the average number of workers per household in the city (1.35), and the average number of persons per household in the city (2.35), the 6,050 employees associated with the High Commercial Assumption would indirectly induce an additional 5,310 residents in the city, for a total of 7,660 residents. As shown in Table 4.J-3, on the previous page, the High Residential Assumption would generate 3,760 residents and 4,510 employees onsite. Applying the same factors noted above, the 4,510 employees associated with the High Residential Assumption would indirectly induce an additional 3,960 residents in the city, for a total of 7,720 residents. The special-event/assembly areas at China Basin Park and Mission Rock Square would be able to hold about 5,000 people and 2,000 people, respectively. Special events would be held in these areas occasionally throughout the year.

Because of the different development scenarios contemplated under each land use assumption, the demand for utilities and service systems would differ. To provide a conservative analysis, the determination of significance for each utility impact is based on the land use assumption that would result in the greatest demand for the respective utility being analyzed, based on the detailed estimates provided below. For those utilities in which impacts would be similar, general references to the project are applied and assumed to refer to either land use assumption.

IMPACTS AND MITIGATION MEASURES

Impact UT-1. The project would have sufficient water supplies available to serve the project from existing entitlements and resources, and no new or expanded entitlements would be needed. In addition, the project would not require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. (Less than Significant)

WATER DEMAND

CONSTRUCTION

Project construction would result in a temporary increase in water demand. Activities such as dust control, concrete mixing/placement, equipment and site cleanup, irrigation for landscaping, and water line testing and flushing would occur periodically throughout the project's construction period. According to the project construction engineer, it is anticipated

that project construction would result in water demand totaling approximately 0.012 mgd.[54] Water demand during construction would be temporary and substantially less than the estimated annual operational demand from the project upon full buildout. As discussed below, during normal, single, and multiple dry years (until 2040), the SFPUC would have sufficient water supplies to serve the project. In addition, in compliance with the Soil Compaction and Dust Control Ordinance, potable water would not be used for soil compaction or dust control activities during project construction unless permission is obtained from the SFPUC. Based on the above, the water demand during project construction would not be anticipated to have a substantial adverse impact on available water supplies or infrastructure. Impacts during construction would be ***less than significant***.

OPERATION

As previously discussed, SB 610 requires that water retailers demonstrate whether their water supplies are adequate with respect to meeting the projected demand of large development projects that meet the criteria for preparation of a WSA. In accordance with SB 610, the SFPUC prepared a WSA for the project (approved January 10, 2017).[55] The WSA is included as Appendix 8-1 to this Draft EIR. Water demand was calculated using the Single-Site SFPUC Nonpotable Water Calculator.[56,57] Because the High Residential land use assumption would result in a greater water demand (178,832,969 gallons per year [or 489,953 gallons per day, or 0.490 mgd]) than the High Commercial land use assumption (164,007,587 gallons per year [or 449,556 gallons per day, or 0.449 mgd]), the WSA analysis is based on the High Residential land use assumption.

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54 Mesikepp, Sam. Email communication to Erin Efner. Construction Assumptions for Mission Rock. November 25, 2015.

55 San Francisco Public Utilities Commission. 2016. *Water Supply Assessment for the Seawall Lot 337 and Pier 48 Mixed-Use Project*. December 20. The WSA is included as Appendix 8-1 to this Draft EIR.

56 The Single-Site SFPUC Nonpotable Water Calculator uses spreadsheets provided by the SFPUC to help estimate a proposed project's water demand.

57 The Single-Site SFPUC Nonpotable Water Calculator inputs are based on the total square footage of the project as well as total employment and the square footage of impervious/landscaped areas; these numbers do not take into consideration existing occupied building space, employment, and impervious surfaces. The water demand in Table 4.K-2 was calculated by using the reduced flow rates for some of the fixtures, including showerheads, lavatory faucets, urinals, and kitchen faucets. Although commercial uses consist of office, research and development/biotech, lab, institutional, medical, and similar nonretail uses, for the purposes of calculating water demand, these areas are assumed to be office uses. Furthermore, although active/retail/production uses may include shops, restaurants, entertainment venues, light industrial/production facilities, community rooms, rooftop lounges, transit hubs, or other uses that promote pedestrian activity, these areas are also assumed to be office uses for purpose of calculating water demand. Although restaurant and grocery stores have the highest water demand per square foot, applying the general office use to the total proposed square footage would provide a conservative estimate of water demand.

To limit the use of potable water for irrigation, a new recycled water main, which could consist of an 8-inch pipe, for landscaping is proposed within the new alignment of Mission Rock Street and the existing recycled water main alignment in Third Street. The City does not currently have recycled water available for distribution in Mission Bay to serve the recycled water infrastructure in Mission Rock Street and Third Street. However, in compliance with the City's recycled-water ordinances, the proposed project would include the installation of an onsite looped recycled water distribution system, which could consist of 8-inch main lines. In addition, a new graywater treatment and collection system, which could consist of 8-inch main lines, is proposed for the project, in compliance with Article 12C of the San Francisco Health Code (Nonpotable Water Ordinance). A graywater system would collect graywater from sinks, showers, and potentially laundry machines in selected parcels and centrally treat the water before providing nonpotable water to all buildings for flushing and site irrigation. If a municipal recycled water supply comes online in the future, the project could continue to use graywater treatment to generate its own recycled water or connect to the City-supplied recycled water. In either case, the required onsite looped recycled water system would be used to distribute the available recycled water. The sewer discharges, including solids, that would be generated by the proposed graywater treatment system would be conveyed directly to the sanitary sewer main through a separate internal building plumbing system. It is not anticipated that the solids produced by the proposed graywater treatment system, which would collect water from sinks, showers, and potentially laundry machines, would generate substantial odor or noise impacts because the solids would be different compared with the solids that are typically produced by a wastewater treatment facility, which collects water from toilets.

Based on the inputs included in the Single-Site SFPUC Nonpotable Water Calculator, the WSA assumes, under the High Commercial land use assumption, that approximately 22 percent of the project's water demand would be met by nonpotable supply; under the High Residential land use assumption, approximately 25 percent of the project's water demand would be met by nonpotable supply. In addition, the goal for the overall development includes LEED Gold certification for all commercial office/retail buildings and LEED Silver certification for all residential development onsite, which would require the proposed project to meet water use reduction standards. Neither the proposed onsite recycled water system nor the graywater treatment system was factored into the WSA's estimate of proposed potable water demand; therefore, the estimate provided in the WSA is conservative and may overstate the project's potable water demand.

As evidenced in the WSA, the project's total estimated water demand represents 0.4 to 0.6 percent of the total in-city retail demand projections presented in the 2015 UWMP. Table 4.K-4, on the following page, summarizes the water demand by project phasing relative to total SFPUC retail demand. The project's water demand would increase between 2020 and 2025 because the project would not be fully built out until 2023.

TABLE 4.K-4. PROJECT DEMAND RELATIVE TO TOTAL RETAIL DEMAND

	2020	2025	2030	2035	2040
Total SFPUC Retail Demand (mgd) in the 2015 UWMP	77.5	79.0	82.3	85.9	89.9
Total Demand of High Residential Assumption (mgd)	0.323	0.490	0.490	0.490	0.490
Portion of Total Retail Demand in the 2015 UWMP	0.42%	0.62%	0.60%	0.57%	0.55%

Source: San Francisco Public Utilities Commission. 2016. *Water Supply Assessment for the Seawall Lot 337 and Pier 48 Mixed-Use Project.* December 20. Table 3.

As previously discussed, Table 4.K-1 (page 4.K-5) demonstrates that, during normal precipitation years, the SFPUC would have adequate supplies to meet the projected demand of its service area. In single dry years, the SFPUC would have sufficient supplies to meet retail demands. In multiple dry years, the SFPUC would experience shortages in RWS deliveries during years two and three without development of additional supply concepts. During both years two and three of multiple dry years, a shortfall of approximately 1.1 mgd, or 1.2 percent, of demand would be experienced.[58] As discussed in the WSA, existing and future retail water supplies included in the 2015 UWMP would be able to meet the retail demand in 2020, 2025, 2030, and 2035 during normal, single, and multiple dry years. However, if planned future water supply projects (e.g., San Francisco Groundwater Supply Project, Westside Recycled Water Project, Eastside Recycled Water Project, and onsite nonpotable supplies) are not implemented, normal-year supplies may not be enough to meet projected retail demands. To balance any water supply deficits during normal years, the SFPUC may import additional water from the RWS, beyond the retail allocation of 81 mgd, with mitigation implemented by the SFPUC as well as potential environmental surcharges if RWS deliveries exceed the 265 mgd "interim supply limitation."[59] Moreover, if dry-year supply projects (i.e., Calaveras Dam Replacement Project, Lower Crystal Springs Dam Improvements Project, Upper Alameda Creek Filter Gallery Project, GSR Project, water transfers) are not implemented, existing dry-year supplies may not be enough to meet projected retail demands. To balance any water supply deficits during dry years, the SFPUC may reduce system deliveries and impose customer rationing.

[58] San Francisco Public Utilities Commission. 2016. *Water Supply Assessment for the Seawall Lot 337 and Pier 48 Mixed-Use Project.* December 20. Table 4.

[59] According to the 2015 UWMP, the SFPUC established an "interim supply limitation" (ISL) to limit water sales from RWS watersheds to an average annual of 265 mgd through December 31, 2018. The wholesale supply allocation of the ISL is 184 mgd, and the retail supply allocation is 81 mgd.

Based on the estimate of the project's water demand shown in Table 4.K-2 (page 4.K-25) and the existing and future water supplies included in the 2015 UWMP, the WSA determined that, during normal, single, and multiple dry years, the SFPUC would have sufficient water supplies to serve the project over a 20-year planning horizon from 2020 through 2040. In addition, the estimated water demand from the proposed project was accounted for within the overall San Francisco retail water demand, which is being used for current water supply planning.[60]

Although implementation of the project would incrementally increase the demand for water in San Francisco, the SFPUC would meet the estimated increase in demand within its anticipated water supply estimated in the 2015 UWMP. New or expanded water supply resources or entitlements or construction of new water treatment facilities would not be required to serve the project and this impact would be ***less than significant***.

WATER TREATMENT

Water supplies delivered from Hetch Hetchy to the city through SFPUC pipelines require minimal treatment. As described in the *Environmental Setting*, above, SFPUC water is treated at the Sunol Valley WTP and the Harry Tracy WTP. Including the Tesla Water Treatment Facility, SFPUC is able to treat up to 615 mgd.

As described above, the total new (net) annual demand on the SFPUC's supply due to the proposed project is conservatively estimated to be 0.490 mgd. According to the WSA, during normal, single, and multiple dry years, the SFPUC would have sufficient water supplies to serve the project. Therefore, the SFPUC would not be required to deliver additional water supplies beyond the previously discussed normal-year system-wide target of 265 mgd. In addition, as shown in Table 4.K-2 (page 4.K-25), SFPUC's retail water supplies are anticipated to meet the SFPUC's retail water demands, which include the proposed project. Therefore, implementation of the project would not require the expansion of existing water treatment facilities or the construction of new facilities. The project would have a ***less-than-significant*** impact with regard to existing water treatment facilities.

WATER FACILITIES

Potable water is currently delivered to the project vicinity by an existing 12-inch main beneath Third Street, an existing 12-inch main beneath Terry A. Francois Boulevard, and an existing 12-inch main beneath Mission Rock Street. To meet the proposed water demand, the project proposes to replace the existing 12-inch main beneath the north/south section of Terry A. Francois Boulevard with a main, which could consist of 12-inch pipe, within the proposed new alignment of that street. New connections would be installed to connect existing potable

[60] San Francisco Public Utilities Commission. 2016. *Water Supply Assessment for the Seawall Lot 337 and Pier 48 Mixed-Use Project.* January 25.

water facilities that serve Pier 48 to the new main beneath Terry A. Francois Boulevard. The project also proposes the installation of a new looped low-pressure water system, which could consist of 12-inch pipe. In addition, as discussed above, the proposed project would include a looped recycled water distribution system onsite, which could consist of 8-inch main lines.

As part of the standard permit review process, the project sponsor would be required to conduct a hydraulic analysis of the SFPUC water distribution system to confirm that the proposed water distribution system would have adequate capacity for meeting the project's water distribution demands, including fire suppression system pressure and flow demands. The project would not require major expansions to the existing water distribution system.

As part of the proposed project, new fire hydrants would be provided and spaced in accordance with City requirements. The project may also include the installation of an onsite system of 12-inch high-pressure water pipes, which would connect to the City's existing Auxiliary Water Supply System (AWSS). Such improvements would be coordinated with and subject to approval by the SFFD and SFPUC during the design review and permitting process. The project sponsor would work with the SFFD to determine utility and access requirements for fire protection and emergency services at the project site during construction and operation.

The installation of new water supply facilities would require excavation, trenching, soil movement, and other activities typical of construction of development projects in San Francisco, as discussed in detail in the appropriate topical sections of this Draft EIR (e.g., Sections 4.E, *Transportation and Circulation*; 4.F, *Noise*; and 4.G, *Air Quality*) as part of the assessment of overall project impacts.

Construction of new water supply facilities, as a component of the proposed project, could result in impacts on the transportation and circulation network. As discussed in Section 4.E, *Transportation and Circulation,* construction of the proposed project would not cause significant impacts on the transportation and circulation network because they would be of limited duration and temporary. However, Improvement Measure I-TR-1.1 is identified to further reduce potential less-than-significant conflicts between construction activities and pedestrians, bicyclists, transit and other vehicles, and nearby businesses and residents.

As described in Section 4.F, *Noise*, construction of the proposed project, including construction of new water supply facilities, would result in temporary noise increases that would be in excess of standards in the Noise Ordinance (Article 29 of the Police Code), even with implementation of applicable mitigation measures. Thus, even with incorporation of Mitigation Measure M-NOI-1.1, construction of the proposed project could cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity, above levels existing without the proposed project, and expose people to or generate excessive ground-borne vibration levels.

Construction of the proposed project, including construction of new water supply facilities, would generate fugitive dust and criteria air pollutants, which would violate an air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. Mitigation Measures M-AQ-1a through M-AQ-1e, M-AQ-2a, and M-AQ-2b, as discussed in Section 4.G, *Air Quality*, are proposed to minimize emissions. However, although implementation of Mitigation Measures M-AQ-1a through M-AQ-1e would substantially reduce construction and operations-related emissions, impacts would remain significant and unavoidable during construction and operation of the proposed project.

In summary, the effects related to construction of the new water supply facilities for the proposed project are addressed as part of the analysis of construction impacts for the proposed project as a whole. Mitigation measures are proposed to reduce significant environmental effects; however, there would be significant and unavoidable construction impacts related to air quality and noise and vibration. Construction of the proposed project's water supply facilities would not result in additional significant impacts that were not otherwise disclosed elsewhere in this EIR; therefore, the physical environmental impacts as a result of construction of water supply facilities as part of the proposed project would be considered ***less than significant***, and no additional mitigation beyond that identified elsewhere in this EIR is necessary.

Impact UT-2. The project would not exceed treatment requirement standards of the Regional Water Quality Control Board and would not require or result in the construction of new wastewater or stormwater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. (Less than Significant)

WASTEWATER TREATMENT REQUIREMENTS

CONSTRUCTION

Wastewater generation would occur periodically throughout the project's construction period. Construction activities could temporarily increase wastewater generation as a result of dewatering and demand from onsite construction workers. However, this demand would be temporary and nominal. Construction dewatering discharges would result in short-term increases in demand on the existing wastewater or storm drainage facilities, but proposed dewatering discharge methods would include options for direct discharge to the Bay under an existing general NPDES permit to ensure that any discharges to the combined sewer system would be within the capacity of existing facilities and would not require the construction or expansion of existing facilities. If discharged directly to the Bay, the dewatering discharges would be subject to the permitting requirements of the Regional Water Quality Control Board under the VOC and Fuel General NPDES permit (discussed in Section 4.N, *Hydrology and Water Quality*), which typically involves reporting and monitoring requirements for discharges of extracted and treated groundwater. Accordingly, the project sponsor or its contractors would be

required to submit a Notice of Intent to the Regional Water Quality Control Board, describing the proposed discharge and treatment system, and the Regional Water Quality Control Board must issue an Authorization to Discharge once it is determined that the discharger is eligible to discharge under the permit. The treated water would most likely be discharged through a stormwater swale or an existing outfall pipe. Regular influent and effluent water quality monitoring would be conducted to demonstrate permit compliance. Therefore, project construction would result in a minimal increase in wastewater generation and would not be anticipated to have a substantial adverse impact on available wastewater treatment or conveyance capacity. Impacts during construction would be ***less than significant***.

OPERATION

It is anticipated that 95 percent of the potable water supplied would be discharged as wastewater into the sewer system; 100 percent of the recycled water would be discharged as wastewater into the sewer system.[61] As such, the estimated wastewater discharge for the High Residential land use assumption, which would generate a higher demand for water than the High Commercial land use assumption, would be 0.441 mgd.[62] The project site is served by the SEP, which treated an average dry-weather flow of about 52 mgd in 2015 and can treat up to 250 mgd during wet weather.[63] The wastewater generated by the High Residential land use assumption would increase the average dry-weather flow by 0.8 percent and comprise about 0.18 percent of the wet-weather capacity of the SEP. Thus, the project would not result in demand that would exceed the SEP's capacity. It is not anticipated that the 0.441 mgd of dry-weather flow generated by the project would increase overflows because overflows currently occur during wet-weather conditions with large storm events. Compliance with permits include discharge prohibitions, effluent limitations, receiving-water limitations, and monitoring and reporting requirements. Thus, this incremental increase would not contribute to a violation of current wastewater treatment and discharge requirements.

As previously discussed, the majority of the project site is located within a separated sewer area, with the exception of the stormwater system on Third Street that currently discharges into the combined system. Currently, no sanitary sewer facilities serve the project site. Flows currently being diverted to the combined sewer system would be instead directed to the separated sanitary sewer and storm drain systems upon project implementation. The project would add to wastewater flows in the project area. However, it would not cause the collection treatment capacity of the sewer system in the city to be exceeded because the wastewater generated under the High Residential land use assumption would be less than the wastewater

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61 BKF Engineers, Surveyors, Planners. 2016. *Draft Mission Rock Infrastructure Plan*. September 20.

62 0.490 mgd*0.90 = 0.441 mgd

63 Eickman, Kent. Engineer, Wastewater Division. San Francisco Water Power Sewer. Email to Jessica Viramontes, ICF International. Received on February 25, 2016.

that was anticipated to be generated at the project site per the 2000 Mission Bay Project Separated Sanitary Sewer Analysis, which determined pipe sizes and inverts so that the proposed sanitary sewer system would meet the Mission Bay Subdivision Regulations, and the 2013 Mission Bay South Infrastructure Plan, which governs construction and development of infrastructure in the South Plan Area and is consistent with redevelopment requirements.[64] Because flows from the proposed project would be less than anticipated by the governing infrastructure planning documents, the separated sewer and stormwater systems would have capacity for wastewater and stormwater generated by the proposed project. Furthermore, the capacity of the existing 21-inch sewer main in Third Street would be adequate with respect to serving the project, assuming that the sanitary sewer system is installed and operates as indicated in the 2013 Mission Bay South Infrastructure Plan.[65]

As discussed in Section 4.N, *Hydrology and Water Quality*, the majority of the project site is paved; therefore, the amount of new impervious surface would be minimal and would not increase stormwater runoff rates and volumes. The proposed project must prepare a Stormwater Control Plan, demonstrating project adherence to the performance measures outlined in the SMR, including stormwater treatment in areas with separate sewer systems. The MS4 permit requires a post-construction BMP condition assessment to inventory and assess the maintenance condition of structural post-construction BMPs. In addition, the NPDES Construction General Permit aims to match post-construction runoff to pre-construction runoff for the 85th-percentile storm event. In addition, the project design would include stormwater management measures, such as bio-retention areas, rain gardens, and flow-through planter areas, all of which would reduce the volume of runoff that would enter the storm sewer system. Therefore, runoff from the project site would not exceed the capacity of existing or planned stormwater drainage systems.

As discussed above, the wastewater generated by the High Residential land use assumption would be less than the wastewater that was anticipated to be generated at the project site per the 2000 Mission Bay Project Separated Sanitary Sewer Analysis and the 2013 Mission Bay South Infrastructure Plan. Because flows from the proposed project would be less than anticipated by the governing infrastructure planning documents, the pump stations that serve the project site would have capacity for wastewater and stormwater generated by the proposed project. Based on the analysis above, the project would not exceed the wastewater treatment requirements of the Regional Water Quality Control Board, and impacts would be ***less than significant***.

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[64] The 2000 Mission Bay Project Separated Sanitary Sewer Analysis anticipated that Seawall Lot 337 would have an average flow of 0.529 mgd and a maximum flow of 1.59 mgd. Source: Olivia Chen Consultants. 2000. *Mission Bay Project: Separated Sanitary Sewer Analysis*. December 26. Table 1.

[65] BKF Engineers, Surveyors, Planners. 2016. *Draft Mission Rock Infrastructure Plan*. September 20.

WASTEWATER FACILITIES

As previously discussed, the majority of the project site is located within the separated sewer area, with the exception of the stormwater system on Third Street that currently discharges into the combined system. Currently, no sanitary sewer facilities serve Seawall Lot 337. As discussed above, Pier 48 is currently served by a 15-inch sanitary sewer main. To serve the project, a series of 8- to 12-inch sanitary sewer mains would be installed onsite within the public street rights-of-way. The sanitary sewer mains would then discharge to the existing 21-inch sanitary sewer system beneath Third Street at two locations, the new sanitary sewer main, which could consist of a 10-inch pipe, at Channel Street and the new sanitary sewer main, which could consist of an 8-inch pipe, at the intersection of Third Street and the proposed Long Bridge Street. The existing 15-inch combined main beneath Terry A. Francois Boulevard would be removed and replaced with a separate sanitary sewer main, which could consist of a 12-inch pipe, during reconstruction of Terry A. Francois Boulevard. At Pier 48, sewer flows would discharge to the proposed sanitary sewer main in Terry A. Francois Boulevard. With implementation of these infrastructure upgrades and expansions, the system would have adequate capacity to carry wastewater flows from the project site to the SEP. In addition, as previously discussed, in 2005, the SFPUC initiated a CIP to, among other things, partially reduce the potential for on-street flooding during heavy rains. With system-wide wastewater improvements continuing under the CIP, it is anticipated that existing sewage collection and treatment services would meet expected demand in the city. As noted above, the project's contribution to the capacity at the SEP would be nominal, 0.18 percent, indicating that no expansion of this facility would be required to serve the project. In addition, as previously discussed, the wastewater generated by the High Residential land use assumption would be less than the wastewater that was anticipated to be generated at the project site per the per the 2000 Mission Bay Project Separated Sanitary Sewer Analysis and the 2013 Mission Bay South Infrastructure Plan. Because flows from the proposed project would be less than anticipated by the governing infrastructure planning documents, the wastewater facilities that serve the project site would have capacity for wastewater and stormwater generated by the proposed project.

Impacts associated with the installation of new wastewater facilities for the proposed project during construction would be similar to the impacts associated with installation of the new water supply facilities summarized above and discussed in detail in the appropriate topical sections of this Draft EIR (e.g., Sections 4.E, *Transportation and Circulation*; 4.F, *Noise*; and 4.G, *Air Quality*) as part of the assessment of overall project impacts.

As such, impacts associated with the construction of new or expansion of existing wastewater facilities would be ***less than significant***.

STORMWATER FACILITIES

As appropriate, the project sponsor would remove existing storm drainage infrastructure within Seawall Lot 337, China Basin Park, and Terry A. Francois Boulevard. Storm drainage infrastructure would remain intact on Pier 48.

To serve the proposed project, new storm drainage pipe infrastructure would be installed within the new interior streets. Compliance with stormwater quality regulations would be ensured during the planning and construction phases, in accordance with the existing San Francisco regulations described in Section 4.N, *Hydrology and Water Quality*. Stormwater treatment would be handled through self-contained treatment within specific streets (or "self-treating" streets) and within large-feature rain gardens in China Basin Park, along the Shared Public Way, and Mission Rock Square, as shown in Figure 4.N-7 in Section 4.N, *Hydrology and Water Quality*. The project would be designed to meet the SMR. Development parcels would be required to implement stormwater treatment measures, either at the parcel or within centralized stormwater management areas at China Basin Park and Mission Rock Square, to meet the guidelines prior to connecting to the storm drain system. In addition, through compliance with SFGBO requirements and implementation of San Francisco Stormwater Management Requirements, runoff water from the project site would not exceed the capacity of existing or planned stormwater drainage systems. In addition, the existing, largely impervious project site would add approximately 5.4 acres of new open space, for a total of approximately 8.0 acres of open space onsite, thereby substantially increasing the amount of pervious surfaces at the project site. Therefore, the project would not increase stormwater runoff rates and volumes. The increase in pervious surfaces, onsite stormwater treatment, and replacement of existing infrastructure indicates that there would be a reduction in stormwater flows to the SEP and capacity of the SEP would not be adversely affected. Therefore, this impact would be ***less than significant***.

Impacts associated with the installation of new stormwater facilities for the proposed project during construction would be similar to the impacts associated with installation of the new water supply facilities summarized above and discussed in detail in the appropriate topical sections of this Draft EIR (e.g., Sections 4.E, *Transportation and Circulation*; 4.F, *Noise*; and 4.G, *Air Quality*) as part of the assessment of overall project impacts.

As such, impacts associated with the construction of new or expansion of existing stormwater facilities would be ***less than significant***.

Impact UT-3. The project would comply with solid waste regulations and would be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs. (Less than Significant)

CONSTRUCTION

Soil would be exported from all areas of the project site during the demolition and grading (first) phase (ranging from 10,000 to 20,000 cubic yards), the infrastructure (second) phase (ranging from 3,360 to 4,500 cubic yards), and the foundation and building (third) phase (ranging from 7,650 to 103,200 cubic yards). In addition, the project would require demolition of asphalt onsite. The soil off-haul location, Baylands Soil Processing in Brisbane, is approximately 6 miles south of the project site. In general, Baylands Soil Processing does not have capacity issues because the facility recycles the materials it receives to produce various recycled soil products.[66] A potential debris disposal location, the Blue Line Material Recovery Facility, is in South San Francisco. The Blue Line Material Recovery Facility is permitted to accept 2,000 tons per day and generally does not have capacity issues.[67] The project's LEED certification goal would incorporate construction solid waste measures (e.g., the recycling of asphalt and concrete for road base and backfill) for all commercial office/retail and residential development onsite. During project construction, the project would meet construction waste recycling requirements for parking lot demolition and/or recycled construction waste. The project would also be subject to the City's Construction and Demolition Debris Recovery Ordinance, which requires all construction and demolition debris to be transported to a registered facility that can divert a minimum of 65 percent of material from landfills. These strategies would reduce solid waste generated by the project during construction. Therefore, the impacts of construction related to solid waste would be ***less than significant***.

OPERATION

The project would increase the generation of solid waste at the project site. Data provided by CalRecycle were used to determine the amount of solid waste that would be generated by the project. Table 4.K-5, on the following page, estimates the amount of solid waste under the High Commercial land use assumption. Under the High Commercial land use assumption, total solid waste generation would be 17,838 tons per year (or 49 tons per day) and under the High Residential land use assumption, total solid waste generation would be 14,666 tons per year (or 40 tons per day). Because the High Commercial land use assumption would result in a greater solid waste generation than the High Residential land use assumption, this analysis is based on the High Commercial land use assumption.

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[66] Baylands Soil Processing, LLC. *The Material Solution*. Available: http://thebaylands.com/. Accessed: December 6, 2016.

[67] CalRecycle. n.d. Solid Waste Facility Permit, Facility Number 41-AA-0185. Available: http://www.calrecycle.ca.gov/Actions/Documents%5C20%5C20142014%5C1090%5C019A%20Proposed%20SWFP%20Blue%20Line%2041-AA-0185%20recd%2004-07-2014.pdf. Accessed: July 6, 2016.

TABLE 4.K-5. ESTIMATED SOLID WASTE GENERATED AT THE PROJECT SITE

Land Use Assumption	Proposed Use	Dwelling Units/Employees	Solid Waste (tons/year)
High Commercial Assumption	Residential	1,000 du	740[a]
	Commercial	5,070 employees	11,704[b]
	Active/Retail	750 employees	4,981[b]
	Leasing and Management Offices	30 employees[c]	43[b]
	Pier 48	200 employees	370[b]
Total			**17,838**

Sources: CalRecycle. *Residential Waste Stream by Material Type*. Available: https://www2.calrecycle.ca.gov/WasteCharacterization/ResidentialStreams. Accessed: September 12, 2016. CalRecycle. *Business Group Waste Stream Calculator*. Available: https://www2.calrecycle.ca.gov/WasteCharacterization/BusinessGroupCalculator. Accessed: September 12, 2016.

a. The solid waste generated by the proposed residential uses was calculated using the following generation rate: 124,112 multi-family tons in San Francisco / 167,840 multi-family units in San Francisco = 0.74 ton per year per multi-family unit. Data are from the *Residential Waste Stream by Material Type* website for San Francisco.

b. The solid waste generated by the proposed nonresidential uses were calculated using the following business groups. All proposed employees were assumed to be full-time equivalent employees.

Commercial: Services, Professional, Technical, & Financial

Active/Retail: Retail Trade – Food and Beverage Stores

Leasing and Management Offices: Services – Management, Administrative, Support and Social

Pier 48: Manufacturing – Food and Nondurable Wholesale

c As discussed in Chapter 2, *Project Description*, the onsite housing could provide employment opportunities for approximately 30 to 50 people at the leasing and management offices. The number of employees anticipated at the leasing and management offices under the High Commercial land use assumption is assumed to be 30 because fewer residences most likely means fewer employees at the leasing and management offices.

As previously discussed, Recology Sunset Scavenger and Recology Golden Gate handle solid waste collection services for residential and commercial garbage and recycling in the city. Recyclable materials generated by the project would be taken to Recycle Central, compostable items and garbage generated by the project would be taken to the Recology Transfer Station, and nonrecyclables would eventually be taken to the Recology Hay Road Landfill in Solano County (via the Recology Transfer Station). The Hay Road Landfill is permitted by Solano County and CalRecycle to accept up to 2,400 tons per day of MSW for disposal and to operate up to 24 hours per day, seven days per week. The landfill has 30,433,000 cubic yards of remaining capacity and an anticipated closure date of 2077.[68]

Although the project would incrementally increase total waste generation from the city, the increasing rate of diversion through recycling and other methods would result in a decreasing share of total waste that requires deposal at the Hay Road Landfill. The High Commercial land

68 California Department of Resource Recycling and Recovery. 2016. *Facility/Site Summary Details: Recology Hay Road (48-AA-0002)*. Available: http://www.calrecycle.ca.gov/SWFacilities/Directory/48-aa-0002/Detail/. Accessed: February 26, 2016.

use assumption would generate 49 tons of solid waste per day (or approximately 98,000 pounds per day, or approximately 2 percent of the 2,400 tons per day that the Hay Road Landfill is permitted to accept). As previously discussed, the City's per-resident disposal target rate is 6.6 PPD, and its per-employee disposal target rate is 10.6 PPD. Thus, the High Commercial land use assumption, which would generate approximately 98,000 pounds per day, would be consistent with the City's disposal target rates for residents and employees. Thus, it is not anticipated that the solid waste generated by project operation would result in the landfill exceeding its permitted capacity, and the project would result in a less-than-significant solid waste generation impact. The project would be subject to the City's Mandatory Recycling and Composting Ordinance, which requires all San Francisco residents and commercial landlords to separate their refuse into recyclables, compostables, and trash, thereby minimizing solid waste disposal and maximizing recycling.

The project would be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs and would comply with federal, state, and local statutes and regulations related to solid waste. Therefore, impacts related to solid waste collection and disposal would be ***less than significant***.

Impact UT-4. The project would not encourage activities that would result in the use of large amounts of fuel, water, or energy or use these resources in a wasteful manner. (Less than Significant)

Natural gas and electric service would be provided to meet the needs of the project site, as required by the California Public Utilities Commission (CPUC), which obligates the SFPUC and PG&E to provide service to its existing and potential customers.

CONSTRUCTION

Natural gas is not typically used during construction. Construction activities for the project would result in a temporary increase in electricity demand. Electricity demand would occur periodically throughout the project's construction period. However, this demand would be temporary and nominal. Therefore, project construction would result in a minimal increase in electricity demand but would not require the construction of additional electrical facilities by the SFPUC. As previously discussed, the Hetch Hetchy Power System is owned and operated by the SFPUC. It supplies clean energy to all of San Francisco's municipal facilities, services, and customers. In addition, the project would use fuels for trucks and construction equipment. The project would consume more than 2.4 million gallons of fuel during the entire construction period. This information is presented in Appendix 6-2 to the Draft EIR. As discussed in Section 4.H, *Greenhouse Gas Emissions*, all construction contractors would comply with relevant commuter benefit programs and emergency ride-home programs to the extent applicable and required, which would reduce the amount of fuel used during construction. In addition, as discussed in Section 4.G, *Air Quality*, Mitigation Measures M-AQ-1a through M-AQ-1d require

engines on certain types of construction equipment to meet higher emissions standards, which is also anticipated to reduce the amount of fuel used during construction. Based on the above, construction of the project would not result in inefficient, wasteful, or unnecessary consumption of energy, and development of the project site would not result in adverse environmental impacts related to energy demand. Thus, this impact would be ***less than significant***.

OPERATION

The SFPUC would provide electric service to the project. SFPUC uses PG&E's distribution facilities. The SFPUC would serve the project with a single 12-kilovolt (kV) line that would be located in a utility trench. The project sponsor, the Port, and other City agencies have designated the project site as a Type 1 Eco-District[69] to help meet environmental goals.

The goal for the overall development includes LEED certification for all commercial office/retail buildings and residential development onsite, as outlined in the SFGBO and other City codes. The project sponsor would implement a comprehensive Sustainability Plan, which would include strategies toward achieving LEED certifications, outline the targets for carbon reductions, and explain how the infrastructure, buildings, and community would coordinate to achieve these targets consistent with design controls. The project sponsor would collaborate with the City through the SFPUC, the Department of the Environment, the Planning Department, and the Port to develop the Sustainability Plan. The project sponsor would be required to comply with these regulations, which have been proven effective in reducing energy use, as demonstrated by San Francisco's Greenhouse Gas Reduction Strategy and the success of energy savings, LEED certification, and the Transportation Demand Management (TDM) Plan in reducing both the city's and the state's energy use. In addition, the project sponsor is also pursuing a goal of meeting 100 percent of the project's building energy demands with solar energy by investing in energy conservation as well as onsite and offsite solar energy projects. Additionally, the proposed project would include the installation of an onsite looped recycled water distribution system in order to conserve water. These strategies comply with the mitigation measures outlined in CEQA Guidelines Appendix F, which aim to improve energy efficiency, conserve energy and water, and use alternative sources of energy. In addition, as previously discussed, the Hetch Hetchy Power System is owned and operated by the SFPUC. It supplies clean energy to all of San Francisco's municipal facilities, services, and customers. Nonetheless, the project would use energy for operation, including electricity and natural gas.

[69] The Planning Department has identified four types of Eco-Districts within the city, each defined by the community that exists within the district. Type 1 Eco-Districts are areas with large amounts of undeveloped land that enable horizontal infrastructure development to be implemented in advance of vertical development to optimize Eco-District goals. The project would be designed to Type 1 Eco-District standards.

Estimated amount of fuel for transportation and other energy usage during operation of the project have been quantified on an annual basis using the Climate Registry's default emissions factors for general reporting protocols. The proposed emergency generators would represent a small portion of the project's overall energy use and are not included in the quantification of the project's energy use. To provide a conservative estimate, no sustainability features have been applied to this calculation. The High Commercial Assumption would consume approximately 30.8 million annual kilowatt-hours (kWh), approximately 326,205 annual therms, and approximately 110.8 billion British thermal units (BTUs) of fuel annually during normal operations.[70] The High Residential Assumption would consume approximately 32.4 million annual kWh, approximately 298,560 annual therms, and approximately 93.6 billion BTUs of fuel annually during normal operations. This information is presented in Appendix 6-2 to this Draft EIR.

In addition, as discussed in Section 4.E, *Transportation and Circulation*, San Francisco has a lower vehicle miles traveled (VMT) ratio than the Bay Area region as a whole. The transportation analysis zone in which the project site is located (TAZ 655) has fewer daily VMT than the Bay Area regional average. Furthermore, the following transportation-related aspects of the project would discourage single-occupancy vehicle trips: proximity to transit, bicycle paths, bicycle storage, bike share shuttles, pedestrian walkways, and a TDM Plan with strategies to discourage the use of automobiles and to encourage transit and other modes of transportation. Mitigation Measure M-AQ-2c: Transportation Demand Management, in Section 4.G, *Air Quality*, includes further measures that would reduce vehicle trips. Because the project is an infill mixed-use development in a transit-rich area, the project's vehicle trips and associated fuel use would not constitute wasteful use of energy and would be consistent with the Plan Bay Area land use strategy which seeks to reduce per capita VMT.[71]

The energy consumed in the project's daily activities would be necessary for ongoing operation of the project site. Because of the various energy-saving measures described above, the City finds no evidence that the project's energy use would be wasteful, inefficient, or unnecessary.

Because development at the project site would meet Part 6 of California Code of Regulations Title 24 conservation standards and would be served by PG&E, the project site would not directly require the construction of new energy generation or supply facilities.

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[70] Electricity use is measured in annual kWh, natural gas use is measured in annual therms, and fuel is measured in BTUs.

[71] Plan Bay Area is a nine-county long-range plan to meet the requirements of California's 2008 Senate Bill 375 (SB 375), which call on each of the State's 18 metropolitan areas to develop a Sustainable Communities Strategy, an integrated transportation, land use, and housing plan that addresses ways to accommodate future population growth and reduce greenhouse gas emissions.

As previously discussed, the High Commercial land use assumption would be consistent with the City's target solid waste disposal rates for residents and employees. Implementation of the Sustainability Plan and the project sponsor's goal of meeting 100 percent of the project's building energy demands with solar energy would ensure that operation of the project would not result in inefficient, wasteful, or unnecessary consumption of energy, and development of the project site would not result in adverse environmental impacts related to energy demand. Thus, this impact would be ***less than significant***.

CUMULATIVE IMPACTS

The geographic context for a discussion of cumulative impacts on utilities is the service area of the utility provider. The geographic context for cumulative impacts on water supply is the SFPUC service area. The geographic context for cumulative impacts on wastewater treatment is the SEP's service area. The geographic context for cumulative impacts on solid waste is the Recology Transfer Station and Hay Road Landfill service areas. With regard to stormwater drainage, the geographic context is the city. Additionally, the geographic context for cumulative impacts on electricity and natural gas is PG&E's service area in northern California.

Impact C-UT-1. The project, combined with other development in the city, would have sufficient water supplies available from existing entitlements and resources; no new or expanded entitlements would be needed. In addition, the project would not require or result in the construction of new water treatment facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects. (Less than Significant)

Other development would increase demands on water supplies as well as water infrastructure and treatment facilities. However, the SFPUC, the local water and wastewater service provider, has incorporated the demand from other development projects in its future water service projections. The WSA (based on the 2015 UWMP) determined that, with the addition of planned retail supplies, the SFPUC would have sufficient water supplies available to serve its retail customers, including the project, existing customers, and foreseeable future development. New or expanded water treatment facilities would not be required as a result of construction of the project, and the project's contribution to water demand would not adversely affect the city's water supply. Therefore, cumulative impacts on the city's water supply would be considered ***less than significant.***

Impact C-UT-2. The project, combined with other development in the city, would not exceed treatment requirements of the Regional Water Quality Control Board and would not require or result in the construction of new wastewater or stormwater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. (Less than Significant)

WASTEWATER

Other development would increase the demands on combined stormwater and wastewater infrastructure and treatment facilities. This would be considered a significant cumulative impact if such growth were to result in the construction of new wastewater or stormwater facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects.

As with the project, other development would be required to meet the wastewater pre-treatment requirements of the SFPUC and State Water Board. According to the 2000 Mission Bay Project Separated Sanitary Sewer Analysis, the average ultimate sanitary flow from Mission Bay was estimated to be 2.61 mgd. As previously discussed, the estimated wastewater discharge for the High Residential land use assumption, which would generate a higher demand for water than the High Commercial land use assumption, would be 0.441 mgd (approximately 17 percent of Mission Bay's average ultimate sanitary sewer flow). The wastewater generated by the High Residential land use assumption would be less than the wastewater that was anticipated to be generated at the project site per the 2000 Mission Bay Project Separated Sanitary Sewer Analysis and the 2013 Mission Bay South Infrastructure Plan. Because flows from the proposed project would be less than anticipated by the governing infrastructure planning documents, the separated sewer and stormwater systems would have capacity for the proposed project. In addition, other large-scale development projects would be required to verify that existing wastewater and stormwater infrastructure can accommodate increased demand, or contribute to any needed upgrades to existing facilities. Furthermore, various SSIP and CIP projects in the project area (e.g., the CIP's Central Bayside System Improvement Project, which will provide collection system enhancements in both the Channel and Islais Creek watersheds; infrastructure improvements to sewers and pump stations; and stormwater management) would increase treatment or conveyance capacity. Therefore, the proposed project's impact, in combination with the cumulative impact of other development, related to wastewater treatment requirements, the city's combined stormwater and wastewater infrastructure, and treatment facilities would be considered ***less than significant.***

STORMWATER

The balance of other development in the city would consist primarily of infill and redevelopment, which would not substantially increase the amount of impervious surfaces in the city. Existing regulations require new projects to address the need for stormwater treatment. For example, as discussed in Section 4.N, *Hydrology and Water Quality*, CWA Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES MS4 permits. MS4 permits require that cities and counties develop and implement programs and measures to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. In addition, as with the project, other development that would create or replace more than 5,000 square feet of impervious surface would be required to incorporate stormwater management strategies per the SMR. Furthermore, various SSIP and CIP projects in the project area (e.g., the CIP's Central Bayside System Improvement Project, which will provide collection system enhancements in both the Channel and Islais Creek watersheds; infrastructure improvements to sewers and pump stations; and stormwater management) would increase treatment or conveyance capacity. Therefore, cumulative impacts on the city's stormwater drainage facilities would be considered ***less than significant.***

Impact C-UT-3. The project, combined with other development within Recology's service area, would not exceed service area solid waste disposal capacity and would be expected to comply with federal, state, and local statutes and regulations related to solid waste. (Less than Significant)

The city currently exceeds statewide goals for reducing solid waste, and is expected to further reduce solid waste volumes in the future. As with the project, other development would be subject to the City's Mandatory Recycling and Composting Ordinance, which requires all San Francisco residents and commercial landlords to separate their refuse into recyclables, compostables, and trash, thereby minimizing solid waste disposal and maximizing recycling. Other development would also be subject to the City's Construction and Demolition Debris Recovery Ordinance, which requires all construction and demolition debris to be transported to a registered facility that can divert a minimum of 65 percent of the material from landfills. Therefore, cumulative impacts related to solid waste would be considered ***less than significant***.

Impact C-UT-4. The project, in combination other development in the city, would not result in wasteful, inefficient, or unnecessary energy use, and the project, in combination with other development served by PG&E, would not exceed existing gas and electric supply capacity (Less than Significant)

All new development would be required to comply with Part 6 of California Code of Regulations Title 24 energy conservation standards for new construction, which require specific energy-conserving design features, the use of nondepletable energy resources, or a

demonstration that buildings would comply with a designated energy budget. In addition, all new development would be required to comply with the SFGBO, which incorporates all mandatory elements of the 2013 CALGreen and Title 24 energy efficiency standards but includes stricter local requirements. The Green Building Code requires green building practices and LEED certification for all new residential and commercial construction in the city, unless otherwise indicated in the SFGBO or Port of San Francisco Green Building Ordinance, as well as alterations to existing buildings. Thus, relative to commercial or residential development, a cumulatively wasteful or inefficient use of electricity or natural gas would not occur. Regarding transportation energy, transportation vehicles, including both passenger and freight vehicles, are heavily regulated in terms of fuel efficiency with aggressive state and federal regulatory requirements (e.g., the Pavley/Advanced Clean Car standards in California, the federal Corporate Average Fuel Economy standards, and similar efforts concerning heavier vehicles) that require progressive improvements in vehicle efficiency over time. In addition, similar to the proposed project, it is anticipated that other development in the city would be primarily of an infill nature, with TDM Plan measures and other measures that would reduce transportation-related energy use (e.g., bike lanes, pedestrian-friendly designs). As such, cumulative transportation energy use is not expected to be wasteful or inefficient.

Existing and planned gas and electric service would be provided to meet the needs of other development customers, as required by the CPUC, which obligates PG&E to provide service to its existing and potential customers. Because the project and future development would comply with Part 6 of the California Code of Regulations Title 24 conservation standards and be served by the SFPUC, through PG&E's distribution facilities, new development would not directly require the construction of new energy generation or supply facilities that would be directly attributable to growth in the city. There would be no substantial adverse environmental impacts related to energy demand. Therefore, cumulative impacts related to energy would be considered ***less than significant.***

4.L BIOLOGICAL RESOURCES

This section describes the regulatory and environmental setting for biological resources. It also describes the impacts on biological resources that would result from implementation of the Seawall Lot 337 and Pier 48 Mixed-Use Project (proposed project) and mitigation measures to reduce these impacts.

Issues identified in response to the notice of preparation (NOP) (Appendix 1) were considered in preparing this analysis. Applicable issues that were identified from the NOP comments include analysis of the potential impacts on the marine environment, as well as state- and federally listed species, and pile-driving impacts on fish, birds, and mammals.

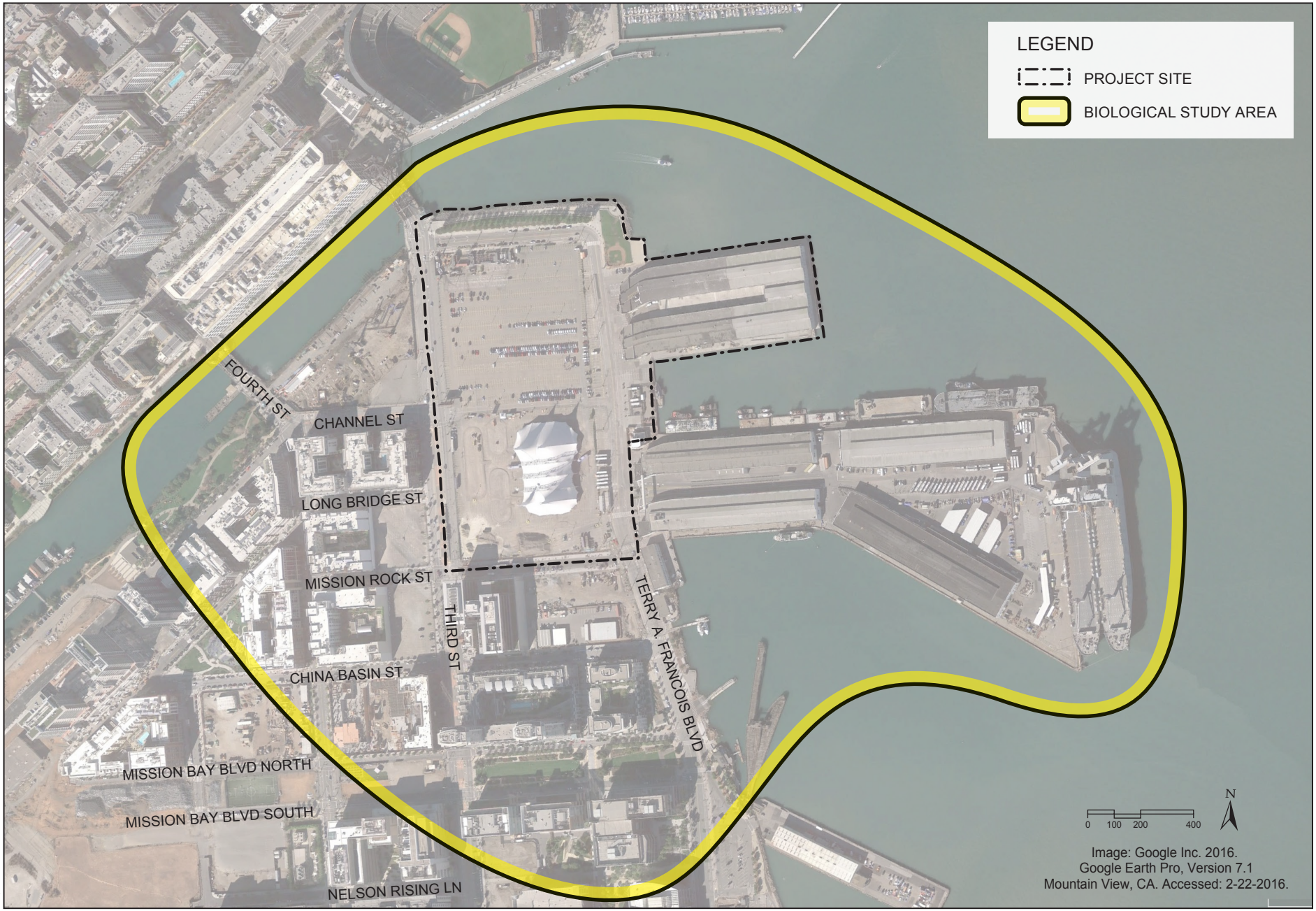
The biological study area for this analysis is defined as the project site, the immediately adjacent Mission Creek and China Basin, and portions of the San Francisco Bay (Bay) (see Figure 4.L-1, Biological Study Area, on the following page).

ENVIRONMENTAL SETTING

The project site is located in the northeast portion of the city and county of San Francisco, in the China Basin area. The cities of Berkeley, Emeryville, and Oakland are located to the east, on the opposite side of the Bay. Along with other municipalities, they form the eastern edge of the Bay. The San Francisco-Oakland Bay Bridge is a prominent manmade feature, approximately 1 mile north of the project site. Treasure Island is visible from the project site.

Mission Creek, as well as its confluence with the Bay, borders the northern boundary of the project site. On the north side of Mission Creek is AT&T Park, which is used for San Francisco Giants baseball games and other major events. Mission Creek once extended from the Mission neighborhood to the Bay but is now channelized, running from China Basin to approximately Interstate 280 (I-280). Mission Creek Park, which lines the creek to the north and south, includes open grassy areas, pathways, a small amphitheater, overlook areas, a nonmotorized boat launch, sports courts, and a dog play area.

Currently, most of the project site is developed with paved parking areas, which are used principally for events at AT&T Park and Pier 48. About 181,200 gross square feet (gsf) of Pier 48 consists of enclosed warehouse space, including two one-story main sheds (Shed A and Shed B) that are connected by a one-story connector shed (Shed C) at the east end of the pier (Figure 2-3).



Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
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Figure 4.L-1
Biological Study Area

Existing onsite vegetation includes weeds and small shrubs along the perimeter of Seawall Lot 337 and grass and 26 trees in China Basin Park. The project site is generally flat, at an elevation of approximately 100 feet, Mission Bay Datum, which is approximately 5 feet above mean high water. No sensitive natural communities, including wetlands and riparian habitat, were observed at the project site.[1]

The biological study area includes portions of the Bay, as illustrated in Figure 4.L-1 on the previous page. The Bay in the vicinity of the project site is characterized by both estuarine intertidal and subtidal habitat. The intertidal habitat is located between Pier 48 and Pier 50 and dominated by armored shoreline or seawall.[2] The subtidal habitat consists of the remainder of the Bay that surrounds the biological study areas and includes open shallow bay. Open shallow bay provides feeding areas for many fish species including Pacific herring (*Clupea pallasii*), northern anchovy (*Engraulis mordax*), and jacksmelt (*Atherinopsis californiensis*). Harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*) can also be observed in these areas.[3] Eelgrass, a habitat area of particular concern (HAPC), is not present in the biological study area.[4]

San Francisco is located within the Pacific Flyway, a major north–south route of travel for migratory birds along the western portion of the Americas, extending from Alaska to Patagonia, Argentina. Every year, migratory birds travel some or all of this distance, both in spring and in fall, following food sources, heading to breeding grounds or traveling to overwintering sites. Migratory birds, such as warblers, orioles, juncos, robins, goldfinches, and swallows, and waterfowl, such as Canada geese and mallards, could visit the project site given its position relative to the Bay.

The project site is fully developed; however, shrubbery in planting beds and trees on or near the site provide only some ground cover. Although the small patches of landscaped vegetation are unlikely to support the candidate, sensitive, or special-status wildlife species with potential to occur in San Francisco, the trees on or near the project site could provide nesting sites for protected migratory bird species that have adapted to the urban environment, such as house finches (*Haemorhous mexicanus*) and mourning dove (*Zenaida macroura*). Additionally, birds could nest on the ledges, rafters, or beams, as well as in drainpipes or holes in walls and ceilings, of the existing one-story sheds on Pier 48.

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1 ICF staff site visit to Seawall Lot 337 and Pier 48 project site, July 28, 2016.

2 State Coastal Conservancy. 2010. *San Francisco Bay Subtidal Habitat Goals Project*. Conservation planning for the submerged areas of the Bay. Fifty-year Conservation Plan.

3 San Francisco Bay Area Wetlands Ecosystem Goals Project. 1999. Baylands Ecosystem Habitat Goals – A Report of Habitat Recommendations.

4 Data Basin. 2016. San Francisco Bay Eelgrass. 2009 eelgrass distribution. Available: https://databasin.org/maps/new#datasets=7dddaf6dcdba4cfea7e037b3bdc7f4db. Accessed: November 30, 2016.

AVIAN USES OF THE STUDY AREA

A variety of terrestrial bird species are habituated to urban environments with little habitat diversity. These birds can utilize trees, shrubs, and buildings within the project site as nesting habitat. The most common species documented as nesting in San Francisco include Brewer's blackbird (*Euphagus cyanocephalus*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia),* house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), and brown-headed cowbird (*Molothrus ater*). Less frequently nesters include Anna's hummingbird (*Calypte anna*), common bushtit (*Psaltriparus minimus*), white-crowned sparrow (*Zonotrichia leucophrys*), chestnut-backed chickadee (*Poecile rufescens*), Cooper's hawk (*Accipter cooperi*), and hooded oriole (*Icterus cucullatus*).

Shore and seabirds could also use the study area for foraging and resting. Shore and seabirds that have been previously identified in the vicinity of the study area include double-crested cormorant (*Phalacrocorax auritus*), western gull (*Larus occidentalis*), black-crowned night heron (*Nyctincorax nycticorax*), brown pelican (*Pelecanus occidentalis californicus*), common loon (*Gabvia immer*), terns (*Sternula* spp.), and long-billed curlew (*Numenius americanus*).[5]

FISH AND MARINE MAMMAL USES OF THE SAN FRANCISCO BAY

Fish species that are frequently found in the open water of the south-central Bay include Pacific herring, northern anchovy, Pacific sardine (*Sardinops sagax caerulea*), English sole (*Parophrys vetulus*), starry flounder (*Platichthys stellatus*), leopard shark (*Triakis semifasciata*), spiny dogfish (*Squalus acanthias*), brown rockfish (*Sebastes auriculatus*), cabezon (*Scorpaenichthys marmoratus*), big skate (*Raja binoculata*), soupfin shark (*Galeorhinus galeus*), sand sole (*Psettichthys melanostictus*), and lingcod (*Ophiodon elongates*).[6] Within the open bay areas are organisms that float in the water column, such as zooplankton; those that swim in the water column, such as fish and mammals; and those that live in the sediment on the bottom, such as benthic invertebrates, crustaceans, and mollusks.

Marine mammals such as harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californicus californianus*), harbor porpoise (*Phocoena phocoena*), and gray whales (*Eschrichtius robustus*) occur in the south-central Bay. Other marine mammals occur in the Bay but are not commonly observed and therefore less likely to occur in the study area. These include humpback whale (*Megaptera noveangliae*), northern elephant seal (*Mirounga angustirostris*), Steller sea lion (*Eumetopius jubatus*), and northern fur seal (*Callorhinus ursinus*).

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[5] California Department of Transportation. 2001. *San Francisco – Oakland Bay Bridge East Spans Seismic Safety Project.* Final Environmental Impact Statement/Statutory Exemption. Volume 1. Available: http://www.dot.ca.gov/dist4/sfobb/sfobbfeis.htm. Accessed: February 3, 2017.

[6] National Marine Fisheries Service. 2012. *Fisheries Management Plan Species Distributions in San Francisco, San Pablo, and Suisun Bays*. Southwest Regional Office.

SPECIAL-STATUS SPECIES

Special-status plant, wildlife, and fish species with the potential to occur in the study area were identified from a California Natural Diversity Database[7] (CNDDB) query, U.S. Fish and Wildlife Service (USFWS) species list database,[8] and California Native Plant Society[9] (CNPS) Online Inventory of Rare and Endangered Plants for the San Francisco North 7.5-minute U.S. Geological Survey (USGS) quadrangle. The lists are included as Appendix 9. The term *special-status species* includes candidate and sensitive species. Species with potential to occur in the study area are presented in Table 4.L-1, on the following page, along with a description of habitat requirements for each species, protection status, and a brief discussion of its likelihood to occur in the study area.

PLANTS

Because of the lack of undeveloped surfaces, no special-status plant species have the potential to occur in the study area. Several special-status plant species occurrences overlap the study area, but these are nonspecific occurrences, with an accuracy of 5 miles. Additionally, most of these occurrences are now considered extirpated[10] by the CNDDB. Therefore, special-status plant species are not discussed further in this analysis.

WILDLIFE

Special-status bird species with the potential to occur in the study area include American peregrine falcon (*Falco pererinus anatum*), brown pelican (*Pelecanus occidentalis californicus)*, black skimmer (*Rynochops nigers*), and California least tern (*Sternula antillarum*). The project site does not provide potential nesting habitat for these species; however, these avian species may forage in or over the Bay near the project site.

Three special-status bat species, big free-tailed bat (*Nyctinomops macrotis*), western mastiff bat (*Eumops perotis californicus*), and Townsend's big-eared bat (*Corynorhinus townsendii townsendii*), have very low potential for occurrence in the study area. Only Townsend's big-eared bat has been documented in the San Francisco North 7.5-minute USGS quadrangle. Bats, and particularly Townsend's big-eared bat, are particularly sensitive to human disturbance and therefore are not expected to be present on the project site because of the extent and frequency of human activity that occurs onsite (i.e., parking for AT&T Park events, The Yard [temporary restaurant and retail space in recycled shipping containers], and special events such as Oktoberfest). Therefore, bat species are not discussed further in this analysis.

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7 California Department of Fish and Wildlife. 2017. *California Natural Diversity Database*. RareFind 5. Available: http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp. Accessed: February 13, 2017.

8 U.S. Fish and Wildlife Service. 2017. *IPaC.* Available: http://ecos.fws.gov/ipac/. Accessed: February 13, 2017.

9 California Native Plant Society. 2017. *Inventory of Rare and Endangered Plants* (online edition, v8-02). Sacramento, CA. Available: http://www.rareplants.cnps.org. Accessed: February 13, 2017.

10 Destroyed, usually by development, and no longer present.

TABLE 4.L-1. SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE STUDY AREA

Common and Scientific Name	Status Federal/State	California Distribution	Habitats	Potential Occurrence in Study Area
Birds				
California brown pelican *Pelecanus occidentalis californicus*	FD/SD	Present along the entire coastline, but does not breed north of Monterey County; extremely rare inland.	Typically in littoral ocean zones, just outside the surf line; nests on offshore islands.	**High.** Species forages within the open bay portion of the study area and could use the pier and other structures for resting areas. Species roosts on Breakwater Island on the south side of the Alameda Point Channel.
Bald eagle *Haliaeetus leucocephalus*	FD/SE	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County.	In western North America, nests and roosts in coniferous forests within 1 mile of a lake, reservoir, stream, or the ocean.	**Low.** Species may forage within the open bay portion of the study area but this is unlikely.

Common and Scientific Name	Status Federal/State	California Distribution	Habitats	Potential Occurrence in Study Area
Peregrine falcon *Falco pereinus anatum*	--/FP	Occurs throughout California from elevations of 12,000 feet to rivers and coastlines and in cities.	Nests in open landscapes with cliffs, on skyscrapers and bridges. Most common along barrier islands, mudflats, coastlines, lake edges, and mountain chains.	**High**. Species has historically nested on the San Francisco –Oakland Bay Bridge[11] and could forage on birds in the Bay Area and urban areas where rock doves are present. Species could use the pier and other structures for resting areas but is unlikely to nest in the project site.
Black skimmer *Rynochops nigers*	--/SSC	Present along the entire coastline from the Bay Area to Baja California.	Nests in colonies on beaches, gravel or shell bars, dredged deposits, islands, saltmarshes, and rooftops. Forages for fish and small crustaceans by skimming the water with its bill.	**Moderate.** Species may forage in the study area.
California least tern *Sternula antillarum*	FE/SE, FP		Nests on sandy or gravelly beaches and banks of rivers or lakes. Forages for small fish and invertebrates in nearby aquatic habitat.	**High.** The closest nesting colony is at the Alameda Naval Air Station, which is directly across the Bay from the study area (4 miles east). Species may forage in the study area.

[11] California Department of Transportation. 2001. San Francisco – Oakland Bay Bridge East Spans Seismic Safety Project. Final Environmental Impact Statement/Statutory Exemption. Volume 1. Available: http://www.dot.ca.gov/dist4/sfobb/sfobbfeis.htm. Accessed: February 3, 2017.

Common and Scientific Name	Status Federal/State	California Distribution	Habitats	Potential Occurrence in Study Area
Mammals				
Townsend's big-eared bat *Corynorhinus townsendii townsendii*	--/SSC	Coastal regions from Del Norte County south to Santa Barbara County.	Roosts in caves, tunnels, mines, and dark attics of abandoned buildings. Very sensitive to disturbances and may abandon a roost after one onsite visit.	**Low**. Unlikely to utilize study area for foraging or roosting due to extreme sensitivity to disturbance.
Big free-tailed bat *Nyctinomops macrotis*	--/SSC	Distribution in California is uncertain because occurrences are very rare; most likely to be found in southern California, but has been recorded in Berkeley, Alameda County.	Inhabits arid, rocky areas; roosts in crevices in cliffs.	**Low**. Unlikely to utilize study area for foraging or roosting. No CNDDB documented records within the San Francisco North 7.5-minute USGS quadrangle map.
Western mastiff bat *Eumops perotis californicus*	--/SSC	Occurs along the western Sierra primarily at low to mid elevations and widely distributed throughout the southern coast ranges. Recent surveys have detected the species north to the Oregon border.	Found in a wide variety of habitats from desert scrub to montane conifer. Roosts and breeds in deep, narrow rock crevices, but may also use crevices in trees, buildings, and tunnels.	**Low**. Unlikely to utilize study area for foraging or roosting. No CNDDB documented records within the San Francisco North 7.5-minute USGS quadrangle map.
Marine Mammals				
Gray whale *Eschrichtius robustus*	FD/--	The entire California coast.	Mainly shallow coastal waters.	**Moderate.** Species may pass near the study area.
Humpback whale *Megaptera noveangliae*	FE/SE	Winters in coastal Central America and Mexico. Migrates along the coast of California to southern British Columbia in the summer and fall.	Coastal and open ocean habitat.	**Low.** Unlikely to be found in the Bay.
Harbor porpoise *Phocoena phocoena*	--/--	Coastal waters from Monterey Bay to the Beaufort Sea.	Commonly found in bays, estuaries, and harbors.	**Moderate.** Species may pass near the study area.

Common and Scientific Name	Status Federal/State	California Distribution	Habitats	Potential Occurrence in Study Area
California sea lion *Zalophus californicus californianus*	--/--	Entire California coastline.	Coastal waters with haul-outs on marina docks, jetties, and buoys.	**High.** Species regularly found in and near the study area.
Steller sea lion *Eumetopius jubatus*	FD/--	Coastal waters ranging from central California to Northern California.	Coastal waters with haul-outs on marina docks, jetties, and buoys.	**Low.** Unlikely to be found in the Bay.
Northern fur seal *Callorhinus ursinus*	--/--	San Miguel Island, off of Southern California, to Northern California.	Mainly pelagic, using only certain offshore islands for pupping and breeding.	**Low.** Unlikely to be found in the Bay.
Northern elephant seal *Mirounga angustirostris*	--/--	Entire California coastline.	During breeding seasons, lives on beaches on offshore islands as well as some remote spots on the mainland; the rest of the year, lives far offshore.	**Low.** Unlikely to be found in the Bay.
Harbor seal *Phoca vitulina*	--/--	Entire California coastline.	Nearshore coastal waters and especially rocky islands, sandy beaches, mudflats, bays, and estuaries.	**Moderate.** Species may pass near the study area.
Fish				
Green sturgeon (southern DPS) *Acipenser medirostris*	FT/SSC	Pacific Ocean, Sacramento, Klamath and Trinity Rivers (Moyle 2002).	Live primarily in the Pacific Ocean, then migrate into freshwater systems to spawn. Juveniles rear in brackish water. Adults spawn in large river systems with well-oxygenated water, with temperatures from 8.0 to 14° C.	**Moderate.** Species may migrate through and forage in the study area.
Longfin smelt *Spirinchus thaleichthys*	FC/ST	Within California, mostly in the Sacramento River–San Joaquin River Delta but also in San Francisco Bay, Humboldt Bay, the Eel River estuary, and the Klamath River estuary.	Salt or brackish estuary waters with freshwater inputs for spawning.	**Moderate.** Species may forage in the study area.

Common and Scientific Name	Status Federal/State	California Distribution	Habitats	Potential Occurrence in Study Area
Central California coast steelhead *Oncorhynchus mykiss*	FT/--	Russian River to Soquel Creek, Santa Cruz County.	Cold, clear water with clean gravel of appropriate size for spawning. Most spawning occurs in headwater streams.	**Moderate.** Species may migrate through the study area.
California coastal Chinook salmon *Oncorhynchus tshawytscha*	FT/--	Russian River to San Francisco Bay.	Cold, clear water with clean gravel of appropriate size for spawning. Most spawning occurs in streams connected to the ocean.	**Moderate.** Species may migrate through the study area.
Spring-run Chinook salmon *O. tshawytscha*	FT/ST	Upper Sacramento River and Feather River.	Has the same general habitat requirements as winter-run Chinook salmon. Coldwater pools are needed for holding adults.[12]	**Low.** Species may migrate through the study area, but the area is outside primary migration routes.
Sacramento winter-run Chinook salmon *O. tshawytscha*	FE/SE	Mainstem Sacramento River below Keswick Dam (Moyle 2002).	Occurs in well-oxygenated, cool riverine habitat with water temperatures from 8.0°C to 12.5°C. Habitat types are riffles, runs, and pools.[13]	**Low.** Species may migrate through the study area, but the area is outside primary migration routes.
Fall-/late fall-run Chinook salmon *O. tshawytscha*	SC/SSC	Sacramento and San Joaquin Rivers and tributary Central Valley rivers.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0°C to 12.5°C. Habitat types are riffles, runs, and pools.[14]	**Moderate.** Species may migrate through the study area.

[12] Moyle, P. B. 2002. Inland Fishes of California. Revised and expanded. University of California Press.

[13] Moyle, P. B. 2002. *Inland Fishes of California*. Revised and expanded. University of California Press.

[14] Moyle, P. B. 2002. *Inland Fishes of California*. Revised and expanded. University of California Press.

Common and Scientific Name	Status Federal/State	California Distribution	Habitats	Potential Occurrence in Study Area
California coastal coho salmon *O. kitusch*	FE/SE	Includes naturally spawned populations from Punta Gorda in Northern California south to and including the San Lorenzo River in Central California as well as populations in tributaries to San Francisco Bay, excluding the Sacramento-San Joaquin River system.	Occurs in coastal streams with water temperatures < 15°C. Needs cool, clear water with instream cover. Spawns in tributaries to large rivers or streams directly connected to the ocean (Moyle 2002).	**None.** Outside of species range. Extirpated in tributaries connected to the Bay.
Pacific herring *Clupea pallasi*	--/State Managed Commercial Fishery	Along California coast to northern Baja California.[15]	Spawning occurs in California from Humboldt Bay to San Francisco Bay in intertidal and shallow subtidal zones. January and February are peak spawning months, but spawning can start in October and continue up to mid-March.[16]	**High.** Species could spawn and rear in the project area.
Northern anchovy	EFH coastal pelagic species/--	Along the California coast from the northernmost part of California to Baja California.[17]	Abundant in the California Current. Moves offshore during the winter months. Moves into nearshore waters in the spring.[18]	**High.** Species captured in large numbers in San Francisco Bay fish studies.[19]

[15] Love, M. 1996. *Probably More than You Want to Know about the Fishes of the Pacific Coast*. Second edition. Santa Barbara, CA: Really Big Press, 335 pp.

[16] California Department of Fish and Wildlife. 2015. *Supplemental Environmental Document*. Pacific herring commercial fishing regulations. Sections 163 and 164, Title 14, California Code of Regulations.

[17] Pacific Coast Fishery Management Council. No date. *Coastal Pelagic Species: Background*. Available: http://www.pcouncil.org/coastal-pelagic-species/background-information/. Accessed: October 14, 2016.

[18] Kucas, S. T., Jr. 1986. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Northern Anchovy.* U.S. Fish and Wildlife Service Biological Report 82(11.50). U. S. Army Corps of Engineers, TR EL-82-4, 11 pp.

[19] Swanson, C. 2007. *2007 San Francisco Bay Fish Index*. A multi-metric index to evaluate the health of San Francisco Bay's fish community in four sub-regions of the estuary. Prepared for the San Francisco Estuary Project Indicators Consortium. November 30, 2007.

Common and Scientific Name	Status: Federal/State	California Distribution	Habitats	Potential Occurrence in Study Area
Brown rockfish *Sebastes auriculatus*	EFH/Pacific groundfish species.	Along the California Coast to Baja California.[20]	Lives in shallow waters and bays. Found primarily in waters with depths of less than 175 feet. Use rocks, pilings, kelp, and other substrate as habitat. Sub-adult and adult brown rockfish are residential, although they migrate into deeper water in the winter.[21]	**High.** Species has been caught in the Bay.

Status Explanations:

FE= Federally Endangered
FT = Federally Threatened
FD = Federally Delisted
FC= Federal Candidate
SE = State Endangered
ST = State Threatened
FP = State Fully Protected
SD = State Delisted
SC = Federal Species of Concern
SSC = State Species of Special Concern
EFH = Essential Fish Habitat

Potential to Occur in the Study Area:

High = Species has been documented in the study area.
Medium = Habitat available in study area and could occur.
Low = Habitat in the study area, but low quality habitat.
None = No habitat in the study area and/or out of species range.

[20] California Department of Fish and Wildlife. 2016. *Nearshore Finfish Profiles*. Abbreviated life history of brown rockfish (*Sebastes auriculatus*). Available: https://www.wildlife.ca.gov/Conservation/Marine/Nearshore-Finfish#26187350-brown-rockfish. Accessed: October 14, 2016.

[21] Stein, D., and T. J. Hassler. 1989. *Species Profiles and Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Brown Rockfish, Copper Rockfish, and Black Rockfish*. U.S. Fish and Wildlife Service Biological Report 82(11.113). U.S. Army Corps of Engineers, TR EL-82-4, 15 pp.

MARINE MAMMALS

Harbor seals, California sea lions, harbor porpoise, and gray whales all occur in the Bay. None of these species are federally or state listed, but they are protected under the federal Marine Mammal Protection Act (MMPA), which outlaws hunting, killing, capturing, or harassing marine mammals.

Harbor seals remain close to shore in subtidal and intertidal zones. In addition, they often venture into bays and estuaries and swim up coastal rivers. They feed on herring, flounder, anchovy, codfish, and sculpin in shallow waters and are present throughout the year. Breeding in California occurs from February to May, with pupping occurring between mid-March and May.[22] Pupping areas in the San Francisco Bay include Castro Rocks, Mowry Slough, and Newark Slough and smaller numbers at Bair Island in Redwood City.[23] The project area could be used by harbor seals as a feeding area.

California sea lions in the Bay occur throughout the year, but the largest numbers are found during the winter herring run (December through February). The numbers decline to a few individuals by June or July. Sea lions use Pier 39 as a haul-out site.[24,25] Sea lions rarely breed in Northern California; instead, breeding occurs from south of San Luis Obispo County to Baja California.[26] Most pups are born in June or July. Breeding takes place a few weeks after the birth of the pups. Sea lions are opportunistic feeders and eat squid, octopus, herring, rockfish, mackerel, and small sharks.[27] The project area could be used by sea lions as a feeding area.

Harbor porpoises returned to the Bay in 2008 after being absent for nearly 60 years. They are present throughout the year and observed regularly at Raccoon Strait and near Angel, Alcatraz and Treasure Islands. They swim under the Golden Gate Bridge during the high tide and feed on herring, anchovy, jacksmelt, rockfish, and squid. Harbor porpoises calve in early summer, followed by breeding. Gestation lasts 10 to 11 months.[28] The project area could be used by porpoises as a feeding area.

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22 Kopec, D. No date. *Harbor seals in the Bay*. U.S. Fish and Wildlife Service.

23 Phipps, N. 2013. Protecting harbor seals in San Francisco Bay. Save the Bay Blog. Available: http://blog.savesfbay.org/2013/10/protecting-harbor-seals-in-san-francisco-bay. Accessed: November 30, 2016.

24 A haul-out site is defined as an area on land where a pinniped (i.e., seals, sea lions) leaves the water between periods of foraging activity.

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

26 San Francisco Bay Area Water Trail. 2016. *Mammals: California Sea Lion*. Available: http://sfbaywatertrail.org/discover-the-bay/about-bay-species/california-sea-lion/. Accessed: August 4, 2016.

27 Marine Mammal Center. 2016. California Sea Lion. Available: http://www.marinemammalcenter.org/education/marine-mammal-information/pinnipeds/california-sea-lion/. Accessed: August 4, 2016.

28 Keener, W. 2011. Safe Harbor: Welcoming Porpoises back to San Francisco Bay. In *Bay Nature Magazine*. Available: http://baynature.org/article/safe-harbor/. Accessed: August 4, 2016.

Gray whales, which are protected under the MMPA, have been sighted in the Bay. Observations are typically off the California coast between December and March, during their southward winter migration to Baja California where calves are born in lagoons and bays from early January to mid-February. Northerly migration to the Bering and Chukchi Seas begins in mid-February, primarily between March and June.[29] Gray whales could enter the Bay during these migration times.

FISH

Special-status fish species with the potential to occur in the study area include the green sturgeon southern distinct population segment (DPS) (*Acipenser medirostris*), which is federally listed as threatened; longfin smelt (*Spirinchus thaleichthys*), a federal; candidate and state-listed threatened species, the central California coast steelhead DPS (*Oncorhynchus mykiss*); and several Chinook salmon (*Oncorhynchus tshawytscha*) runs, which are federally listed as threatened and endangered (Table 4.L-1, page 4.L-6). All of these species could forage in the Bay.

Essential fish habitat (EFH) is present in the study area for coastal pelagics, Pacific groundfish, and Chinook salmon. Pacific groundfish species include rockfishes, flatfishes, sharks, etc. Coastal pelagic species include northern anchovy and Pacific sardine. Pacific groundfish and coastal pelagic species are discussed below because of their importance as commercially managed species and presence in the study area.

Green sturgeon enter the Bay during spawning runs between mid-February and early May and immediately migrate up the Sacramento River. In the fall, post-spawned adults migrate back to the ocean. After hatching, larvae and juveniles move down into the Sacramento River–San Joaquin River Delta (Delta). After rearing in the Delta for several years, they migrate out to the ocean.[30] The study area encompasses critical habitat for green sturgeon. Critical habitat for green sturgeon is designated up to mean high water (MHW) in the Bay, including the area beneath piers and in the surrounding water.[31] The study area would provide rearing and migratory habitat for juvenile and adult sturgeon.

Longfin smelt are considered pelagic (open water) and anadromous. Both adult and juveniles are found throughout the year in water of various salinities (from freshwater to seawater), although once they are past the juvenile stage, they are found mainly in water with salinities

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[29] National Oceanic and Atmospheric Administration Fisheries. No date. *Marine Mammal Laboratory*. Marine Mammal Species: Gray Whale (*Eschrichtius robustus*) Available: http://www.afsc.noaa.gov/nmml/species/species_gray.php#pub. Accessed: October 17, 2016.

[30] National Marine Fisheries Service. No date. *Green Sturgeon*. Available: http://www.westcoast.fisheries.noaa.gov/protected_species/green_sturgeon/green_sturgeon_life_history.html. Accessed: August 8, 2016.

[31] 74 *Federal Register* 52300, October 9, 2009

from 14 to 28 parts per thousand.[32] Longfin smelt move into freshwater and may spawn as early as November, but typically from January to April. They are thought to be restricted by a water temperature of 22°C (71°F) but may move toward the ocean in the summer months when temperatures rise in the Delta.[33] The study area could provide rearing and migratory habitat for longfin smelt during summer months.

Central California coast steelhead includes populations from the Russian River south to Aptos Creek in Santa Cruz County, including streams that are tributaries to San Francisco and San Pablo Bays. Adults migrate upstream to freshwater from December to March, and juveniles emigrate downstream to the Bay in late winter and spring.[34] The study area could provide rearing and migratory habitat for both adult and juvenile steelhead.

Several Chinook salmon runs, including the federally endangered winter-run Chinook salmon, enter the Bay from the Pacific Ocean during spawning migration, then head north to the Sacramento River. The name for each run is based on the timing for immigration into freshwater streams to spawn. Peak immigration time for winter-run Chinook salmon is March, spring run is May to June, and fall/late fall run is September to December. Juveniles emigrate downstream to the Delta and estuary between October and July.[35] The study area would provide migratory habitat for adults and juveniles and juvenile rearing habitat.

COASTAL PELAGIC SPECIES

Pacific herring, which spawns periodically in the Bay, is a state-managed commercial fishery because of its importance as a forage fish for many marine and estuarine species and commercial value. Typically, herring spawns between December and February, but spawning activity has been documented as early as October and as late as mid-March.[36] In 2015–2016, spawning began in late November and ended in mid-March. Spawning areas include Richardson Bay, the San Francisco waterfront, Coyote Point, Paradise Cove-Belvedere Cove,

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[32] Coastal seawater has salinity in the range of 33 parts per thousand. Salinity ranges in the project area vary seasonally because of inflows of freshwater and, thus, can seasonally provide suitable habitat for longfin smelts in winter and spring periods when freshwater inflows occur.

[33] Moyle, P. 2002. *Inland Fishes of California*. Revised and expanded. Berkeley, CA: University of California Press.

[34] Center for Biological Diversity. No date. *Natural History*. Central California Coast Steelhead Trout, *Oncorhynchus mykiss*. Available: http://www.biologicaldiversity.org/species/fish/central_California_coast_steelhead_trout/natural_history.html. Accessed: August 8, 2016.

[35] Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

[36] California Department of Fish and Wildlife. 2015. *Supplemental Environmental Document*. Pacific Herring Commercial Fishing Regulations. Sections 163 and 164, Title 14, California Code of Regulations.

Richardson Bay, Point Richmond, and Tiburon.[37] The study area provides spawning habitat for Pacific herring. Pacific herring spawn in intertidal and nearshore zones in and around the Bay. Eggs are adhesive and deposited on pier pilings or other substrate.

Northern anchovy is another important forage species for larger predators and the most abundant fish in the Bay. The peak time in the Bay is generally from April to October. Spawning occurs in channels, and larvae move into shallow habitat where food is more abundant. The study area may provide rearing habitat for larvae and juvenile northern anchovy.[38] Northern anchovy spawn in the winter and spring in inshore shallow water, at depths of less than 10 meters. The eggs are pelagic, and after hatching, larvae float motionless in the water.[39]

PACIFIC GROUNDFISH

Brown rockfish occur along the California coast from Mendocino County to San Diego. Rockfish are important sport fishing species. Adults less than 5 years of age occur in the Bay. Older brown rockfish are found in deeper water. Females give live birth, and larvae are 5 to 6 millimeters long. The larvae and small juveniles are pelagic for several months to 1 year.[40]

WATERS OF THE UNITED STATES

Waters of the United States present in the study area include the San Francisco Bay, China Basin, and Mission Creek, each of which is considered to be a traditional navigable water (TNW). TNWs fall within U.S. Army Corps of Engineers (USACE) jurisdiction under the federal Clean Water Act (CWA). No wetlands are present at the project site.

MARINE AMBIENT NOISE LEVELS

Under existing conditions, ambient noise levels in the project vicinity are elevated because of shipping activity in the Bay. Reported ambient peak sound levels in the Bay (underwater) range from 120 to 155 decibels (dB) because of heavy industrial use, large marine vessels, and other

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[37] California Department of Fish and Wildlife. 2016. *2015–2016 Herring Season Overview*. Available: https://cdfwherring.wordpress.com/. Accessed: August 8, 2016.

[38] Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife.* Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

[39] Kucas, S. T., Jr. 1986. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Northern Anchovy.* U.S. Fish and Wildlife Service Biological Report 82(11.50). U. S. Army Corps of Engineers, TR EL-82-4, 11 pp.

[40] Stein, D., and T. J. Hassler. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) – Brown Rockfish, Copper Rockfish, and Black Rockfish. U.S. Fish and Wildlife Service Biological Report 82(11.113). U.S. Army Corps of Engineers, TR EL-82-4, 15 pp.

boat traffic (e.g., ferries).[41] Background levels within 100 meters of large ships can be up to 160 dB root mean square (RMS);[42] within 20 meters of a fish trawler passing at low speed, background levels can be up to 140 dB RMS.[43] Fish or marine mammals that swim within 100 meters of large vessels or 20 meters of a fish trawler would experience even higher levels of sound. Thus, common background levels experienced by fish and marine mammals in the project areas can be up to 160 dB RMS but even greater close to vessels.

REGULATORY FRAMEWORK

This section summarizes key federal, state, and local regulations that are applicable to biological resources with the potential to be present in the study area.

FEDERAL

Endangered Species Act. The federal Endangered Species Act (ESA) protects fish and wildlife species, including their habitats that have been identified by the National Marine Fisheries Service (NMFS) or USFWS as threatened or endangered. *Endangered* refers to a species, subspecies, or DPS that is in danger of extinction through all or a significant portion of their range. *Threatened* refers to a species, subspecies, or DPS that is likely to become endangered in the near future.

The ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 7 and 9 of the ESA are relevant to the proposed project and are summarized below.

Section 7: ESA Authorization Process for Federal Actions. Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by federal agencies. Under Section 7, the federal agency conducting, funding, or permitting an action must consult with NMFS or USFWS, as appropriate, to ensure that the proposed project would not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed project "may affect" a listed species or designated critical habitat, the lead federal agency for any construction, permit, or authorization is required to prepare a Biological Assessment (BA) to evaluate the nature and severity of the expected effect. In response, NMFS or USFWS issues a Biological Opinion (BO), with a determination that the proposed project either:

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[41] California Department of Transportation. 2015. *Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish.* Sacramento, CA. November. Available: http://www.dot.ca.gov/hq/env/bio/fisheries_bio_acoustics.htm. Accessed: August 1, 2016.

[42] Decibel RMS is the change in ambient pressure caused by a sound wave over a given amount of time.

[43] California Department of Transportation. 2015.

- May jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or
- Would not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The BO issued by NMFS or USFWS may stipulate discretionary "reasonable and prudent" conservation measures. If a project would not jeopardize a listed species, USFWS or NMFS would issue an incidental take statement to authorize the proposed activity.

Critical Habitat. Critical habitat, as defined in ESA Section 3, is:

I. The specific area within the geographic area occupied by a species, at the time it is listed in accordance with the ESA, on which are found those biological features:

   i. Essential to the conservation of the species, and

   ii. May require special management considerations or protection; and

II. Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Section 9: ESA Prohibitions. Section 9 of the ESA prohibits the take of any fish or wildlife species listed under the ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by federal regulations. *Take*, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, or maliciously damaging or destroying federally listed plants on any site that is under federal jurisdiction.

Magnuson-Stevens Fishery Conservation and Management Act. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires that all federal agencies consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect EFH. *EFH* is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds are considered EFH. The phrase *adversely affect* refers to the creation of any effect that reduces the quality or quantity of EFH. Federal activities that occur outside of an EFH but may nonetheless, have an effect on EFH waters and substrate must also be considered in the consultation process.

Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered. The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other federal statutes, such as the National Environmental Policy Act (NEPA), Fish and Wildlife Coordination Act, CWA, and ESA. EFH consultation requirements can be satisfied through concurrent environmental compliance if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH and the notification meets requirements for EFH assessments.

Clean Water Act. The federal CWA is the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. CWA empowers the U.S. Environmental Protection Agency (EPA) to set national water quality standards, as well as effluent limitations, and establishes permit review mechanisms to enforce them. Section 404 of the CWA regulates the discharge of dredged and fill materials into waters of the United States, including wetlands and other waters of the United States as well as the following water bodies:

- All areas within the ordinary high-water mark of a stream, including nonperennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

Section 404 requires project proponents to obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States, including streams, ponds, and wetlands, before proceeding with a proposed activity. CWA Section 401 requires applicants for a Section 404 permit to first obtain certification or a waiver from certification from the Regional Water Quality Control Board (Regional Water Board) to ensure that the proposed project complies with state water quality standards.

Marine Mammal Protection Act. The Marine Mammal Protection Act (MMPA) (Title 16, United States Code [USC], 1361–1421h), adopted in 1972, makes it unlawful to take or import any marine mammals and/or their products. An incidental harassment permit may be issued by NMFS to cover activities with negligible effects on species for up to 1 year. The MMPA includes two levels of harassment. Level A harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal in the wild. Level B harassment is defined as harassment having potential to disturb marine mammals by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) protects migratory bird species from take. *Take*, under the MBTA, is defined as an action or an attempt to pursue, hunt, shoot, capture, collect, or kill (50 Code of Federal Regulations [CFR] 10.12). The definition differentiates between "intentional" take (take that is the purpose of the activity in question)

and "unintentional" take (take that results from, but is not the purpose of, the activity in question). The U.S. Courts of Appeal, including the Ninth Circuit, have held that unintentional take is not regulated under the MBTA.

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

STATE

California Endangered Species Act. The California Endangered Species Act (CESA), which is administered by the California Department of Fish and Wildlife (CDFW), protects wildlife and plants that have been listed by the California Fish and Game Commission as threatened or endangered under the act. CESA prohibits all persons from taking species that are state-listed as threatened or endangered, except under certain circumstances. The CESA definition of *take* is any action or attempt to "hunt, pursue, catch, capture, or kill."

CESA Section 2081 provides a means by which agencies or individuals may obtain authorization for incidental take of state-listed species, except for certain species designated as fully protected under the California Fish and Game Code. Take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for a Section 2081 permit are similar to those used in the ESA Section 7 process. They include identification of effects on listed species, development of mitigation measures to minimize and fully mitigate effects, development of a monitoring plan, and assurance of funding to implement mitigation and monitoring.

California Environmental Quality Act. Under Section 15380 of the California Environmental Quality Act (CEQA) Guidelines, a species that is not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown by a local agency to meet the criteria" for listing. This provides an agency with the ability to protect species from a project's potential impacts until the responsible government agencies have an opportunity to designate the species as protected, if warranted.

California Native Plant Protection Act. With respect to rare plant species, CESA defers to the National Plant Protection Act (NPPA) of 1977, which prohibits importing rare and endangered plants into California, taking rare and endangered plants (in certain circumstances), and selling rare and endangered plants. State-listed plants are protected mainly when state agencies are involved in projects under CEQA. The NPPA does not prohibit taking rare and endangered plants incidental to possession or sale of real estate (California Fish and Game Code Section

1908); consequently, it does not prohibit removal of a rare or endangered plant in the course of development of land but, rather, only in the context of removal of the plant for the purposes of sale. Owners of land with known rare or endangered species are required to notify CDFW of plans to change land use a minimum of 10 days prior to the change to allow CDFW time to salvage the plants. However, if CDFW fails to respond within these 10 days, then the land owner may proceed with the land use change (California Fish and Game Code Section 1913(c)).

Porter-Cologne Water Quality Control Act. California Water Code Section 13260 requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." Under the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), *waters of the state* are "any surface water or groundwater, including saline waters, within the boundaries of the state." Although all waters of the United States that are within the borders of California are also waters of the state, the reverse is not true. Therefore, California retains authority to regulate discharges of waste into any waters of the state, regardless of whether USACE has concurrent jurisdiction under CWA Section 404. If USACE determines that a wetland is not subject to regulation under Section 404, CWA Section 401 water quality certification is not required. However, the Regional Water Quality Control Board (RWQCB) may impose waste discharge requirements if fill material is placed into waters of the state. In the project area, all of the marine waters are both waters of the United States and waters of California; therefore, the CWA Section 401 water quality certification from the San Francisco RWQCB will address the same waters addressed by the USACE permit under CWA Section 404 (see discussion above).

California Fish and Game Code. The California Fish and Game Code provides protection from take for a variety of species, referred to as Fully Protected Species. Section 3511 lists fully protected birds, Section 3515 lists fully protected fish, Section 4700 lists fully protected mammals, and Section 5050 lists fully protected amphibians and reptiles. The California Fish and Game Code, Section 86, defines *take* as any action to "hunt, pursue, catch, capture, or kill or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of Fully Protected Species is prohibited.

Sections 3503 and 3800 of the California Fish and Game Code prohibit the "take, possession, or destruction of birds, their nests, or eggs" and the "take of nongame birds." Section 3503.5 specifically prohibits the take, possession, or destruction of birds of prey (hawks, eagles, owls, and allies, often referred to as "raptors") and their nests. Human disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered take. Removal of vegetation is the most common action that can lead to a violation of these code sections.

Marine Life Management Act. Within California, most of the legislative authority over fisheries management is enacted within the Marine Life Management Act. This law directs CDFW and the California Fish and Game Commission to issue sport and commercial harvesting licenses

and also license aquaculture operations. CDFW, through the commission, is the state's lead biological resource agency. CDFW is responsible for enforcement of the state's endangered species regulations and the protection and management of all state biological resources.

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

California Species of Special Concern. CDFW maintains lists of Species of Special Concern that receive special attention from federal agencies during environmental review, although they are not otherwise protected under the ESA. Project-related impacts on such species would be considered significant under CEQA Guidelines Section 15380 and require mitigation. The definition for *Species of Special Concern* includes one or more of the following (not necessarily mutually exclusive) criteria:

- Is extirpated from the state or, in the case of birds, its primary seasonal or breeding role;
- Is listed as federally, but not state, threatened or endangered;
- Meets the state definition of threatened or endangered but has not formally been listed;
- Is experiencing, or has formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status;
- Has naturally small populations, exhibiting high susceptibility to risk from any factor(s) and, if realized, could lead to declines that would qualify it for state threatened or endangered status."

CDFW's Nongame Wildlife Program is responsible for producing and updating Species of Special Concern publications for mammals, birds, and reptiles and amphibians. Section 15380 of the CEQA Guidelines indicates that Species of Special Concern should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein. In contrast to species listed in the federal ESA or CESA, however, Species of Special Concern have no formal legal status.

Sensitive Natural Communities. Special-status or sensitive natural communities (vegetation types) have limited distribution statewide or within a county or region. CDFW's Vegetation Classification and Mapping Program (VegCAMP) works to classify and map the vegetation of California and determine the rarity of vegetation types. The current version of CDFW

VegCAMP's List of Vegetation Alliances and Associations (or Natural Communities List[44]) indicates which communities are currently considered rare or highly imperiled. Communities with a state rarity ranking of S1–S3 (based on NatureServe's Heritage Methodology) are considered rare or imperiled, and impacts on such communities may be considered significant under CEQA.

REGIONAL

San Francisco Bay Conservation and Development Commission (BCDC) Bay Plan. BCDC has permit authority over development of the Bay and the shoreline pursuant to the McAteer-Petris Act (California Government Code Section 66000 et seq.). The act requires the BCDC to prepare a "comprehensive and enforceable plan for the conservation of the water of the San Francisco Bay and the development of its shoreline." In 1969, BCDC submitted the completed San Francisco Bay Plan to the governor and legislature. The McAteer-Petris Act was later amended to give the San Francisco Bay Plan the force of law.

BCDC has jurisdiction over all filling, dredging, and changes to uses in the Bay; regulates new development within 100 feet of the shoreline that is subject to tidal action to ensure that maximum public access to the Bay is provided; and ensures that the limited amount of shoreline that is suitable for regional high-priority, water-oriented uses is reserved for such purposes. BCDC jurisdiction over piers that predate its establishment in 1965 is treated differently, depending on the scope of work proposed. Proposed development that does not involve any additional coverage of Bay water or any work on piers or pier substructures is treated within the BCDC shoreline-band jurisdiction. Work that involves removal and replacement of all or a substantial portion of a pier deck to extend the life of the pier or work that changes the use of the structure is treated as work within BCDC's Bay jurisdiction. The project would involve removal of the pier deck and associated wooden pilings, installation of a new pier deck and pilings and change in use. BCDC permits would be required for construction activities, the placement of fill, dredging, and a change in use.

BCDC policies are articulated in the McAlteer-Petris Act, San Francisco Bay Plan, and San Francisco Waterfront Special Area Plan, which outline permitted uses and conditions for those permitted uses on piers and in adjacent areas. These plans are discussed in detail in Chapter 3, *Plans and Policies*.

The Bay Plan also includes the "Replacement Fill Policy," also known as the "50 Percent Rule," which includes certain public access and fill removal requirements that apply to publicly owned pile-supported piers, including piers along the San Francisco waterfront. The 50 Percent Rule

[44] California Department of Fish and Game. 2010. *List of Vegetation Alliances and Associations*. Vegetation Classification and Mapping Program. Sacramento, CA. September.

requires pier development projects that include seismic retrofit or major substructure repair to limit the development to 50 percent of the pier area for water-oriented commercial recreational uses only. The remaining 50 percent of the pier area is required to provide onsite public access, fill removal, or a combination of the two. As explained in Chapter 3, *Plans and Policies*, the California legislature (per Assembly Bill 2797) amended BCDC's Special Area Plan to authorize BCDC to exempt the Pier 48 work from the 50 Percent Rule, thereby alleviating any potential inconsistency.

LOCAL

City and County of San Francisco (City) General Plan (General Plan). The following objectives and policies from the Environmental Protection Element of the General Plan are applicable to the proposed project:

- Objective 1: Achieve a proper balance among the conservation, utilization, and development of San Francisco's natural resources.
- Policy 1.1: Conserve and protect the natural resources of San Francisco.
- Policy 1.2: Improve the quality of natural resources.
- Policy 1.3: Restore and replenish the supply of natural resources.
- Policy 1.4: Assure that all new development meets strict environmental quality standards and recognizes human needs.
- Objective 3: Maintain and improve the quality of the bay, ocean, and shoreline areas.
- Policy 3.1: Cooperate with and otherwise support regulatory programs of existing regional, State, and Federal agencies dealing with the Bay, Ocean, and Shorelines.
- Policy 3.2: Promote the use and development of shoreline areas consistent with the General Plan and the best interest of San Francisco.
- Objective 7: Assure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the city's citizens.
- Policy 7.1: Preserve and add to public open space in accordance with the objectives and policies of the Recreation and Open Space Element.
- Policy 7.3: Require that filling of land adhere to the highest standards of soils engineering consistent with the proposed use.
- Objective 8: Ensure the protection of plant and animal life in the city.
- Policy 8.1: Cooperate with and otherwise support the California Department of Fish and Game and its animal protection programs.

- Policy 8.2: Protect the habitats of known plant and animal species that require a relatively natural environment.
- Policy 8.3: Protect rare and endangered species.

San Francisco Bird-Safe Building Ordinance. San Francisco Planning Code Section 139, Standards for Bird-Safe Buildings,[45] focuses on buildings, both public and private, that create location-specific hazards (building location increases bird injury and mortality) and building-feature hazards (increased bird injury and mortality regardless of location).

Location-specific hazards apply to buildings in or within 300 feet of an Urban Bird Refuge and having a direct line of sight. An Urban Bird Refuge is defined as "open spaces 2 acres and larger dominated by vegetation, including vegetated landscaping, forests, meadows, grassland, or wetlands or open water." Section 139 requires 90 percent of glazing in the "Bird Collision Zone" (60 feet above grade, plus 60 feet above an adjacent vegetated roof 2 acres or larger) to be treated (fritted,[46] stenciled, frosted, or covered with netting, screens, grids, or bird-visible ultraviolet patterns, as defined in Section 139). Lighting must also be minimized, and any wind generators must comply with San Francisco Planning Department requirements, "including any monitoring of wildlife impacts that the department may require."

For location-related hazards involving new buildings, the following requirements apply:

- Façade Treatments: A bird-safe glazing treatment is required such that the Bird Collision Zone consists of no more than 10 percent untreated glazing. Building owners are encouraged to concentrate permitted transparent glazing on the ground-floor and lobby entrances to enhance visual interest for pedestrians.
- Lighting Design: Minimal lighting shall be used. Lighting shall be shielded. No uplighting shall be used. No event searchlights should be permitted for the property.

In addition to regulating buildings that pose a locational hazard to birds (buildings in and within 300 feet of an Urban Bird Refuge), Section 139 applies similar standards to all new or substantially remodeled buildings in San Francisco with certain features (feature-related standards). Specifically, all "free-standing glass walls, wind barriers, skywalks, balconies, and greenhouses on rooftops that have unbroken glazed segments approximately 24 square feet and larger in size" must be treated with a bird-safe glazing treatment, such as fritting, netting, permanent stencils, frosted glass, exterior screens, physical grids placed on the exterior of the glazing, or ultraviolet patterns that are visible to birds. For both locational and feature-related

[45] City and County of San Francisco. 2011. *Standards for Bird-Safe Buildings*. San Francisco Planning Department. July 14. Available: http://sf-planning.org/standards-bird-safe-buildings.

[46] *Fritted glass* refers to glass with ceramic or metal particles that have been fused to glass to create an opaque or textured surface. The particles are generally opaque and can be applied to either the entire surface of the glass or just particular areas to create decorative patterns.

hazards, vertical elements of the window patterns should be at least ¼ inch wide, with a minimum spacing of 4 inches, or have horizontal elements at least ⅛ inch wide, with a maximum spacing of 2 inches.

Protected Trees. The Urban Forestry Ordinance (San Francisco Public Works Code Article 16, Sections 800–814) protects significant, street, and landmark trees within the city.[47] Significant trees are located within 10 feet of a public right-of-way and meet certain size requirements: 20-foot or greater height, 15-foot or greater canopy width, or 12-inch or greater trunk diameter measured at 4.5 feet above grade. A permit is required before any significant tree can be removed. A street tree is any tree in the public right-of-way. A tree removal permit is required to remove any street tree in San Francisco. Lastly, landmark trees are trees that have been designated by the Board of Supervisors because of the rareness of the species, size or age, extraordinary structure, ecological contribution, or historical or cultural importance. Trees that have been designated by the City for landmark status are protected from physical damage or removal.

Biodiversity Policy and Goals. The City's Biodoversity Policy calls for the City's biological resources to be protected and restored. SF Environment has established a Biodiversity Program to protect, enhance, and restore the biodiversity, habitats, and ecological integrity of San Francisco's natural environment in parks, wildlands, neighborhoods, and the built environment and connect San Franciscans to nature in their city. The goals of the Biodiversity Program include the following:

- Human-Nature Connection. Cultivate a positive and healthy awareness, respect, and celebration of our local nature and biodiversity to create civic pride and mutually beneficial human-nature relationships.
- Biologically Rich Ecosystems. Conserve and restore natural areas and habitats of the indigenous ecosystem and watersheds of the northern San Francisco peninsula, and manage them for the species, habitat diversity, and natural resources as the foundation for our thriving and resilient city.
- A Living City with Habitat Corridors. Integrate biodiversity and natural systems into planning, design, and implementation for the built environment for an improved and enriched quality of life for people and wildlife and a sense of place for all San Franciscans in their neighborhoods.
- Citywide Biodiversity Program and Model Policies. Institutionalize local nature and biodiversity policies and practices among government, businesses, communities, and educational institutions.

[47] City and County of San Francisco. 2015. *Urban Forestry Ordinance*. Available: http://sfdbi.org/sites/sfdbi.org/files/migrated/ftp/uploadedfiles/dbi/Key_Information/TreeProtectionLegislation.pdf.

ENVIRONMENTAL IMPACTS

This section describes the impact analysis related to biological resources for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

The proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

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

METHODS FOR ANALYSIS

GENERAL IMPACT ANALYSIS METHODS

The presence of special-status species in the study area was determined through a review of CNDDB records, the CNPS list and the USFWS list (Appendix 9 and Table 4.L-1, page 4.L-6). The identification of potential impacts on special-status species was based on which species and habitats were present in the study area and the consequences of project construction and operation on those species and habitats. The significance criteria above were used to determine the level of impact.

PILE DRIVING THRESHOLDS FOR IMPACT ANALYSIS FOR FISH

The assessment of pile-driving noise impact on fish was based on consideration of specific noise thresholds and ambient noise levels.

Since 2000, transportation agencies, resource agencies, ports, and other entities have been developing criteria for determining impacts and appropriate mitigation measures to protect fish from substantial harm due to underwater pile-driving sounds. In 2004, the California Department of Transportation (Caltrans) established a Fisheries Hydroacoustic Working Group (FHWG) to facilitate the development of interim criteria, based on best available scientific information. The FHWG includes participants from Caltrans, the Washington Department of Transportation, Oregon Department of Transportation, NMFS, USFWS, CDFW, and USACE. The FHWG is supported by a panel of hydroacoustic and fisheries experts and overseen by a steering committee composed of managers with decision-making authority from each of the members' organizations.

In June 2008, member agencies of the FHWG agreed in principle to interim criteria for assessing injuries to fish from underwater sound pressure caused by in-water use of an impact hammer. The criteria identified thresholds, both for the peak sound-pressure level (i.e., the largest absolute value of instantaneous sound pressure) and the cumulative sound exposure level (SEL) (i.e., the sum of acoustical energy over all pile strikes), for the onset of physical injury to fish. Different cumulative SELs are established for fish that are greater than or equal to 2 grams and fish that are less than 2 grams (because smaller fish are more susceptible to injury). Physical injury to fish is expected if either of these thresholds is exceeded. The FHWG thresholds for peak noise levels and accumulated sound levels are set out in Table 4.L-2, below.

TABLE 4.L-2. SUMMARY OF IMPACT PILE DRIVING NOISE THRESHOLDS FOR FISH

Peak Noise Level Injury Evaluation	
Injury Threshold (dB)	206 dB
Accumulated Sound Level Injury Evaluation	
Injury Thresholds (Cumulative SEL)	Fish ≥ 2 g (187 dB); Fish < 2 g (183 dB)
Behavioral Effects Evaluation	
NMFS Threshold (RMS)	150 dB
Upper Range of Background levels	160 dB

Sources:
Injury Thresholds: Fisheries Hydroacoustic Working Group (FHWG), as cited in Caltrans 2015.
Behavioral Threshold: NMFS, as cited in Caltrans 2015.
Range of Background Levels: Caltrans. 2015.

The injury thresholds criteria above are not considered appropriate for assessing the effects of project-related vibratory pile driving.[48] Vibratory hammers generally produce less sound than impact hammers in that they generally produce continuous and lower-intensity sound that is below the levels known to cause injury in fish. Vibratory drivers are often included in mitigation measures to reduce the adverse effects on fish that result from impact pile driving. There are no established injury criteria for fish related to vibratory pile driving, and resource agencies in general are not concerned about vibratory pile driving resulting in adverse effects on fish.[49]

Little is known about how pile driving and other sources of human-generated noise actually affect behavior in fish. However, it is thought that underwater noise may disrupt or alter essential behavior or activities (e.g., migration, feeding, sheltering) and affect a fish's ability to grow, survive, or reproduce.[50] NMFS recommends a separate threshold of 150 dB RMS for the behavioral effects of listed salmonids when evaluating impact pile driving.[51] However, there is no scientific support for this criterion or evidence to determine its applicability to particular species. Given that background levels experienced by fish in the central part of San Francisco Bay (including the project site) are up to 160 dB RMS (and greater), the threshold used for the assessment of behavioral effects is the upper range of the background levels (160 dB RMS) instead of the NMFS behavioral threshold for fish. Common and special-status fish species (including salmonids) are present throughout the central San Francisco Bay where vessel and industrial activity results in ambient noise levels far above that which would be encountered in quiescent areas lacking such anthropogenic activity. Noise levels from pile-driving within the range of existing baseline levels would not be expected to result in long-term changes in fish behavior or fish population.

PILE DRIVING THRESHOLDS FOR IMPACT ANALYSIS FOR MARINE MAMMALS

The assessment of pile-driving noise impact on marine mammals was based on consideration of specific noise thresholds and ambient noise levels.

NMFS recommends specific thresholds for different marine mammal species to evaluate when auditory effects are likely to occur, including different thresholds for physical injury due to peak noise and accumulated sound levels, disturbance due to airborne noise (e.g., noise at haul-out areas), and behavioral effects.[52]

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48 California Department of Transportation. 2015.

49 California Department of Transportation. 2015.

50 California Department of Transportation. 2015.

51 California Department of Transportation. 2015.

52 National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016. Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing. Underwater acoustic thresholds for onset of permanent and temporary threshold shifts. National Oceanic and Atmospheric Administration Technical memorandum NMFS-OPR-55. July.

Auditory injury effects are defined in terms of either a temporary or permanent threshold shift. A temporary threshold shift (TTS) results in temporary hearing loss. A permanent threshold shift (PTS) results in permanent hearing loss. The NMFS thresholds address impact hammer pile driving and vibratory pile driving and removal separately. NMFS-recommended injury thresholds are listed in Table 4.L-3 (impact hammer pile driving), below, and Table 4.L-4 (vibratory pile driving and removal) on the following page.

NMFS has also developed thresholds for the evaluation of behavioral thresholds for airborne noise and in-water noise. The airborne criteria are most suitable for analyzing impacts to sea lions and harbor seals when they reside above water; specifically this criteria is used to evaluate impacts to marine mammals in haul-out areas. The airborne criteria are listed in Table 4.L-3, below, and Table 4.L-4 on the following page.[53]

TABLE 4.L-3. SUMMARY OF IMPACT PILE-DRIVING NOISE THRESHOLDS FOR MARINE MAMMALS

Species	Harbor Seal	Sea Lion	Harbor Porpoise	Gray Whale
Peak Noise Level Injury Evaluation				
Peak Thresholds (dB)	218 dB	232 dB	202 dB	219 dB
Accumulated Sound-Level Injury Evaluation				
Accumulated Sound Daily Thresholds (Cumul. SEL)	185 dB	203 dB	155 dB	183 dB
Airborne Noise Evaluation				
Airborne Threshold (RMS, haul-out areas only)	90 dB (Harbor Seals)/100 dB (Sea Lions)			
Behavioral Evaluation				
Behavioral Threshold (RMS)	160 dB – not used for analysis			
Upper Range of Background Levels (RMS)	160 dB – used for analysis			

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.
Source for Airborne and Behavioral Thresholds: National Marine Fisheries Service, No Date.
Source for Background Noise Levels: Caltrans. 2015.

[53] National Marine Fisheries. No Date. Interim Sound Threshold Guidance website. Accessible: http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/threshold_guidance.html. Last accessed, March 23, 1017.

TABLE 4.L-4. SUMMARY OF VIBRATORY PILE-DRIVING AND REMOVAL-RELATED NOISE THRESHOLDS FOR MARINE MAMMALS

Species	Sea Lion	Harbor Seal	Harbor Porpoise	Gray Whale
Accumulated Sound-Level Injury Evaluation				
Accumulated Sound Thresholds (Cumul. SEL)	219 dB	201 dB	173 dB	199 dB
Airborne Noise Evaluation				
Airborne Threshold (RMS, haul-out areas only)	90 dB (Harbor Seals)/100 dB (Sea Lions)			
Behavioral Effects Evaluation				
Behavioral Threshold (RMS)	120 dB – not used for analysis			
Upper range of background levels (RMS)	160 dB– used for analysis			

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.
Source for Airborne and Behavioral Thresholds: National Marine Fisheries Service, No Date.
Source for Background Noise Levels: Caltrans. 2015.

In-water noise associated with pile driving may startle marine mammals and result in dispersion from the study area. NMFS has identified behavior thresholds for impact pile driving (160 db RMS) and vibratory pile driving/removal (120 dB RMS) as well.[54] NMFS guidance states that the behavioral threshold for vibratory pile driving/removal may be adjusted if background noise levels are above the NMFS threshold. Given the industrial nature of activity in the central San Francisco Bay (e.g., port and waterfront industrial activity, large marine vessel movements, and other frequent vessel movements), the behavioral thresholds used by NMFS are considered inappropriate for such an active and noisy environment. These thresholds would be better suited for areas with low ambient noise levels where marine mammals are not routinely exposed to elevated anthropogenic sound levels. Marine mammals in the central Bay already experience elevated sound levels. Given that background levels experienced by marine mammals in the central part of San Francisco Bay (including the project site) are up to 160 dB RMS (and greater), the threshold used for the assessment of behavioral effects is the upper range of the background levels (160 dB RMS) instead of the NMFS behavioral threshold. Harbor seals and sea lions (and occasionally harbor porpoise) are present in the central San Francisco Bay where vessel and industrial activity results in ambient noise levels far above that which would be encountered in quiescent areas lacking such anthropogenic activity. Noise levels from pile-driving within the range of existing baseline levels would not be expected to result in long-term changes in marine mammal behavior or marine mammal populations.

[54] National Marine Fisheries. No Date.

LAND USE ASSUMPTIONS

As described in Chapter 2, *Project Description*, this environmental impact report (EIR) analyzes two land use assumptions: High Commercial and High Residential. These assumptions represent the full range of land uses and the building program that could be developed on the project site under the proposed flexible zoning for Blocks H, I, and J. Although the land use mix between High Commercial and High Residential would differ, the two assumptions would have a similar total square footage, similar building configuration (with the exception of the building height on Blocks H, I, and J), and similar construction characteristics, including the amount of landside and in-water pile driving. Therefore, the differences between the two assumptions would not result in any meaningful difference in potential impacts on biological resources. As such, the following analysis applies to both the High Commercial and High Residential land use assumptions.

TOPICS NOT EVALUATED IN DETAIL

The study area is almost entirely paved and located within an urban setting. The project site does not include riparian habitat, sensitive natural communities, or federally protected wetlands, nor are these resources present in areas that would be affected by project construction. Therefore, impacts pertaining to riparian habitat, sensitive natural communities, and federally protected wetlands are not evaluated further. In addition, there are no adopted habitat conservation or natural community conservation plans or locally designated natural areas or conservation plans that apply in the project area. Therefore, impacts pertaining to conflicts with adopted habitat conservation or natural community conservation plans are not evaluated further.

IMPACTS AND MITIGATION MEASURES

The impact discussion below addresses the project's construction and operational impacts on biological resources under multiple impact headings: Impact BI-1 (water quality impacts), BI-2 (shading and changes in habitat acreage impact on special-status species), BI-3 (pile-driving impacts on fish and marine mammals), BI-4 (impacts on wildlife movement), BI-5 (impacts on migratory birds), and BI-6 (impacts related to local policies or ordinances for protecting biological resources).

Impact BI-1. Construction and operation of the proposed project would not decrease water quality to the extent that a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS would occur. (Less than Significant)

CONSTRUCTION IMPACTS

Implementation of the proposed project would include construction activities, such as asphalt demolition, rough grading and excavation, pile driving (landside), new building construction, rehabilitation of existing facilities (Pier 48 and associated aprons), paving, and landscaping. Additionally, the seismic upgrading required for Pier 48 would include the installation of approximately 106 new piles below a new, heavily reinforced concrete apron. The modified portions of the aprons would be approximately 12 feet wide, 6 feet deep, and 40 feet long and located at both the north and south perimeter of the pier, replacing portions of the exterior pier deck in these locations. Along with demolition of the existing perimeter deck, approximately 675 existing 24-inch rounded creosote-treated wood piles would be extracted with a vibratory extractor to make way for the new piles. The new pile work would include both precast concrete and cylindrical steel-cased piles.

Construction of the Pier 48 seismic improvements mentioned above, which would last approximately 16 months, has the potential to contribute contaminants into and increase the turbidity of the Bay. Depending on the level of exposure, suspended sediment (i.e., turbidity) can cause lethal, sublethal, or behavioral effects in fish.[55] For salmonids (Chinook salmon and steelhead), an elevated level of suspended sediment (turbidity) has been linked to a number of behavioral and physiological responses (gill flaring, coughing, avoidance, and an increase in blood sugar levels) that indicate some level of stress.[56,57,58] Although turbidity may cause stress,

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[55] Newcombe, C. P., and J. Jensen. 1996. Channel *Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact*. Victoria, BC: Ministry of Environment, Lands, and Parks, Habitat Protection Branch.

[56] Sigler, J. W., T. C. Bjornn, and F. H. Everest. 1984. Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon. *Transactions of the American Fisheries Society* 113:142–150.

[57] Berg, L., and T. G. Northcote. 1985. Changes in Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (*Oncorhynchus kisutch*) Following Short-Term Pulses of Suspended Sediment. *Canadian Journal of Fisheries and Aquatic Science* 42:1410–1417. Vancouver, BC: Institute of Animal Resource Ecology, University of British Columbia. May. Available: http://www.for.gov.bc.ca/hfd/library/ffip/Berg_L1985CanJFishAquatSci.pdf.

[58] Servizi, J. A., and D. W. Martens. 1992. Sublethal Responses of Coho Salmon (*Oncorhynchus kisutch*) to Suspended Sediments. *Canadian Journal of Fisheries and Aquatic Science* 49:1389–1395.

studies[59] have shown that moderate levels of turbidity (35 to 150 nephelometric turbidity units[60] [NTUs]) accelerate foraging rates among juvenile Chinook salmon, most likely because of reduced vulnerability to predators (camouflaging effect). The potential effects would be most acute directly below the construction work area but would decrease with distance from the construction work area as suspended sediment settles out of the water column. Chronic exposure to high turbidity and suspended sediment also may affect growth and survival by impairing respiratory function, reducing tolerance to disease and contaminants, and causing physiological stress. High suspended-sediment concentrations can also indirectly affect fish feeding and growth by burying stream substrates and degrading the quality of the substrate for aquatic invertebrates, an important food source for juvenile salmonids and other fish.

Releases of contaminants, such as gasoline, diesel fuel, lubricants, hydraulic fluid, or other fluids that are contained in construction equipment, including heavy equipment near open water, could result in acute negative effects on special-status fish species such as steelhead, Chinook salmon, longfin smelt, and green sturgeon as well as invertebrates.[61] In addition, long-term effects could result if a spill were not properly remediated. The potential sources of contaminants in the study area would be the construction equipment (lubricating oils and fuel) and debris from the piles being removed from Pier 48, which contain creosote. Temporary water quality effects could occur during pile removal because of the resuspension of sediments containing organic compounds and debris produced during removal. These in-water construction activities would result in short-term disturbance of localized Bay sediments and temporary impacts to water quality. These substances can cause mortality to aquatic organisms through exposure to lethal concentrations or exposure to nonlethal levels that cause physiological stress and increased susceptibility to other sources of mortality, such as disease.[62] Petroleum products also tend to form oily films on the water surface that can reduce dissolved oxygen (DO) levels available to aquatic organisms.

Removal of the creosote-treated wood pilings may release toxic compounds, but there would be an overall long-term benefit in water quality by replacing the old pilings with precast concrete and steel-cased concrete-filled piles. Removal of the wood pilings would reduce the amount of

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[59] Gregory, R. S., and T. G. Northcote. 1993. Surface, Planktonic, and Benthic Foraging by Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in Turbid Laboratory Conditions. *Canadian Journal of Fisheries and Aquatic Sciences* 50:233–240.

[60] Nephelometric turbidity units (NTUs) is the measurement of turbidity (the cloudiness or haziness of a fluid caused by suspended solids).

[61] National Marine Fisheries Service. 2006. *Biological Opinion for the Sacramento River Flood Control Project.* Critical Levee Erosion Repair Project, 151422SWR2006SA00115:HLB. Long Beach, CA. June.

[62] Dupuis, A., and F. Ucan-Marin. 2015. *A Literature Review of the Aquatic Toxicology of Petroleum Oil: An Overview of Oil Properties and Effects to Aquatic Biota.* Department of Fisheries and Oceans Canadian Science Advisory Secretariat. Research Document 2015/007.

creosote that leaches into the Bay. In addition, precast concrete and steel-cased concrete-filled piles are nontoxic. Therefore, long-term improvements to water quality would result. As discussed under Impact HY-1 in Section 4.N, *Hydrology and Water Quality*, the proposed project would not result in a violation of water quality standards or Waste Discharge Requirements. Construction activities within the Bay would be subject to the requirements of a Section 10 permit from USACE, which would receive Water Quality Certification from the Regional Water Board as well as a Major Permit from the BCDC. The permits would specify best management practices (BMPs) and require preparation and implementation of plans for the protection of water quality (e.g., Debris Management Plan, Spill Resource and Countermeasure Plan, Materials Management Disposal Plan), proper fuel transfer procedures, and equipment maintenance to minimize fuel leaks and spills. In addition, barge mooring requirements would be implemented to ensure that construction debris would be captured. Other measures would prevent cement, concrete, and saw water[63] from entering the Bay or ensure the proper disposal of construction material. Therefore, potential surface water quality impacts from project construction would be ***less than significant,*** and potential impacts on special-status fish species from a decrease in water quality associated with project construction would be ***less than significant***.

OPERATIONAL IMPACTS

As discussed in Section 4.N, *Hydrology and Water Quality*, Impact HY-1, runoff from impervious surfaces could contain nonpoint pollution sources, which are typical in urban settings. These are normally associated with automobiles, trash, cleaning solutions, and landscaped areas. Stormwater would be drained by new pipes, drainage inlets, and other storm drain facilities, which would be connected to the existing storm drain system that serves the site (Figure 4.N-1, page 4.L-2). All flows from the project site would discharge to new or existing storm drainage facilities and be discharged to the Bay.

For areas draining directly to Lower San Francisco Bay, the proposed project would be required to comply with San Francisco's stormwater management requirements, as outlined in the Stormwater Management Ordinance and the corresponding San Francisco Stormwater Management Requirements and Design Guidelines (SMR). This is because project operations would involve ground disturbance (or impervious surface creation/replacement) of 5,000 gsf or greater. The stormwater management measures utilize low-impact development techniques, such as green roofs, pervious pavements, rain gardens or bio-retention areas, and flow-through planters, to reduce pollutant discharges. These low-impact development features treat stormwater runoff through biological uptake. Plant materials filter pollutants through their

[63] Sawdust from woodcutting that is entrained in water. Water is often used as a dust suppressant for sawdust, which can result in runoff of saw water.

sandy loam substrate while aesthetically enhancing landscape designs. Stormwater management measures would be designed according to the SMR. For further details, see Section 4.N, *Hydrology and Water Quality*, Impact HY-1.

Compliance with both the SMR and Leadership in Energy and Environmental Design (LEED) regulations described in Section 4.N, *Hydrology and Water Quality*, Impact HY-1, would allow the project to achieve its long-term sustainable approach to planning and design as well as meet the stormwater requirements established by the City and the Port of San Francisco (Port) for the municipal separate storm sewer system (MS4).[64] Therefore, potential surface water quality impacts from project operation would be ***less than significant,*** and potential impacts on special-status fish species from a decrease in water quality associated with project operation would be ***less than significant***.

Impact BI-2. Changes in shading and habitat at Pier 48 would not result in a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS. (Less than Significant)

This impact discussion addresses the project's construction and operational impacts on candidate, sensitive, or special-status species due to shading and changes in habitat acreage as a result of changes in the amount of fill.

CONSTRUCTION IMPACTS

Pier 48 would be seismically upgraded and rehabilitated by replacing the existing creosote-treated wood piles with new precast concrete piles, steel-cased concrete-filled piles, and wood framing. Cap beams, stringers, and decking would be installed on top of the piles, and new asphalt or concrete would be placed on the rebuilt surface. Construction activities at Pier 48 would occur over the course of approximately 16 months. Overwater and in-water structures, including barges associated with construction activities, can alter underwater light conditions and result in a decrease in photosynthesis of diatoms, benthic algae, eelgrass and other aquatic plants, decreasing prey items for fish.[65]

The project site water area under Pier 48 is currently shaded by the structure. Light conditions are limiting productivity under the pier (e.g., no eelgrass is present near or under the pier[66]). Invertebrate, fish, and aquatic plant occurrences under docks have been found to be severely

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64 BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

65 B. Nightingale and C. Simenstad. 2001. *Overwater Structures: Marine Issues.* Submitted to Washington Department of Fish and Wildlife. Washington Department of Ecology. Washington Department of Transportation. May 9.

66 Data Basin. 2016. San Francisco Bay Eelgrass. 2009 eelgrass distribution. Available: https://databasin.org/maps/new#datasets=7dddaf6dcdba4cfea7e037b3bdc7f4db. Accessed: November 30, 2016.

limited when compared to adjacent unshaded vegetated habitat in the Pacific Northwest.[67,68] Shading due to barges moving in and out of the project area during project construction may temporarily shade a larger portion of the project area compared with what is currently shaded but would not alter existing conditions in the area because any shading would be of short duration and would not expand the area that is permanently shaded.

Regarding project fill, the project would remove approximately 675 24-inch (diameter) rounded creosote-treated wood piles and replace them with 62 18- or 24-inch-wide square precast concrete piles and 44 steel-cased concrete-filled piles, which are anticipated to be approximately 120 feet in length and either 4 or 6 feet in diameter. As shown in Table 4.L-5, below, with the change in piles at Pier 48, the project would result in a net increase in the amount of subtidal habitat surface area, which would increase the amount of useable habitat for special-status fish and/or marine mammals under the pier. This would benefit special-status fish and/or marine mammals.

TABLE 4.L-5 CHANGE IN BAY FILL AND SUBTIDAL SURFACE AREA WITH PIER 48 PILE REMOVAL AND INSTALLATION

Pile Type	Number	Diameter (inches)	Length in Water (feet)[1]	Fill in Water (cubic yards)	Bottom Surface (acres)
Existing timber	*675*	*24*	20.75	6,519	*0.19*
New precast concrete	62	24[2]	20.75	599	0.02
New steel/concrete	44	72[3]	20.75	3,824	0.11
New (Total)	*106*		**Total**	**4,423**	***0.13***
Net Change	**-569**		**Net Change**	**-2,096[4]**	**-0.06[4]**

Notes:

(1) Depth of water under pier (below mean tide level [MTL]) assumed to be an average of 20.75 feet (National Oceanic and Atmospheric Administration [NOAA] 2013; last correction 11/30/16. Nautical chart shows range of depths below mean lower low water [MLLW] of 16 to 18 feet, and MTL is approximately 3.75 feet above MLLW). If average water depth were higher or lower than this, the absolute fill amounts would change, but the project would still result in the same percentage reduction in fill (28 percent). Bottom surface area estimates would not be affected because they are not dependent on the water depth.

(2) Piles could be either 18 or 24 inches in diameter; conservatively assumed for this analysis to be 24 inches.

(3) Piles could be either 48 or 72 inches in diameter; conservatively assumed for this analysis to be 72 inches.

(4) Negative number corresponds to a decrease in fill areas for piles and decrease in surface area occupied by piles (equivalent to an increase in bottom surface area habitat).

[67] Orth, R. J., and K. A. Moore. 1983. Chesapeake Bay: An Unprecedented Decline in Submerged Aquatic Vegetation. *Science* 22:51–52.

[68] Thayer, G. W., W. J. Kenworthy, and M.S. Fonseca. 1984. *The Ecology of Eelgrass Meadows of the Atlantic Coast: A Community Profile.* FWS/OBSO-84/02. U.S. Fish and Wildlife Service, Washington, D.C.

For the reasons described above, Pier 48 construction impacts on special-status species would be ***less than significant***.

OPERATIONAL IMPACTS

Direct overwater structures cast concentrated shadows and can affect the productivity of the habitat directly below the structure. Although the project would not add to the number of structures over water, buildings associated with the project would cast shadows on Mission Creek for approximately 4 hours after sunrise between March and October. China Basin would receive new shadows from morning through early afternoon between mid-October and March, with the longest shadows reaching northward about halfway between the north shore of China Basin Park and the edge of the AT&T Park plaza. On and around the summer solstice (June 21), new shadows would be cast southward in the Bay, past Pier 50. See Section 4.I, *Wind and Shadow*, for additional detail. Although there would be some shadows cast on water from the buildings, these shadows would be a temporary, short-duration condition. In addition, Bay waters are daily subject to high wave and tidal currents that maintain seafloor sediments and sediments in suspension, resulting in turbid water that naturally limit to ambient light penetration and phytoplankton production. For these reasons, the increase in temporary shading from buildings that cast shadows on the water during certain times of the day and year would not be expected to adversely affect fish habitat. The project site is currently developed with the Pier 48 structure, which casts a permanent shadow on the waters below it. Pier 48 would not increase with respect to size (or shadow) as a result of the seismic upgrades; thus, there would be no permanent increase in shading associated with project-related operation of Pier 48. Thus, this impact is considered ***less than significant***.

Impact BI-3. Impact pile driving and vibratory driving and extraction from construction of Pier 48 seismic upgrades could have a substantial adverse effect on fish and marine mammal species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS. (Less than Significant with Mitigation)

The Pier 48 seismic upgrade would involve removal of existing wood piles and the installation of new precast concrete and cylindrical steel-cased concrete-filled piles, construction activities that may affect fish and marine mammals.

CONSTRUCTION IMPACTS

FISH

Noise, vibrations, and other physical disturbances can harass fish, disrupt or delay normal activities, or cause injury or mortality. In fish, the hearing structures and swim bladder and surrounding tissues are particularly vulnerable to high-pressure sounds.[69] The type and severity of effects depends on several factors, including the intensity and characteristics of the sound, the distance of the fish from the source, the timing of actions relative to the occurrence of sensitive life stages, and the frequency and duration of the noise-generating activities. The range of effects includes physical injury (including hearing loss), stress, mortality, and behavioral effects.

Impact Pile Driving. Project-related impact pile driving could harm fish because of the underwater noise it produces. Sound levels from project-related impact pile driving in or near open water often have the intensity to injure or kill fish within a certain radius. These high sound-pressure levels can rupture the swim bladder and damage other sensitive tissues and organs. Noise from project-related pile driving can also damage hearing organs, which can temporarily affect hearing sensitivity, communication, and the ability to detect predators or prey. Pile driving can also produce continuous lower-energy sounds, below the thresholds associated with direct injury, that cause behavioral effects (e.g., startle or avoidance responses) as well as temporary hearing loss or physiological stress, depending on the duration of exposure.

During impact pile driving, noise levels are greatest at the source. The noise levels attenuate as the distance from the source increases. To assess the effect of impact pile driving on fish, NMFS developed a spreadsheet that estimates the distance at which pile-driving sound attenuates to the threshold level (i.e., the maximum distance from the source where pile-driving sounds are predicted to exceed the injury and behavioral threshold levels). This spreadsheet, which is based on the practical spreading loss model, estimates the distance at which peak, accumulated sound (SEL), and RMS sound-pressure levels attenuate to threshold levels to define an area where fish could be exposed to potentially harmful sound levels.[70]

An estimated 62 18- or 24-inch precast concrete piles would be installed using an impact hammer. The assessment of pile-driving noise from an impact hammer was based on measured sound levels from similar pile-driving projects.[71] The sound analysis considered impact pile driving with and without the use of an attenuation method to mitigate underwater sound

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[69] Popper, A. N., T. J. Carlson, A. D. Hawkins, B. L. Southall, and R. L. Gentry. 2006. *Interim Criteria for Injury of Fish Exposed to Pile-Driving Operations: A White Paper.* May.

[70] Refer to California Department of Transportation 2015 for a detailed discussion of the model, sound metrics, and computations (See Section 4.6, Impact Analysis in this reference).

[71] California Department of Transportation. 2015.

levels. The peak sound-pressure level, using an attenuation method (in this case, a bubble curtain), typically decreases sound levels by at least 5 dB. The precast 18- or 24-inch square concrete piles that would be installed with an impact hammer are anticipated to be 30 feet in length. It is estimated that approximately 100 hammer strikes would be required to install each pile.[72] The project engineer estimated that three or four concrete piles would be driven per day during in-water pile-driving operations; based on this rate of construction, impact driving would occur over 16 to 21 working days (the days may not be consecutive).

The resultant sound-level estimates for impact hammer pile driving relative to the injury thresholds as well as the behavioral effects threshold are shown in Table 4.L-6, on the following page.

Vibratory Pile Driving and Removal. Approximately 44 48- or 72-inch steel-cased concrete-filled piles would be installed with a vibratory driver. The piles are anticipated to be approximately 120 feet in length. After the casings are installed, each pile would be drilled to remove soil. The soil would be replaced with reinforced concrete. This vibratory work, which would last up to 7 hours per day, would require about 12 months to complete, with one or two piles being installed per day (actual number of days to install the new 48- or 72-inch piles would be approximately 22 to 44, but the days may not be consecutive). Along with demolition of the existing perimeter deck, approximately 675 existing 24-inch rounded creosote-treated wood piles would be extracted with a vibratory extractor to make way for the new piles. The resultant sound-level estimates for vibratory pile driving and extraction are shown in Table 4.L-7, page 4.L-42.

As noted above, the impact hammer criteria described above are not considered appropriate for assessing the effects of project-related vibratory pile driving.[73] Vibratory hammers generally produce less sound than impact hammers in that they generally produce continuous and lower-intensity sound that is below the levels known to cause injury in fish. Vibratory drivers are often included in mitigation measures to reduce the adverse effects on fish that result from impact pile driving. There are no established injury criteria for fish related to vibratory pile driving, and resource agencies in general are not concerned about vibratory pile driving resulting in adverse effects on fish.[74]

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[72] Knorpp, Jon. Written communication to ICF. November 17, 2016.

[73] California Department of Transportation. 2015.

[74] California Department of Transportation. 2015.

TABLE 4.L-6. SUMMARY OF EFFECTS OF IMPACT PILE DRIVING ON FISH

Number and size of piles	62 24-inch concrete
Type of equipment	Impact hammer
Number of blows/day	Four piles per day, 100 strikes per pile, 400 strikes per day
Peak Noise Level Injury Evaluation	
Injury Threshold (dB)	*206 dB*
Sound levels without attenuation	206 dB (3 meters) 195 dB (17.5 meters)
Sound levels with attenuation	206 dB (2 meters) 190 dB (17.5 meters)
Accumulated Sound Level Injury Evaluation	
Injury Thresholds (Cumulative SEL)	*Fish ≥ 2 g (187 dB); Fish < 2 g (183 dB)*
Accumulated sound levels without attenuation	190 dB (17.5 meters) 187 dB (28 meters) 183 dB (51 meters)
Accumulated sound level with attenuation	187 dB (13 meters) 185 dB (17.5 meters) 183 dB (24 meters)
Behavioral Effects Evaluation	
Upper Range of Background levels (RMS)	*160 dB*
Sound levels without attenuation	176 dB (17.5 meters) 160 dB (204 meters) 150 dB (947 meters)
Sound levels with attenuation	171 dB (17.5 meters) 160 dB (95 meters) 150 dB (440 meters)

Sources:
Injury Thresholds: Fisheries Hydroacoustic Working Group (FHWG), as cited in Caltrans 2015.
Range of Background Levels: Caltrans. 2015.
Project Noise Levels: ICF calculations using NMFS model.

TABLE 4.L-7. SUMMARY OF VIBRATORY PILE-DRIVING AND REMOVAL-RELATED NOISE LEVELS FOR FISH

Number and type of piles	44 72-inch (installation) 675 24-inch timber (removal)
Type of equipment	Vibratory driver (installation) Vibratory extractor (removal)
Number of hours of activity/day	7 hours
Effects Evaluation[1]	
Upper range of background levels (RMS)	*160 dB*
Vibratory driver (w/out attenuation)	180 dB (10 meters)
Vibratory driver (w/attenuation)[2]	175 dB (10 meters
Vibratory extractor (w/out attenuation)	162 dB (10 meters)
Vibratory extractor (w/attenuation)[2]	157 dB (10 meters)

Source for Background Noise Levels: Caltrans. 2015

Source for Project Noise Levels: ICF calculations.

Notes:

1. As discussed above under thresholds, there are no established injury criteria for fish related to vibratory pile driving, and resource agencies in general are not concerned about vibratory pile driving resulting in adverse effects on fish; thus, this analysis is for informational purposes only.

2. Although mitigation is not required for vibratory pile driving or removal relative to impacts to fish, as discussed below, mitigation for effects to marine mammals may require attenuation and thus the attenuated levels are also included in this table.

Conclusion. Peak sound levels generated by impact pile driving would exceed the thresholds for the protection of fish only within areas that are less than 2 to 3 meters from pile driving; such sound levels would be unlikely to result in fish injury. However, accumulated sound levels[75] from impact pile driving could cause injury to fish of all sizes within 28 to 51 meters of the source of pile driving (without attenuation). This is based on the conservative assumption that fish remain in the potential zone of injury for an entire day of pile-driving operations. As noted above, vibratory pile driving and extraction are not expected to result in injury to fish.

It should be noted that special-status fish species (Table 4.L-1, page 4.L-6) in the study area during the time of impact pile driving (June 1 through November 30, as required by Mitigation Measure M-BI-3.1, discussed further below) would most likely be large juveniles and adults and therefore capable of moving out of this zone before harmful sound levels are reached. Once impact pile driving begins, individual fish that approach the study area are likely to detect the sounds and avoid or bypass the potential injury impact zone.

[75] The underwater sound pressure level that a fish may experience during pile driving over a day.

Opportunities for fish to avoid impact pile-driving sounds would also occur during periods when pile driving ceases (e.g., while repositioning equipment) and at night when pile driving would be suspended.

In addition to potential injury effects on fish, project-related impact pile driving may also result in behavioral effects if sound levels exceed both the NMFS behavioral threshold (150 dB RMS) and the upper range of background levels (160 dB RMS). The analysis shows that sound levels would exceed 160 dB RMS within 95 and 204 meters of the pile-driving location with and without attenuation, respectively. Therefore, behavioral effects could occur in proximity to pile driving. However, as noted, behavioral effects on fish are not well understood; therefore, it is difficult to assess the definitive significance of such effects in the limited area in proximity to impact pile-driving separate from the injury effects. Given the limited area of effect where sound levels would be above 160 dB (95 to 204 meters, with and without attenuation), the limited duration (16 to 21 likely nonconsecutive days), and the fact that fish are exposed to sound levels above 160 dB when swimming next to large vessels under existing conditions, it is not expected that impact pile-driving effects on fish behavior would result in measurable long-term physical effects on listed or nonlisted fish populations, although individual fish may experience temporary stress. Vibratory pile driving and removal are not expected to have measureable behavioral effects on fish.

Based on the above, impacts on special-status fish species from impact pile driving would be ***significant***.

MARINE MAMMALS

Four species of marine mammal are known to occur in the study area: harbor seals, California sea lions, harbor porpoises, and gray whales. Harbor seals and California sea lions are more common in the study area; harbor porpoises and gray whales are in the study area infrequently. Potential marine mammal impacts would include temporary or permanent hearing loss (referred to as a temporary or permanent threshold shift) and disorientation due to diminished communication and echolocation clicks. All four species could be disturbed by Pier 48 seismic upgrades, including impact pile-driving and vibratory activities. Although none of the species are under special-status protection, they are protected under the MMPA. Therefore, an analysis of potential impacts on these species is provided.

As distance from pile driving increases, sound attenuation from transmission loss reduces the sound-pressure levels. The potential harmful effects also decrease. Disturbance and noise associated with pile driving may startle marine mammals and result in dispersion from the study area. Pinnipeds (seal and sea lions) frequently occur within the study area and could display disturbance behavior, such as alerting or fleeing. Because of the infrequency of cetacean occurrences (whales, dolphins, and porpoises) within the study area, cetacean behavioral effects are less likely but still possible if cetaceans are present in proximity to pile-driving activity (see further discussion below).

Impact Pile Driving. As discussed above under *Fish*, an impact hammer would be used to install 62 18- or 24-inch precast concrete piles. The sound levels for impact pile driving are shown below in Table 4.L-8, below.

TABLE 4.L-8. SUMMARY OF IMPACT HAMMER PILE-DRIVING IMPACTS ON MARINE MAMMALS

Species	Harbor Seal	Sea Lion	Harbor Porpoise	Gray Whale
Number and type of piles	62 24-inch precast concrete piles			
Number of piles/day strikes/day	Four piles per day, 100 strikes per pile, 400 strikes per day			
Peak Noise Level Injury Evaluation				
Peak Thresholds (dB)	*218 dB*	*232 dB*	*202 dB*	*219 dB*
Without attenuation	206 dB at 3 meters/195 dB at 17.5 meters			
With attenuation	206 dB at 2 meters/190 dB at 17.5 meters			
Accumulated Sound-Level Injury Evaluation				
Accumulated Sound Daily Thresholds (Cumul. SEL)	*185 dB*	*203 dB*	*155 dB*	*183 dB*
Distance to threshold without attenuation	28 meters	<10 meters	61 meters	51 meters
Distance to threshold with attenuation	13 meters	< 10 meters	28 meters	24 meters
Airborne Noise Evaluation				
Airborne Threshold (RMS, haul-out areas only)	*90 dB (Harbor Seals)/100 dB (Sea Lions)*			
Distance to threshold without attenuation	95 meters (90 dB)/30 meters (100 dB)			
Behavioral Evaluation				
Upper Range of Background Levels	*160 dB*			
Distance to threshold without attenuation	204 meters			
Distance to threshold with attenuation	95 meters			

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.
Source for Airborne Thresholds: National Marine Fisheries Service, No Date.
Source for Background Noise Levels: Caltrans. 2015
Source for Project Noise Levels: ICF calculations.

Vibratory Pile Driving and Removal. As noted above, approximately 44 48- or 72-inch steel-cased concrete piles would be installed with a vibratory driver, and approximately 675 existing 24-inch rounded creosote-treated wood piles would be extracted with a vibratory extractor to make way for the new piles. The sound-level estimates for vibratory pile driving and extraction are shown in Table 4.L-9 on the following page.

TABLE 4.L-9. SUMMARY OF VIBRATORY PILE-DRIVING AND REMOVAL-RELATED IMPACTS ON MARINE MAMMALS

Species	Sea Lion	Harbor Seal	Harbor Porpoise	Gray Whale
Number and type of piles	44 72-inch (installation) 675 24-inch timber (removal)			
Type of equipment	Vibratory driver (installation) Vibratory extractor (removal)			
Number of hours of activity/day	7 hours			
Accumulated Sound-Level Injury Evaluation				
Accumulated Sound Thresholds (Cumul. SEL)	*219 dB*	*201 dB*	*173 dB*	*199 dB*
Distance to threshold w/vibratory driver (without attenuation)	20 meters	< 10 meters	683 meters	462 meters
Distance to threshold w/vibratory driver (with attenuation)	< 10 meters	< 10 meters	317 meters	214 meters
Distance to threshold w/vibratory extractor (without attenuation)	< 10 meters	< 10 meters	43 meters	29 meters
Distance to threshold w/vibratory extractor (with attenuation)	< 10 meters	< 10 meters	20 meters	14 meters
Airborne Noise Evaluation				
Airborne Threshold (RMS, haul-out areas only)	*90 dB (Harbor Seals)/100 dB (Sea Lions)*			
Distance to threshold	67 meters (90 dB)/21 meters (100 dB)			
Behavioral Effects Evaluation				
Upper range of background levels	*160 dB*			
Vibratory driver (w/out attenuation)	180 dB (10 meters)			
Vibratory driver (w/attenuation)	175 dB (10 meters			
Vibratory extractor (w/out attenuation)	162 dB (10 meters)			
Vibratory extractor (w/attenuation)	157 dB (10 meters)			

Source for Injury Thresholds: National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016.
Source for Airborne Thresholds: National Marine Fisheries Service, No Date.
Source for Background Noise Levels: Caltrans. 2015
Source for Project Noise Levels: ICF calculations.

Conclusion. The distance to the airborne threshold for both impact pile driving and vibratory pile driving (and removal) is within 100 meters of the construction site. The airborne threshold is used only for evaluating impacts on seals that have hauled out of the water. There are no known seal haul-out locations within this area of effect; the nearest known haul-out location is on Yerba Buena Island, which is approximately 4,000 meters away. Thus, impacts related to airborne noise for seals would be ***less than significant.***

With impact pile driving, peak-level injury thresholds of noise for harbor porpoise would be exceeded very close to pile-driving equipment (somewhere between 3 and 17.5 meters from pile driving equipment), while peak-level thresholds for pinnipeds or grey whales would not be exceeded at 3 meters. Accumulated underwater sound levels (before attenuation) could be exceeded within 10 meters for sea lions and up to 61 meters for harbor porpoises from pile-driving activity. Therefore, impact pile driving may result in injury to marine mammals from peak noise and accumulated sound levels.

With vibratory pile driving, accumulated underwater sound thresholds could also be exceeded within 10 meters of pile-driving activity for sea lions and up to 683 meters for harbor porpoises (before attenuation). With vibratory pile removal, accumulated underwater sound thresholds could also be exceeded within 10 meters of pile-driving activity for sea lions and harbor seals and up to 49 meters for harbor porpoises (before attenuation). Therefore, vibratory pile driving and removal may also result in injury to marine mammals from increases in accumulated sound levels. Given that harbor seals and sea lions are known to frequent the project site, impact driving, vibratory driving, and vibratory removal of piles could result in injury to these marine mammals. Impacts on harbor porpoises or grey whales are less likely because of their infrequent presence in the project area but are possible if present during pile-driving activity. Thus, impact pile driving, vibratory pile driving, and vibratory removal could result in physical injury to marine mammals, and this impact would be ***significant***.

It is expected that any behavioral effects would be limited to areas where pile driving would result in sound levels that are much higher than the upper range of background sound levels because marine mammals in San Francisco Bay are used to background sound levels as evidenced by their consistent presence in areas with background sound levels, and would only be expected to change their behavior when sound levels notably exceed the normal conditions they are exposed to every day. The analysis shows that sound levels would exceed 160 dB RMS within 95 and 204 meters with and without attenuation, respectively. Thus, behavioral effects could occur in proximity to pile driving. Given the limited area of effect where sound levels would be above 160 dB (95 to 204 meters), the limited duration (16 to 21 days of actual impact driving and 22 to 44 days of vibratory driving),[76] and the fact that marine mammals are exposed to sound levels above 160 dB when swimming closer than 100 meters to large vessels under existing conditions, it is not expected that temporary pile-driving induced changes in behavior would result in measurable long-term physical effects, although individual marine mammals may experience temporary stress before they leave the areas in proximity to pile driving. The project's construction-related behavioral effects on marine mammals in proximity to the site are thus considered ***less than significant***.

[76] As described above, vibratory removal would result in sound levels within the upper range of background levels and thus would not be expected to result in behavioral effects on marine mammals.

MITIGATION MEASURES. Implementation of Mitigation Measures M-BI-3.1 and M-BI-3.2 would reduce noise impacts on special-status fish species related to project pile-driving activities by prioritizing vibratory pile driving wherever feasible, employing a "soft start" technique that allows fish the opportunity to leave the impact area, implementing noise attenuation measures, and limiting impact pile driving to a season when special-status fish species are unlikely to be in the area. With implementation of Mitigation Measures M-BI-3.1 and M-BI-3.2, peak and accumulated sound levels would be below injury threshold levels (except immediately around the pile driver itself – two meters for peak levels and 13 to 24 meters for accumulative sound levels), fish are not likely to be exposed to accumulative sound levels over a full day of pile driving and the likelihood of affecting special-status species would be remote. This impact would be mitigated to a ***less-than-significant*** level.

Implementation of Mitigation Measure M-BI-3.3 would reduce noise impacts on marine mammals from project pile-driving and removal activities by prioritizing vibratory pile driving, employing a "soft start" technique that allows marine mammals the opportunity to leave the impact area, implementing noise attenuation measures, monitoring marine mammal activity, and shutting down pile-driving activity when marine mammals enter a zone in which injury thresholds would be exceeded. With implementation of Mitigation Measure M-BI-3.3, noise-related impacts on marine mammals would be ***less than significant.***

M-BI-3.1: Conduct Impact Hammer Pile Driving during Periods that Avoid Special-Status Fish Species' Spawning and Migration Seasons

In-water pile installation using impact hammers shall occur within the work window of June 1 to November 30, which has been established for dredging in San Francisco Bay to reduce potential effects on special-status fish species.

M-BI-3.2: Pile-Driving Noise Reduction for the Protection of Fish

Prior to the start of pile driving in the Bay, the project sponsor shall develop an underwater noise monitoring and attenuation plan and obtain approval from NMFS. The NMFS-approved plan or any modifications shall be provided to the City Planning Department for determination of consistency with the requirements in this measure.

The plan shall provide details regarding the estimated underwater sound levels expected, sound attenuation methods, methods used to monitor and verify sound levels during pile-driving activities, and management practices to be taken to reduce pile-driving sound in the marine environment to below NMFS thresholds for injury to fish. The plan shall incorporate, but not be limited to, the following BMPs:

- All steel pilings shall be installed with a vibratory pile driver to the deepest depth practicable. An impact pile driver may be used only where necessary, as determined by the contractor and/or project engineer, to complete installation of the steel pilings, in accordance with seismic safety or other engineering criteria.
- The smallest pile driver and minimum force shall be used to complete the work necessary to meet NMFS requirements, as determined by the contractor and/or project engineer.
- The hammer shall be cushioned using a 12-inch-thick wood block during all impact hammer pile-driving operations.
- To reduce impacts to levels below injury thresholds, based on hydroacoustic monitoring and the amount of impact pile driving occurring on a particular day, a bubble curtain, wood block cushion, air barrier, or similar technology shall be employed during impact pile-driving activities.
- A "soft start"[77] technique shall be employed upon initial pile-driving activities every day to allow fish an opportunity to vacate the area.
- During impact pile driving, the contractor shall limit the number of strikes per day to the minimum necessary to complete the work, as determined by the contractor and/or project engineer.
- No pile driving shall occur at night.
- During impact pile driving, a qualified fish biologist shall monitor the project site for fish that exhibit signs of distress. If fish are observed exhibiting signs of injury or distress, work shall be halted by the biologist, and the cumulative SEL up to that point shall be examined. If the cumulative SEL is close to the threshold or exceeds the threshold, then pile-driving activities will cease until the next day.
- All pile-driving and pile-removal activity shall be monitored by a NMFS-approved biological monitor before and during all pile driving. The biological monitor shall maintain a monitoring log of daily pile-driving activities, any field sound measurements, fish sightings, and implementation of soft-start and shut-down requirements. A monitoring report shall be prepared for submission to NMFS and the City (submitted monthly and at the completion of all pile-driving/pile removal activities).

[77] Soft starts require an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period between subsequent three-strike sets. Soft starts for vibratory hammers will initiate noise at 15 seconds at reduced energy, followed by a 1-minute waiting period between subsequent starts. This process should continue for a period of no less than 20 minutes.

M-BI-3.3: Pile-Driving Noise Reduction for Protection of Marine Mammals

Prior to the start of pile driving in the Bay, as part of the underwater noise monitoring and attenuation plan required by Mitigation Measure M-BI-3.2, the project sponsor shall provide details regarding the estimated underwater sound levels expected, not just from impact hammer pile driving that may affect fish but also from vibratory pile driving and removal because these sound levels may affect marine mammals. The plan shall also address sound attenuation methods, methods used to monitor and verify sound levels during pile-driving activities, and management practices to be taken to reduce pile-driving sound in the marine environment to below NMFS thresholds for injury to marine mammals. As part of implementation of the sound attenuation monitoring plan, the project sponsor shall take actions to reduce the effect of underwater noise transmission on marine mammals. These actions shall include, at a minimum:

- The establishment of initial safety zones, based on the estimated NMFS injury threshold contours for the different marine mammals (as shown in Table 4.L-8, page 4.L-44, and Table 4.L-9, page 4.L-45). The initial size of the safety zones may be modified, based on subsequent analysis of the anticipated noise levels and the actually proposed piles, equipment, and activity prior to construction but only with the approval of NMFS.
- Hydroacoustic monitoring, according to the NMFS-approved sound attenuation and monitoring plan, which shall be completed during initial pile driving to verify projected isopleths for pile driving and removal. The plan shall require real-time hydroacoustic monitoring for a sufficient number of piles to determine and verify modeled noise isopleths. The safety zones established prior to construction may be modified, based on field measurements of noise levels from different pile-driving activities, if the field measurements indicate that different noise threshold contours than those estimated prior to construction are appropriate but only with the approval of NMFS.
- Halting of work activities when a marine mammal enters a safety zone (specific to that species) and resumed only after the animal has not been observed within the safety zone for a minimum of 15 minutes.
- Use of a "soft start"[78] technique each day upon commencement of pile-driving activity, any time after ceasing pile-driving activity for more than 1 hour, and any time after shutdown due to marine mammal entry into a safety zone.

[78] Soft starts require an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period between subsequent three-strike sets. Soft starts for vibratory hammers will initiate noise at 15 seconds at reduced energy, followed by a 1-minute waiting period between subsequent starts. This process should continue for a period of no less than 15 minutes.

- Monitoring by an NMFS-approved biological monitor of all pile-driving and pile-removal activity before and during all pile driving/removal to inspect the work zone and adjacent Bay waters for marine mammals and implement the safety zone requirements described above. The biological monitor shall maintain a monitoring log of daily pile-driving/removal activities, any field sound measurements, marine mammal sightings, and implementation of soft-start, shut-down, and safety-zone requirements. A monitoring report shall be prepared for submission to the City and NMFS (submitted monthly and at the completion of all pile-driving/pile-removal activities).

Impact BI-4. The project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species, or established native-resident or migratory wildlife corridors. (Less than Significant)

CONSTRUCTION

Seawall Lot 337. Onshore construction would not affect the movement of any wildlife species, or any wildlife corridors, because wildlife species do not utilize the developed onshore ground areas for movement. Although birds move through the general project area, flight movement would not be impeded during construction. Thus, the project would have ***a less-than-significant impact*** on wildlife movement due to onshore construction.

Pier 48. Construction and rehabilitation of Pier 48 would not substantially interfere with the movement of migratory fish species or marine mammals. Fish and marine mammals may avoid the habitat near the pier during construction because of noise emitted by equipment and pile driving. However, there is suitable habitat adjacent to the pier that provides the same habitat. Additionally, although the area around Pier 48 may be utilized by aquatic species, it does not provide a direct connection between two larger areas of core habitat. Therefore, the area around Pier 48 would not be appropriately considered a wildlife movement corridor, as defined in scientific literature.[79] This would be a temporary impact of limited scope during construction and ***less than significant***.

OPERATION

Seawall Lot 337. The proposed project would develop Seawall Lot 337 with a new network of buildings and streets. The buildings proposed on Seawall Lot 337 could range in height from 90 to 240 feet (and an additional up to 20 to 40 feet, including nonhabitable area elements/wall extensions), depending on the land use. In general, buildings with primarily commercial

[79] Beier, P. 1992. A Checklist for Evaluating Impacts to Wildlife Movement Corridors. *Wildlife Society Bulletin* 20:434–440; Hilty, J.A., W.Z. Lidicker Jr., and A.M. Merenlender. 2006. *Corridor Ecology*, pp. 89–91. Washington, DC: Island Press.

uses could range in height from 90 feet (six stories) to 190 feet (13 stories), while buildings with mainly residential uses could range in height from 120 feet (11 stories) to 240 feet (23 stories).

Reflective and transparent glass used in project buildings, which mirrors the surrounding environment during daylight hours, could cause birds to collide with the new buildings. Further, during nighttime, new lighting associated with the proposed project could misdirect or confuse birds, resulting in disruption of natural behavioral patterns and navigational cues, similarly resulting in injury or death from colliding with buildings. Because of the project site's proximity to the San Francisco Bay and location within the Pacific Flyway, these impacts could adversely affect migratory birds. However the study area is already developed. It contains artificial lighting and is located adjacent to AT&T Park, which has very bright lights at night during baseball games and other large nighttime events. The project would not be expected to greatly increase light pollution beyond what already exists in the study area and the vicinity. Thus, birds would be minimally affected. Similarly, marine mammals would not experience any adverse effects as a result of an increase in lighting at the project site.

As discussed above, Planning Code Section 139, Standards for Bird-Safe Buildings, focuses on buildings that create both location-specific hazards and feature-related hazards and requires glazing treatment for specific areas to reduce the reflectivity of the building so that birds are able to differentiate the building from the surrounding vegetation. In addition, lighting must be minimized. The implementation of these measure would help reduce the potential for bird collisions and also reduce overwater light increases, which would help to reduce light changes for offshore marine mammals.

Additionally, Planning Code Section 139 has feature-related standards, which apply to all new or substantially renovated buildings in San Francisco, including the proposed project. These feature-related standards require that free-standing glass walls, wind barriers, skywalks, balconies, and greenhouses on rooftops that have unbroken glass segments approximately 24 square feet in size or greater use bird-safe glazing treatments on 100 percent of the feature (Planning Code Section 139(c)(2)). Thus, proposed buildings would have no free-standing glass walls, greenhouses, wind barriers, or other clear barriers on rooftops or balconies without glazing treatments. This treatment would prevent glass transparency so that vegetation behind transparent glass walls is not visible to birds. With compliance with the mandatory requirements of Planning Code Section 139, this impact would be considered ***less than significant***.

Pier 48. Operation of Pier 48 would not substantially interfere with the movement of migratory fish species or marine mammals. There would be additional lighting in the existing setting with the project, but lighting restrictions would help to control the amount and intensity of lighting, limiting it to only that necessary for site safety. Because of the adjacent AT&T Park, the general offshore area already experiences substantial lighting levels, especially during night games, and the additional lighting at Pier 48 would result in only a limited change in the ambient levels at

night for offshore areas. The lighting effects attenuate rapidly as one proceeds farther offshore. Thus, Pier 48 lighting is not expected to affect areas farther offshore. Habitat for fish and marine mammals would not be substantially altered or reduced in quality compared to existing conditions, and the Pier 48 operational impact on wildlife movement would be ***less than significant***.

Impact BI-5. Construction of the proposed project could affect migratory nesting birds. (Less than Significant with Mitigation)

The existing vegetation and structures, such as the one-story sheds and Pier 48 on the project site, could provide nesting habitat for a variety of protected migratory birds. This habitat is of low quality because of the developed nature of the site and surrounding area and the minimal amount of vegetation present (no trees onsite, other than 26 trees in China Basin Park). As part of the project, additional trees would be planted, and additional buildings would be present on the project site, providing increased nesting habitat for migratory birds. China Basin Park would be expanded to approximately twice its current size, from approximately 2.2 acres to 4.4 acres, and two new parks (Mission Rock Square and Channel Wharf) would be added. Trees planned as part of the proposed project could be native or climate adapted, ranging in height at maturity from 30 to 60 feet. Trees are expected to reach maturity between 5 and 20 years, depending on species and locations. According to the DPW Street Tree Design Guidelines,[80] these could include species such as Monterey cypress, New Zealand Christmas tree, red-flowering gum, Chinese elm, strawberry tree, southern live oak, ginkgo, freeman maple, Brisbane box, red oak cultivar, Victorian box, California pepper, cork oak, or melaleuca. Native or climate-appropriate grasses, shrubs, and ground cover would also be planted.

If construction of the proposed project occurs during the nesting season (February 1 to August 31), removal of existing shrubs and trees and/or rehabilitation of the sheds and piers on the project site could result in the direct mortality of nesting adult or young birds, destruction of active nests, and/or disturbance of nesting adults, causing nest abandonment and/or loss of reproductive effort. This impact to nesting birds would be ***significant***. Native bird species, when nesting, are protected by both state (California Fish and Game Code Sections 3503 and 3513) and federal (MBTA of 1918) laws.

Bird species which forage in the Bay would not be adversely affected by construction activities at the project site and could avoid construction that will occur in the Bay. Construction noise would have very little impact on foraging activities since birds in this area are acclimated to high levels of urban activity and noise.

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[80] San Francisco Urban Forestry Council. No date. Recommended Street Tree Species List – With Notations. Available: http://sfpublicworks.org/sites/default/files/SF%20Street%20Tree%20Species%20List%202016%20Adopted.pdf. Accessed: February 21, 2017.

Operationally, migratory birds may nest in trees planted on the site, but normal operations of the project would not be expected to result in displacement of nesting birds. Thus, there would be no operational effects on bird nests from the project following completion of construction.

MITIGATION MEASURE. Implementation of Mitigation Measure M-BI-5 would reduce impacts on protected nesting migratory bird species from removal of shrubs and trees and/or rehabilitation of the existing sheds and Pier 48 because it would require pre-construction surveys prior to any work occurring during the nesting season and implementation of measures to avoid disturbances to any active nests that are found. With implementation of Mitigation Measure M-BI-5, removal of protected nesting migratory bird species and their active nests would be avoided. Therefore, this impact would be ***less than significant***.

M-BI-5: Conduct Pre-Construction Surveys for Nesting Migratory Birds

To facilitate compliance with state and federal laws (California Fish and Game Code and the MBTA) and prevent impacts on nesting migratory birds, the project sponsor shall avoid vegetation/structure removal, ground-disturbing activities, and elevated noise levels near suitable nesting habitat during the nesting season (February 1 through August 31) or conduct pre-construction surveys, as described below. Alternatively, the project sponsor may remove vegetation or structures that may support nesting birds outside of the breeding season such that no breeding habitat would be present should construction start in the normal breeding season.

If it is not feasible to avoid the nesting season and suitable nesting areas remain on the project site, the project sponsor shall hire a qualified wildlife biologist with demonstrated nest-searching experience to conduct surveys for nesting birds, including raptors. The following list details the nesting bird survey requirements for this project.

- One nesting bird assessment is required at the beginning of each year, at the start of the nesting bird season (February), to determine if suitable nesting habitat remains or has been reinstated (e.g., the project site is revegetated).
- If suitable nesting habitat is present, one nesting survey shall be conducted between February and April, and one nesting survey shall be conducted between April and June.
- Additional nesting surveys are required when construction work stops at a portion of the site where suitable nesting habitat remains for more than 15 days or if construction is phased in such a way that no disturbance has occurred in a portion of the project site.
- If active nests are observed during construction when the wildlife biologist is not present, all work within 250 feet of the nest shall stop, and wildlife biologist shall be contacted immediately. All personnel shall move at least 250 feet away from

the nest. To the extent feasible, after consulting with the wildlife biologist, construction equipment shall be shut down or moved 250 feet away from the nest.

Nesting bird surveys shall be performed no earlier than 7 days prior to the commencement of ground-disturbing activities and vegetation removal (including clearing, grubbing, and staging). The area surveyed shall include all construction areas as well as areas within 250 feet outside the boundaries of the areas to be cleared or as otherwise determined by the biologist.

If the wildlife biologist finds any active nests (e.g., a nest with eggs, chicks, or young) during the survey, the biologist shall establish no-disturbance species-specific buffer zones for each nest, marked with high-visibility fencing, flagging, or pin flags. No construction activities shall be allowed within the buffer zones. The size of the buffer shall be based on the species' sensitivity to disturbance and planned work activities in the vicinity; typical buffer sizes are 250 feet for raptors and 50 feet for other birds. The buffer shall remain in effect until the chicks have fledged from the nest or the nest is no longer active, which will be verified by the biologist.

If inactive nests are identified, the project sponsor or its contractor shall remove those nests from the structure/vegetation and install nest exclusion measures on structures (i.e., fine mesh netting, panels, or metal projectors) outside of the nesting season, if deemed necessary and suitable by the qualified wildlife biologist. All exclusionary devices shall be monitored and maintained throughout the breeding season to ensure that they are successful in preventing the birds from accessing the cavities or nest sites.

After each survey and/or after nest-deterrence activities are completed, the wildlife biologist shall complete a memorandum detailing the survey effort and results and submit the memorandum to the project sponsor within 7 days of survey completion.

Impact BI-6. The proposed project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant)

The project site contains 26 trees in China Basin Park, all of which will be removed during project implementation. None of the onsite trees are street trees or landmark trees, and all are less than 20 years old. No other trees are present on the project site. The project includes extensive landscaping including planting a substantially larger number of trees than are being removed. The Port-owned project site is not subject to the Urban Forestry Ordinance, which is specific to street trees under the jurisdiction of Public Works or trees designated as landmark trees by the Board of Supervisors. Furthermore, there are no applicable Port of San Francisco

policies related to tree removal in China Basin Park. Therefore, the project would not conflict with local policies or ordinances protecting biological resources, resulting in a ***less-than-significant*** impact.

CUMULATIVE IMPACTS

Unless otherwise identified below, the geographic context for the analysis of cumulative biological resources impacts includes the city and the Bay. Specifically, the projects considered in this analysis are listed in Table 4-1 of Chapter 4, *Environmental Setting and Impacts.* The impact discussion below addresses impacts on biological resources under multiple impact headings: Impact C-BI-1 (water quality impacts), C-BI-2 (shading and changes in habitat acreage impact on special-status species), C-BI-3 (pile-driving impacts on fish and marine mammals), C-BI-4 (impacts on wildlife movement), C-BI-5 (impacts on migratory birds), and C-BI-6 (impacts related to local policies or ordinances that protect biological resources).

Impact C-BI-1. The proposed project, in combination with future development in the city, would affect water quality but not to the extent that a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS would occur. As such, the proposed project's contribution would not be cumulatively considerable. (Less than Significant)

Construction and operational activities that result in the disturbance or degradation of water quality could adversely affect special-status fish species, critical habitat, and EFH by reducing feeding opportunities, causing fish to temporarily avoid habitat, or resulting in injury or mortality. It is reasonable to expect that there will be construction and operational impacts on habitat through disturbance, degradation, or contamination associated with future offsite development. Special-status species are protected under both the ESA and CESA, and it is assumed that all development would comply with water quality regulations. To prevent short-term (construction) impacts on water quality, construction of nearby projects would need to comply with the requirements of the National Pollutant Discharge Elimination System Construction General Permit and the San Francisco Public Utilities Commission's stormwater management requirements (e.g., the San Francisco Public Utilities Commission's Construction Site Runoff Ordinance). In addition, future cumulative projects would be required to comply with hazardous material requirements, such as the San Francisco Maher Ordinance for soil and groundwater contamination as well as Spill Prevention, Control, and Countermeasure requirements, as necessary. Project operations would be subject to San Francisco stormwater and San Francisco Green Building Ordinance requirements as well as other stormwater requirements established by the City and Port MS4 programs. The applicable regulations, which have been developed to protect water quality as defined in the basin plan, require

implementation of stormwater BMPs. Because the proposed project and other foreseeable cumulative projects in the vicinity would be required to comply with these regulations, cumulative impacts would be ***less than significant***.

Impact C-BI-2. Future development in the city may result in shading that could result in a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS. However, the project would not result in a net permanent increase in shading of the Bay, and the proposed project's contribution would be not cumulatively considerable. (Less than Significant)

Other development projects in the city and along the San Francisco Bay shoreline could result in ***significant*** cumulative impacts on special-status fish species and aquatic species. Projects located close to the Bay shoreline that include development of water-side docks in the Bay could affect nearshore aquatic habitat for fish and other aquatic species by shading, which can decrease aquatic productivity and food production in intertidal and subtidal zones. As discussed above under Impact BI-2, the project would not result in a permanent increase in shading due to improvements to Pier 48 or other project buildings. Habitat would increase compared with the existing condition. Any shading associated with construction of the project (barges at Pier 48) would be temporary and in an area already affected by shading. Therefore, the project's contribution to this cumulative impact would be ***less than cumulatively considerable***.

Impact C-BI-3. The proposed project, in combination with future development in the city, would not have a substantial adverse effect on a fish species or marine mammals identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS due to pile driving. (Less than Significant with Mitigation)

The proposed project, combined with other development projects in the city and along the San Francisco Bay shoreline, could result in cumulative impacts on special-status fish species and marine mammals if in-water pile driving is needed for other projects. Pile driving is a temporary construction impact on fish and marine mammals. The proposed project and future development would be subject to the Marine Mammal Protection Act as well as mitigation measures to reduce pile-driving noise. Implementation of Mitigation Measures M-BI-3.1, M-BI-3.2, and M-BI-3.3 would reduce noise impacts on fish and marine mammals and reduce the likelihood of injury to fish and marine mammals by reducing the noise levels produced by pile-driving and vibratory equipment. In addition, a qualified biologist would be onsite to monitor pile-driving activity and ensure that the potential for injury to fish would be minimized. It would be unlikely for marine mammals to be injured because of the established safety zone. Upon implementation of Mitigation Measures M-BI-3.1, M-BI-3.2, and M-BI-3.3, the project's contribution to this cumulative impact would be ***less than cumulatively considerable.***

Impact C-BI-4. The proposed project, in combination with future development in the city, would not interfere substantially with the movement of any native resident or migratory fish or wildlife species, or established native-resident or migratory wildlife corridors. (Less than Significant)

The proposed project, combined with other development projects in the city and along the San Francisco Bay shoreline, which is located within the Pacific Flyway, could interfere with bird movement and result in ***significant*** cumulative impacts on avian migratory corridors. The proposed project and other future development projects would be subject to Planning Code Section 139, Standards for Bird-Safe Buildings,[81] which focuses on buildings that create both location-specific hazards and feature-related hazards. These provisions would reduce the impact of future projects along the Bay shoreline to a ***less-than-significant*** level. With implementation of Planning Code Section 139 requirements, the proposed project would result in a ***less than cumulatively considerable*** contribution to a cumulative impact on migratory bird habitat.

The proposed project may increase the amount of habitat available to fish species by removing the creosote-treated pilings. Fish would be able to move more freely around the pier. Therefore, the proposed project would result in a ***less than cumulatively considerable*** contribution to a cumulative impact on migratory fish habitat.

Impact C-BI-5. Construction of the proposed project, in combination with future development in the city, could affect nesting birds. (Less than Significant with Mitigation)

The proposed project, combined with other development projects in the city and along the San Francisco Bay shoreline, could result in ***significant*** cumulative impacts on avian wildlife. The project would improve nesting habitat by increasing the number of trees and structures on the project site. However impacts could occur during construction if nesting birds are directly affected by grading or vegetation removal or indirectly affected by construction noise. The proposed project and future development would be subject to the provisions of California Fish and Game Code Sections 3503 and 3513 and the MBTA. These provisions would reduce the impact of future projects along the Bay shoreline to a ***less-than-significant*** level. For the proposed project to comply with federal and state laws to protect avian wildlife, Mitigation Measure M-BI-5 would require pre-construction nesting surveys for migratory birds to be conducted during the nesting season (February 1 to August 31) and implementation of measures to avoid disturbances to any active nests that are found. With mitigation, the proposed project would result in a ***less than cumulatively considerable*** contribution to a cumulative impact on nesting migratory birds.

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[81] City and County of San Francisco. 2011. *Standards for Bird-Safe Buildings*. San Francisco Planning Department. July 14. Available: http://sfdbi.org/sites/sfdbi.org/files/migrated/ftp/uploadedfiles/dbi/Key_Information/TreeProtectionLegislation.pdf.

Impact C-BI-6. The proposed project, in combination with future development in the city, would not result in a considerable contribution to significant cumulative impacts on local policies or ordinances to protect biological resources, such as a tree preservation policy or ordinance. (Less than Significant)

The cumulative context for an analysis of cumulative impacts related to conflicts with local policies or ordinances to protect biological resources is the city. Activities that result in the removal of significant, landmark, or street trees (as described under Regulatory Framework) could result in conflicts with the City's Urban Forestry Ordinance.[82] With future development in the city, it is reasonable to expect there would be an additional loss of protected trees. It is also reasonable to expect that cumulative projects would replace trees that are removed and likely expand the number of trees overall. Compliance with the measures in the Urban Forestry Ordinance would be required by all future development in the city where trees under Public Works' jurisdiction could be affected. The project is not subject to the Urban Forestry Ordinance and there are no Port of San Francisco policies related to tree protection. In addition, the proposed project includes extensive landscaping including planting a substantially larger number of trees than are being removed. This would result in a ***less-than-significant*** impact at the project level and a ***less-than-significant*** contribution to a cumulative impact on protected trees in the city.

[82] City and County of San Francisco. 2015. *Urban Forestry Ordinance*. Available: http://sfdbi.org/sites/sfdbi.org/files/migrated/ftp/uploadedfiles/dbi/Key_Information/TreeProtectionLegislation.pdf.

4.M GEOLOGY AND SOILS

This section describes the regulatory and environmental setting for geology and soils. This section also addresses geologic and soil impacts that could result from construction and operation of the Seawall Lot 337 and Pier 48 Mixed-Use Project (proposed project). This section includes analysis of seismic impacts related to fault rupture, seismically induced ground shaking, and seismically induced ground failure (i.e., liquefaction); soil erosion or loss of topsoil; construction on unstable soil or geologic units; construction on soils subject to expansion and contraction; and direct or indirect destruction of a unique paleontological resource or geologic feature. The discussion of erosion presented in this section relates to the information presented in Section 4.N, *Hydrology and Water Quality*, specifically, the discussion of the requirements of the National Pollutant Discharge Elimination Program (NPDES) General Construction Stormwater Permit and the NPDES General Municipal Stormwater Permit and how they pertain to erosion control. No responses to the notice of preparation (NOP) (Appendix 1) were received relevant to geology and soils. The study area for this analysis is defined as the project site.

ENVIRONMENTAL SETTING

REGIONAL PHYSIOGRAPHY

San Francisco is located in the northern portion of the San Francisco Peninsula, which is part of the geologically complex California Coast Ranges geomorphic province.[1] The Coast Ranges province is characterized by a series of northwest-trending ridges and valleys that run roughly parallel to the San Andreas fault zone and can be further divided into the northern and southern ranges, which are separated by San Francisco Bay (Bay). The Bay lies within a broad depression created from an east–west expansion between the San Andreas and the Hayward fault systems. The tectonic forces that dominate the region developed from the margin between the Pacific Plate and the North American Plate where the Pacific Plate slowly creeps northward past the North American Plate on the San Andreas, Hayward, and associated subsidiary faults. The Bay and northern portion of the San Francisco Peninsula are within a structural down-dropped block between the Northern Santa Cruz Mountains to the west and Diablo Mountain Range to the east. Much of the Coast Range province is composed of marine sedimentary deposits and volcanic rocks. The relatively thick marine sediments dip east beneath the alluvium of the Great Valley. West of the San Andreas fault lies the Salinian Block, a granitic core that extends from the southern end of the province to north of the Farallon Islands.

[1] Norris, Robert M., and Robert W. Webb. 1990. *Geology of California*. Second edition. John Wiley & Sons Inc.

PROJECT AREA GEOLOGY

The Northern Coast Ranges, where project activities would occur, are composed largely of the Franciscan Complex or Assemblage, which is composed of an amalgamation of semicoherent blocks called *terranes*. San Francisco contains one of these terranes, the Alcatraz terrane. Within the basement of the Alcatraz terrane, Franciscan Complex (also known as Franciscan Formation) rock outcrops are exposed in areas such as Yerba Buena Island, Alcatraz Island, and Angel Island. The Franciscan Complex consists primarily of graywacke, shale, greenstone (altered volcanic rocks), basalt, chert (ancient silica-rich ocean deposits), sandstone, shale, and serpentinite. Most of these rock units originated as ancient seafloor sediments and were displaced and deformed through long periods of tectonic forces. More recently deposited dune sand mantles the Franciscan Complex over large areas of San Francisco. The sand dunes of San Francisco once formed one of the most extensive coastal dune systems on the West Coast, underlying about one-third of San Francisco.

For more than a century, and especially following the 1906 earthquake, tens of millions of cubic meters of fill have been placed along Bay margins.[2] Much of the fill used along the San Francisco waterfront consists of clay- to cobble-sized materials, including former dune sand that was excavated during the building of San Francisco, hauled to the waterfront, and dumped on top of the Bay Mud (discussed in more detail below) or other surface material. Typical fill also consists of rubble (concrete, bricks, and wood) from building demolition, notably after the 1906 earthquake and fire, as well as assorted organic and non-organic debris, refuse, some hazardous substances, and other materials. Much of the artificial fill materials were emplaced prior to regulations that began in the mid-1960s and would not qualify as engineered fill under current standards. Because they were not emplaced with the use of modern engineering compaction techniques to increase their liquefaction resistance, these largely unconsolidated to semi-consolidated sediments are vulnerable to liquefaction and amplification of strong ground motions. Some areas with the artificial fills have yet to be shaken strongly during a major earthquake.[3] There is considerable variation in the type, depth, age, and nature of the fill, depending on the source of the fill and original configuration of the Bay shoreline.

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[2] Hicock, Christopher, Robert Givler, Greg De Pascale, and Ranon Dulberg. 2008. *Detailed Mapping of Artificial Fills, San Francisco Bay Area.* Prepared by William Lettis & Associates, Inc. September. (National Earthquake Hazards Reduction Program, U.S. Geological Survey Award Number 07HQGR0078.) Available: http://earthquake.usgs.gov/research/external/reports/07HQGR0078.pdf. Accessed: October 5, 2015.

[3] Hicock, Christopher, Robert Givler, Greg De Pascale, and Ranon Dulberg. 2008. *Detailed Mapping of Artificial Fills, San Francisco Bay Area*. Prepared by William Lettis & Associates, Inc. September. (National Earthquake Hazards Reduction Program, U.S. Geological Survey Award Number 07HQGR0078.) Available: http://earthquake.usgs.gov/research/external/reports/07HQGR0078.pdf. Accessed: October 5, 2015.

In some Bay margin areas, including the project site, these artificial fills are underlain by soft, compressible estuarine deposits known as Bay Mud. The Bay Mud can be further divided into younger Bay Mud and older Bay Mud, which can vary in engineering properties, depending on thicknesses and degrees of consolidation. Bay Mud is generally found along the shorelines, including adjacent to the project site. It generally consists of uniform gray, soft, saturated clay and silt with organic material and some sand. Lenses of sand, silt, and organic material (peat) are present within the mud. Younger Bay Mud is commonly divided into an upper "soft" member and an underlying semi-consolidated member. It is present near the ground surface (under the fill cover) and forms the Bay bottom. It is saturated, soft, and compressible. When loads (such as buildings) are placed on it, the soft mud can compress and settle. Placement of the loads could also result in plastic deformation and lateral movement, sometimes accompanied by upthrusting in adjacent areas (creation of so-called mud waves) or underwater landsliding. Younger Bay Mud has low shear strength (resistance to downslope movement of rock and soil). For these reasons, Younger Bay Mud is not considered suitable material for bearing foundations of anything but very light structures and is usually not relied upon to support vertical loads.

During boring probes,[4,5] the project site was found to be underlain by approximately 10 to 40 feet of heterogeneous fill of variable density, made up of brick, rock, concrete, debris, gravel, and sand. The fill is underlain by approximately 35 to 45 feet at the shoreline at the Pier 48 site[6] and 45 to 70 feet at the Seawall 337 site[7] of weak, soft to medium-stiff, compressible Younger Bay Mud of Holocene age. At the Seawall 337 site, the deeper fill material (below a depth of about 15 to 20 feet) represents a Bay Mud wave. A Bay Mud wave can occur when heavy fill loads are placed on the Bay Mud and cause a bearing capacity failure of the Bay Mud. The fill material placed on the Bay Mud is pushed down into it. At some sites where boring tests were conducted for project-specific geotechnical studies, a layer of dense to very dense sand with clay and clayey sand was present under the layer of Younger Bay Mud from approximately 60

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4 Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

5 Treadwell & Rollo. 2013. *Liquefaction and Lateral Spread Potential at Seawall Lot 337.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, CA. (Project No. 750604203.) December 23.

6 Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

7 Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* Prepared for Mission Rock Development. September 8.

to 80 feet below ground surface.[8,9,10] The layer of sand that underlies Younger Bay Mud in Mission Bay is identified in other studies as the Colma Formation of Pleistocene age.[11] The Younger Bay Mud and the layer of sand/Colma Formation are underlain by 60 to 80 feet of Old Bay Clay of Pleistocene age, which is medium stiff to very stiff and overconsolidated.[12] The Old Bay Clay is underlain by dense to very dense sand, with clay and clayey sand, over bedrock. Bedrock was encountered during the boring at between 160 and 260 feet below ground surface.[13,14] Bedrock was found to be highly weathered, weak, and fractured Franciscan Formation shale, sandstone, and serpentinite. Groundwater was encountered between 6.5 and 9 feet below ground surface.[15]

GEOLOGIC HAZARDS

SLOPE FAILURE

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, triggered either by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience soil slumps, rapid debris flows, or deep-seated rotational slides. Slope stability can depend on a number of complex variables, including the geology, structure, and amount of groundwater, as well as external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that

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8 Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

9 Treadwell & Rollo. 2001. *Pier 48 Foundation Evaluation, San Francisco, California*. Log of Boring B-2.

10 Treadwell & Rollo. 2001. *Pier 48 Foundation Evaluation, San Francisco, California*. Log of Boring B-3.

11 Simpson, L.A., and G.E. Treadwell & Rollo, Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In D*FI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

12 An *underconsolidated* clay has not yet achieved equilibrium under the existing load, a *normally consolidated* clay has completed consolidation under the existing load, and an *overconsolidated* clay has undergone a pressure greater than its current load.

13 Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* Prepared for Mission Rock Development. September 8.

14 Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

15 Section 4.N, *Hydrology and Water Quality,* reports that the depth to groundwater is 10 to 20 feet below ground surface (Department of Toxic Substances Control. 2002. Hazardous Soils Report – Covenant to Restrict Use of Property Environmental Restriction, H&H Site located at China Basin Channel and Terry A. Francois Boulevard, City and County of San Francisco.) This slight discrepancy does not affect the findings in this analysis.

increase the stresses on the slope. Landslides can occur on slopes of 15 percent or less, but the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges.

The best available predictor of where slides and earth flows might occur is the distribution of past movements.[16] In 1997, the U.S. Geological Survey (USGS) released a preliminary map and geographic information system (GIS) database that summarize the distribution of landslides that are evident in the landscape of the San Francisco Bay region.[17] The map is a digitized nine-county compilation of existing landslides. It has been used to divide the area into four landslide zones (i.e., mostly landslides, many landslides, few landslides, flatland). Project construction would occur adjacent to the San Francisco waterfront, within an area of gentle low-elevation slopes with little or no potential for the formation of slumps, translational slides, or earthflows, except along streambanks and terrace margins. The California Geological Survey also identifies this area as not being subject to landslide.[18]

SOIL HAZARDS

In urbanized areas, native soils are commonly no longer present or have been reworked and combined with imported fill materials over a long history of earthwork activities associated with development. Within the project site, the San Francisco waterfront areas where project construction would occur have been subject to many changes over the years, including the placement of fill and debris. Soils mapped by the federal Natural Resources Conservation Service (NRCS) along the waterfront near the project site fall primarily under three classifications: Urban land-Orthents, reclaimed complex (0 to 2 percent slopes); Urban Land; and Urban land-Orthents, cut-and-fill complex (5 to 75 percent slopes).[19] These classifications indicate that the soils present at the project site are highly disturbed and not native soils.

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[16] Nilsen, T.H., and B.L. Turner. 1975. *Influence of Rainfall and Ancient Landslide Deposits on Recent Landslides (1950-71) in Urban Areas of Contra Costa County, California.* (U.S. Geological Survey Bulletin 1388.) Available: http://pubs.er.usgs.gov/publication/b1388. Accessed: October 5, 2015.

[17] Wentworth, C.M., S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron. 1997. Part C, Summary of Distribution of Landslide and Earth Flows in the San Francisco Bay Region, California. In *San Francisco Bay Region Landslide Folio.* (Open File Report 97-745.) Available: http://pubs.usgs.gov/of/1997/of97-745/sf-sef.pdf. Accessed: October 5, 2015.

[18] California Geologic Survey. 2000. *Seismic Hazard Zones: City and County of San Francisco*. Available: http://gmw.consrv.ca.gov/shmp/MapProcessor.asp?MapNavAction=&Action=IMap&Location=NoCal&FClass=Quad&FID=San%20Francisco%20North&Liq=false&Land=false&Bore=false&Road=true&City=false&x1=539765.7922388642&y1=4192422.2105356133&x2=557219.3179211357&y2=4177877.605800387#. Accessed: October 5, 2015.

[19] Natural Resources Conservation Service. 2015. *Soil Survey for San Francisco through SoilWeb Earth*. U.S. Department of Agriculture. Available: http://casoilresource.lawr.ucdavis.edu/soilweb-apps/. Accessed: October 5, 2015.

Problematic soils, such as those that are corrosive or expansive, can damage structures and buried utilities and increase maintenance requirements. Corrosive soils damage concrete and uncoated steel, undermining their integrity over time. The fill at the project site is moderately to severely corrosive, and the Bay Mud is severely corrosive.

Expansive soils are characterized by their ability to undergo significant volume change (i.e., to shrink and swell) because of variations in moisture content. Changes in soil moisture can result from rainfall, landscape irrigation, utility leakage, roof drainage, and/or perched groundwater.[20] Expansive soils are typically very fine grained and have a high to very high percentage of clay. Expansion and contraction of expansive soils in response to changes in moisture content can lead to differential and cyclical movements that can cause damage and/or distress to structures and equipment. Changes in moisture content can result in foundation damage, other structural damage, warping, cracking of paved surfaces, rupture of utility lines, and other types of damage. Construction on expansive soils can undermine a structure's future stability. According to the preliminary geotechnical report prepared for the proposed project, fill at the project site is not expansive.[21] Bay Mud underlying the fill is expansive; however, it is not subject to volume changes because it is below the groundwater level, and as long as it remains underwater, would not undergo moisture changes.[22]

Geologic or soil units can become unstable or prone to settlement for a variety of reasons. Settlement is one cause of subsidence. Immediate settlement occurs when a load from a structure or the placement of new fill material is applied, causing distortion in the underlying materials. This settlement occurs quickly and is typically complete after placement of the final load. Consolidation settlement occurs in saturated clay from the volume change caused by squeezing out water from the pore spaces. Consolidation occurs over a period of time and is followed by secondary compression, which is continued change in the pore spaces under continued application of the load. Consolidation settlement from Bay Mud deposits, as well as poorly engineered fill materials, is one of the characteristic hazards in San Francisco Bay, including Mission Bay. Soils tend to settle at different rates and by varying amounts, depending on the load weight or changes in properties over an area, which is referred to as the differential settlement of the soils. Settlement can also occur as a result of seismicity (see discussion under *Earthquake-Induced Settlement*, below).

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[20] Perched groundwater is a local saturated zone above the water table that typically exists above an impervious layer (such as clay) of limited extent.

[21] Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* Prepared for Mission Rock Development. September 8.

[22] Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* Prepared for Mission Rock Development. September 8.

REGIONAL FAULTING AND SEISMIC HAZARDS

The San Francisco Bay Area is situated near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast. Since the Miocene epoch (approximately 23 million years ago), about 200 miles of right-lateral movement[23] has occurred along the San Andreas fault zone to accommodate the relative movement between these two plates. The movement between the Pacific Plate and the North American Plate generally occurs across a 50-mile-wide zone, extending from the San Gregorio fault to the southwest to the Great Valley Thrust Belt to the northeast. In addition to the right-lateral slip movement between the two tectonic plates, portions of the North American Plate have moved toward each other during the last 3.5 million years, resulting in compressional forces at the latitude of San Francisco Bay.

ACTIVE AND POTENTIALLY ACTIVE FAULTS

Figure 4.M-1, on the following page, shows the locations of active[24] and potentially active[25] faults in the San Francisco Bay region. The San Andreas, Hayward-Rodgers Creek, Calaveras, Concord-Green Valley, and San Gregorio strike-slip faults are active faults of the San Andreas system that accommodate predominantly lateral movement between the North American and Pacific tectonic plates. Active blind and reverse thrust faults[26] in the San Francisco Bay region that accommodate compressional movement include the Monte Vista-Shannon and Mount Diablo faults. The closest faults to the project site are the San Andreas, Hayward, San Gregorio, and Calaveras faults. Table 4.M-1, page 4.M-9, summarizes the distance from the project site, direction to the fault, and estimated maximum earthquake moment magnitude (Mw)[27] for each fault located within approximately 30 miles of the project site.

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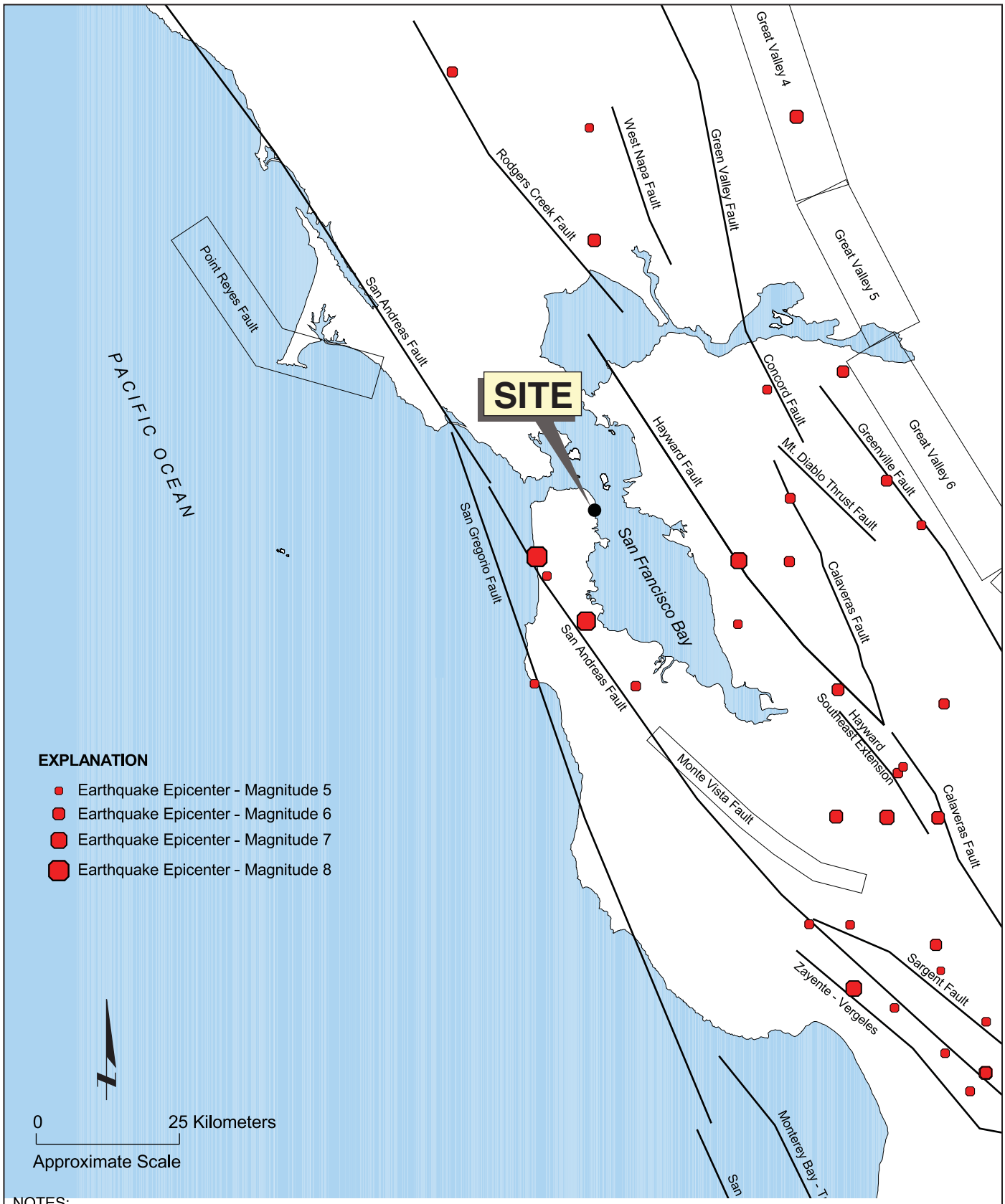
[23] The Pacific Plate and the North American Plate are moving past each other along the San Andreas fault zone; "right-lateral movement" means that they are moving to the right relative to each other.

[24] An active fault is one that shows geologic evidence of movement within Holocene time (approximately the last 11,000 years).

[25] A potentially active fault is one that shows geologic evidence of movement during the Quaternary (approximately the last 1.6 million years).

[26] A reverse fault is one with predominantly vertical movement in which the upper block moves upward in relation to the lower block; a thrust fault is a low-angle reverse fault. Blind thrust faults are low-angled subterranean faults that have no surface expression.

[27] An earthquake is classified by the amount of energy released, expressed as the magnitude of the earthquake. Until relatively recently, magnitudes have been quantified using the Richter scale. However, seismologists now use a moment magnitude (Mw) scale because it provides a more accurate measurement of the size of major and great earthquakes. Moment magnitude is directly related to the average slip and fault rupture area.



NOTES:
Digitized data for fault coordinates and earthquake catalog was developed by the California Department of Conservation Division of Mines and Geology. The historic earthquake catalog includes events from January 1800 to December 2000.

Source: Treadwell & Rollo, 2011.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.M-1
Major Faults and Earthquake Epicenters in the Project Region

TABLE 4.M-1. MAJOR SAN FRANCISCO BAY AREA FAULTS NEAR THE PROJECT SITE

Fault Name	Age[f]	Maximum Historic Earthquakes[a]	Moment Magnitude (Mw) [b, g]	Approximate Distance from Project Site (mi) [c, d]
N. San Andreas	historic	7.8 (1906)	7.9	8
Hayward-Rodgers Creek	historic	6.8 (1868)	7.1	10
San Gregorio	historic	3–6.4 (1270–1400 AD)	7.3	12
Mount Diablo Thrust	Quaternary (estimated)[h]	n/a	6.7	21
Calaveras	historic	6.5 (1861)	6.8	21
Concord-Green Valley	historic	5.4 (1955)	6.9	24
Monte Vista-Shannon	Quaternary (estimated)[e]	n/a	6.8	24

Sources:

a. U.S. Geological Survey. 2015a. *Historic Earthquakes in the United States and Its Territories*. Available: http://earthquake.usgs.gov/earthquakes/states/historical.php. Accessed: October 1, 2015.

b. California Geological Survey. 2002. *Probabilistic Seismic Hazard Assessment for the State of California, Appendix A, in Fault Source Parameters.* (CDMG Open File Report 96-08.) Available: http://www.consrv.ca.gov/CGS/rghm/psha/ofr9608. Accessed: October 1, 2015.

c. Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* Prepared for Mission Rock Development. September 8.

d. U.S. Geological Survey. 2015b. *Quaternary Faults in Google Earth*. Available: http://earthquake.usgs.gov/hazards/qfaults/google.php. Accessed: October 5, 2015.

e. Bryant, W.A., compiler. 2000. Fault Number 56, Monte Vista-Shannon Fault Zone. In *Quaternary Fault and Fold Database of the United States.* U.S. Geological Survey website. Available: http://earthquakes.usgs.gov/hazards/qfaults. Accessed: October 5, 2015.

Notes:

f. Historic faults are Holocene faults that have also demonstrated fault movement within the last 200 years. Holocene faults are those that have shown geologic evidence of movement within Holocene time (approximately the last 11,000 years). Quaternary faults have demonstrated displacement within last 1.6 million years.

g. Moment magnitude is related to the physical size of a fault rupture and movement across a fault. It provides a physically meaningful measure of the size of a faulting event.

h. Because the Mount Diablo thrust is a blind fault and does not have a surface expression, it is difficult to date its activity.

MHE = maximum historic earthquake; Mw = moment magnitude.

Since 1800, four major earthquakes have been recorded on the San Andreas fault. In 1836, an earthquake with an estimated Mw of 6.4 occurred east of Monterey Bay (San Juan Bautista) on the San Andreas fault.[28] Shortly thereafter, in 1838, an earthquake with an Mw of about 7.5 occurred on the San Andreas fault. The San Francisco earthquake of 1906 caused the most significant damage in the history of the Bay Area in terms of loss of lives and property damage. This earthquake created a surface rupture along the San Andreas fault from Shelter Cove to San Juan Bautista, approximately 290 miles in length. It had an Mw of about 7.9 and was felt 350 miles away in Oregon, Nevada, and Los Angeles. The most recent large earthquake to affect the Bay Area was the Loma Prieta earthquake on October 17, 1989. The epicenter of this earthquake was approximately 60 miles from the project site in the Santa Cruz Mountains. The earthquake had an Mw of 6.9.

On the Hayward fault, an earthquake with an estimated Mw of 6.8[29] occurred in 1868 on the southern segment (between San Leandro and Fremont). In 1861, an earthquake of unknown magnitude (probably an Mw of about 5.6) was reported on the Calaveras fault.[30] The most recent significant earthquake on this fault was the 2007 Alum Rock earthquake, with an Mw of 5.7.

USGS estimates that there is a 72 percent probability of a strong earthquake (Mw 6.7 or higher) occurring on one of the regional faults in the 30-year period between 2014 and 2044.[31]

FAULT RUPTURE

Fault rupture almost always follows pre-existing faults, which are zones of weakness. Surface rupture occurs when movement on a fault deep within the earth breaks through to the surface. According to the preliminary geotechnical report prepared for the project site, there is very low potential for fault rupture within the project site because no active faults cross the project site.[32]

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[28] California Geological Survey. 2004. *Significant California Earthquakes*. Available: http://www.conservation.ca.gov/CGS/rghm/quakes/Pages/eq_chron.aspx. Accessed: October 5, 2015.

[29] U.S. Geological Survey. n.d. *Historic Earthquakes: Hayward, California, 1868, October 21, 15:53 UTC, Magnitude 6.8.* Available: http://earthquake.usgs.gov/earthquakes/states/events/1868_10_21.php. Accessed: October 5, 2015.

[30] Kelson, I.I., J.S. Hoeft, and M. Buga. 2008. *Assessment of Possible Surface Rupture on the Northern Calaveras Fault, Eastern San Francisco Bay Area.* (U.S. Geological Survey, National Earthquake Hazards Reduction Program Award No. 07HQGR0082.) June. Available: http://earthquake.usgs.gov/research/external/reports/07HQGR0082.pdf. Accessed: October 5, 2015.

[31] UCERF3. 2015. *UCERF3: A New Earthquake Forecast for California's Complex Fault System*. (Fact Sheet 2015-3009.) Available: http://www.wgcep.org/sites/wgcep.org/files/fs2015-3009.pdf. Accessed: October 5, 2015.

[32] Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* Prepared for Mission Rock Development. September 8.

GROUND SHAKING

The intensity of the seismic shaking, or strong ground motion, on the project site during an earthquake would depend on the distance between the project site and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the project site. Earthquakes occurring on faults close to the project site would most likely generate the largest ground motions.

According to the shaking hazard mapping done by the Association of Bay Area Governments (ABAG), it is expected that the San Francisco shoreline within the project site would experience violent ground shaking due to an earthquake along the peninsula segment of the San Andreas fault and very strong to violent ground shaking due to an earthquake along the combined northern and southern segments of the Hayward fault.[33] These are the faults closest to the project site. Additionally, the Community Safety Element of the San Francisco General Plan (General Plan) contains shaking hazard maps for San Francisco.[34] The maps cited above refer to updated versions of the same source maps.

LIQUEFACTION AND OTHER SEISMICALLY INDUCED GROUND FAILURE

Liquefaction is a phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of strong earthquake-induced ground shaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude of the earthquakes that are likely to affect the site. Saturated, unconsolidated silts, sands, silty sands, and gravels within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena include vertical settlement from densification, lateral spreading, ground oscillation, flow failures, loss of bearing strength, subsidence, and buoyancy effects.

Much of the landside portion of the San Francisco shoreline, including the project site where construction would occur, is within a liquefaction hazard zone that was identified by the California Geological Survey as part of the Seismic Hazards Mapping Act (although the mapping does not extend into the Bay).[35] As noted above, areas of artificial fill, especially any

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[33] Association of Bay Area Governments. n.d. *Shaking Scenarios*. Resilience Program. Available: http://gis.abag.ca.gov/website/Hazards/. Accessed: October 5, 2015.

[34] City and County of San Francisco. 2012. *Community Safety Element*. October. Available: http://www.sf-planning.org/ftp/general_plan/community_safety_element_2012.pdf. Accessed: October 5, 2015.

[35] California Geologic Survey. 2000. *Seismic Hazard Zones: City and County of San Francisco.* Available: http://gmw.consrv.ca.gov/shmp/MapProcessor.asp?MapNavAction=&Action=IMap&Location=NoCal&FClass=Quad&FID=San%20Francisco%20North&Liq=false&Land=false&Bore=false&Road=true&City=false&x1=539765.7922388642&y1=4192422.2105356133&x2=557219.3179211357&y2=4177877.605800387#. Accessed: October 5, 2015.

fill placed before the 1960s, can be susceptible to liquefaction. The 2012 San Francisco Seismic Hazard Zones map[36] of the Community Safety Element of the San Francisco General Plan, which shows areas that are susceptible to seismically induced liquefaction, indicates that much of landside portion of the San Francisco shoreline is within a potential liquefaction hazard zone. The potentially liquefiable layers are discontinuous and random across the project site, leading to variability in the magnitude of potential liquefaction-induced settlement across the project site. The largest predicted magnitude of liquefaction-induced settlement of 3 to 5 inches occur generally near the north and south ends of Seawall Lot 337 and along Terry A. Francois Boulevard at the west end of Pier 48.[37,38]

The project site has also been subject to lurch cracking and sand boils during historic seismic activity.[39] Lurch cracking refers to fractures, cracks, and fissures that result from ground shaking and the associated settlement of poorly consolidated soil or fill. Sand boils are eruptions of liquefied sand that are forced up through cracks or fissures in the overlying soil as a result of the pressure of the overlying sediments. The potential for lurch cracking and sand boils is greatest in areas where the water table is high, such as at the project site.

LATERAL SPREADING

Of the liquefaction hazards, lateral spreading generally causes the most damage. This is a phenomenon in which large blocks of intact, non-liquefied soil move downslope on a broad or wide liquefied layer.[40] When lateral displacement occurs, the mass moves toward an unconfined area, such as a descending slope or stream-cut bluff. Slopes between 0.3 and 3 percent can displace the surface by several meters to tens of meters. Areas of observed lateral spreading in San Francisco are limited mainly to areas where fill has been placed over marsh and Bay Mud deposits.[41]

The project site is located in areas of the waterfront where fill has been placed over marsh or Bay Mud; accordingly, it is subject to lateral spreading. The preliminary geotechnical studies prepared for the project site show that some layers in the 40-foot-thick fill layer have lateral

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[36] City and County of San Francisco. 2012. *Community Safety Element*. October. Available: http://www.sf-planning.org/ftp/general_plan/community_safety_element_2012.pdf. Accessed: October 5, 2015.

[37] Treadwell & Rollo. 2013. *Liquefaction and Lateral Spread Potential at Seawall Lot 337*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, CA. (Project No. 750604203.) December 23.

[38] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[39] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[40] Youd, T.L., and D.M. Perkins. 1978. *Mapping Liquefaction Induced Ground Failure Potential.* Proceedings of the American Society of Civil Engineers, Journal of the Geotechnical Engineering Division.

[41] Youd, T.L., and S.N. Hoose. 1978. *Historic Ground Failures in Northern California Triggered by Earthquakes.* Geological Survey Professional Paper 993.

spread potential of approximately 4 to 8 feet.[42,43,44] The existence of a vertical reinforced-concrete curtain wall (seawall), constructed in 1926, at Pier 48[45] may limit the extent of lateral spread flow or movement in the upper 12 feet. However, the wall could fail and/or the fill could migrate beneath the seawall and laterally spread toward the free face of the slope.[46] Where movement occurs, a rotational failure is likely. With a rotational failure, the slope slides along a failure surface and comes to rest with a more stable configuration. With the high potential for lateral spreading in the fill, there may be a progressive failure at the project site, which may extend to about 110 feet west of the seawall at the shoreline.[47] The deformations associated with this progressive failure could extend approximately 2 to 4 feet and affect improvements at or east of Terry A. François Boulevard.

EARTHQUAKE-INDUCED SETTLEMENT

Settlement 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 the settling of subsurface materials (particularly loose, noncompacted, and variable sandy sediments). Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill or Bay Mud.

Borings performed at the project site show that fill above the groundwater is sufficiently dense and/or cohesive; the potential for seismic densification is low—approximately 1 inch.[48] However, the potential for seismically induced settlement from other seismically induced sources could be much greater. Settlement due to liquefaction could be on the order of 5 inches, and lateral ground displacements due to lateral spreading could be on the order of 4 to 8 feet.[49]

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[42] Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* September 8. Prepared for Mission Rock Development.

[43] Treadwell & Rollo. 2013. *Liquefaction and Lateral Spread Potential at Seawall Lot 337.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, CA. (Project No. 750604203.) December 23.

[44] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[45] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[46] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[47] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[48] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[49] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

EARTHQUAKE-INDUCED LANDSLIDES

Earthquake motions can also 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.

Within the project site, the San Francisco waterfront where construction would occur is relatively flat and not likely to be affected by earthquake-induced landslides. There are no mapped zones of potential earthquake-induced landslides.[50] The Seismic Hazard Zones map of the Community Safety Element of the General Plan, which shows areas that are susceptible to seismically induced landslide, indicates that none of the project site is located within a potential landslide hazard area.

PALEONTOLOGICAL SETTING

Paleontological resources, or fossils, are the remains, imprints, or traces of animals, plants, and invertebrates from a previous geological period. Collecting localities and the geologic formations containing those localities are also considered paleontological resources, representing a limited, nonrenewable resource. Once destroyed, they cannot be replaced.

The deposition and preservation of paleontological resources relate to the lithologic (rock) unit in which they occur. If a rock type was created in a deposition environment that was not conducive to the deposition and preservation of fossils, fossils will not be present. Lithologic units that may be fossiliferous include sedimentary and volcanic formations. Pleistocene sediments in the San Francisco Bay are known to yield vertebrate fossils.[51]

The Franciscan Formation present at the project site is of Jurassic to Cretaceous age (150 to 66 million years ago).[52] The Old Bay Clay present at the project site was deposited in an estuarine environment during late Pleistocene time (2.6 million to 11,700 years ago), an interglacial period with high sea levels. The Colma Formation present at the project site was formed from

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[50] California Geologic Survey. 2000. *Seismic Hazard Zones: City and County of San Francisco.* Available: http://gmw.consrv.ca.gov/shmp/MapProcessor.asp?MapNavAction=&Action=IMap&Location=NoCal&FClass=Quad&FID=San%20Francisco%20North&Liq=false&Land=false&Bore=false&Road=true&City=false&x1=539765.7922388642&y1=4192422.2105356133&x2=557219.3179211357&y2=4177877.605800387#. Accessed: October 5, 2015.

[51] University of California Museum of Paleontology. 2015. *Specimens*. Available: http://ucmpdb.berkeley.edu/cgi/ucmp_query2. Accessed: October 8, 2015.

[52] Simpson, L.A., and G.E. Treadwell & Rollo Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In D*FI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

subsequent glaciation during the Wisconsin period (85,000 to 11,000 years ago), which exposed the Bay floor and resulted in sand deposits, now known as the Colma Formation, on top of the Yerba Buena Mud. Approximately 20,000 years ago, sea levels began to rise with the melting of the glaciers. Approximately 10,000 years ago, water re-entered the Bay through the Golden Gate, and estuarine deposits in the form of Bay Mud began a process of deposition that continues through to this day. The formations from most recent to oldest and therefore also from shallowest to deepest in Mission Bay are Younger Bay Mud, Colma Formation, Old Bay Clay, sand and clay, and Franciscan Formation.[53] Old Bay Clay, as discussed under *Project Area Geology*, above, is encountered approximately 45 to 85 feet below ground surface.[54,55] The layer of Colma Formation is not continuous across Mission Bay.[56]

The geologic units present in the project area; their paleontological sensitivity, as defined in the Methods for Analysis section, below; and information about the fossil history of the geologic unit are shown in Table 4.M-2 on the following page. Unlike archaeological sites, which are narrowly defined, paleontological sites are defined by the entire extent (both areal and stratigraphic) of a unit or formation. In other words, once a unit is identified as containing vertebrate fossils, or other rare fossils, the entire unit is a paleontological site.[57] For this reason, the paleontological sensitivity of geologic units is described and analyzed broadly rather than within the context of a specific site. Colma and Franciscan Formations, which have high paleontological sensitivity, are described below.

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[53] Keller, B.R. 2009. Literature Review of Unconsolidated Sediment in San Francisco Bay and Nearby Pacific Ocean Coast. *San Francisco Estuary and Watershed Science 7(1)*. Available: http://escholarship.org/uc/item/5rh9t1jj. Accessed: April 7, 2016.

[54] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[55] Treadwell & Rollo. 2013. *Liquefaction and Lateral Spread Potential at Seawall Lot 337.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, CA. (Project No. 750604203.) December 23.

[56] Simpson, L.A., and G.E. Treadwell & Rollo, Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In D*FI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

[57] Society of Vertebrate Paleontology. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Impact Mitigation Guidelines Revision Committee. Available: http://vertpaleo.org/The-Society/Governance-Documents/SVP_Impact_Mitigation_Guidelines.aspx. Accessed: April 8, 2016.

TABLE 4.M-2. GEOLOGIC UNITS AND PALEONTOLOGICAL SENSITIVITY IN THE PROJECT AREA

Age	Geologic Unit[a,b]	Paleontological Sensitivity
Holocene	Younger Bay Mud	Low
Pleistocene	Colma Formation	High
Pleistocene	Old Bay Clay	Undetermined
Cretaceous-Jurassic	Franciscan Formation	High

Sources:

a. Simpson, L.A., and G.E. Treadwell & Rollo Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In *DFI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

b. Rodda, P.U., and N. Baghai. 1993. Late Pleistocene Vertebrates from Downtown San Francisco, California. *Journal of Paleontology* 67:1,058–1,063.

COLMA FORMATION

The Colma Formation consists of moderately sorted fine to medium fine sand with small to moderate amounts of silt and clay, with some beds of gravel and cobbles near Colma, California.[58] The origin of the materials is terrestrial deposition associated with the onset of Wisconsin glaciation (approximately 83,000 to 120,000 years ago).[59, 60] Vertebrate fossils documented from the Colma Formation include *Mammuthus Columbia* and *Bison laitrons*.[61] For this reason, this geologic unit is considered to have high paleontological sensitivity.

In Mission Bay, where encountered, the Colma Formation varies from approximately 3 to 60 feet thick.[62] Site-specific geotechnical investigations encountered this formation between approximately 60 and 80 feet below ground surface at the project site.[63,64]

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58 Schlocker, J. 1974. *Geology of the San Francisco North Quadrangle, California*. (Geological Survey Professional Paper 782.) Washington, DC: United States Printing Office. Available: http://pubs.usgs.gov/pp/0782/report.pdf. Accessed: April 13, 2016.

59 Simpson, L.A., and G.E. Treadwell & Rollo, Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In D*FI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

60 Caskey, S.J., K. Grove, C. Li, and G. Berger. 2004. *Constraints on Late Pleistocene and Active Uplift Rates along the Serra Fault and the Timing of Late Pleistocene Transpressional Deformation along the San Andreas Fault, Northern San Francisco Peninsula.* (U.S. Geological Survey award number 04HQGR0024.) Available: http://earthquake.usgs.gov/research/external/reports/04HQGR0024.pdf. Accessed: April 12, 2016.

61 Rodda, P.U., and N. Baghai. 1993. Late Pleistocene Vertebrates from Downtown San Francisco, California. *Journal of Paleontology* 67:1,058–1,063.

62 Simpson, L.A., and G.E. Treadwell & Rollo, Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In D*FI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

63 Treadwell & Rollo. 2001. *Pier 48 Foundation Evaluation, San Francisco, California*. Log of Boring B-2.

64 Treadwell & Rollo. 2001. *Pier 48 Foundation Evaluation, San Francisco, California*. Log of Boring B-3.

FRANCISCAN FORMATION

The Franciscan Formation consists of sandstone, shale, siltstone, chert, and other oceanic deposits and ultramafic volcanic rock in the California Coast Ranges. In the San Francisco North quadrangle, the formation is characterized by 80 percent greywacke sandstone, 10 percent shale and siltstone, 6 percent mafic volcanic rocks, 3 percent radiolarian chert, and less than 1 percent conglomerate, limestone, and glocophane schist. Ultramafic rock, principally serpentine, has intruded all of these deposits. The origin of the materials is oceanic deposits (from approximately 150 to 66 million years [Ma] ago).[65] Although vertebrate fossils in Franciscan Formation are rare, documented instances include three aquatic reptiles.[66] For this reason, this geologic unit is considered to have high paleontological sensitivity.

The Franciscan Formation in Mission Bay is eroded and highly sheared.[67] It was encountered between 160 and 260 feet below ground surface at the project site.[68]

REGULATORY FRAMEWORK

FEDERAL

Earthquake Hazard Reduction Act of 1977. Federal laws codified in United States Code Title 42, Chapter 86, were enacted to reduce risks to life and property from earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. Implementation of these requirements are regulated, monitored, and enforced at the state and local levels. Key regulations and standards are summarized below.

STATE

California Building Code. California Code of Regulations (CCR), Title 24, Part 2, the California Building Code (CBC), provides minimum standards for building design in the state. The 2016 CBC, effective January 1, 2017, is the current code and based on the current (2015) International Building Code (IBC).

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[65] Schlocker, J. 1974. *Geology of the San Francisco North Quadrangle, California*. (Geological Survey Professional Paper 782.) Washington, DC: United States Printing Office. Available: http://pubs.usgs.gov/pp/0782/report.pdf. Accessed: April 13, 2016.

[66] Hilton, R.P. 2003. Dinosaurs and Other Mesozoic Reptiles of California. University of California Press. Appendix: Summary of the Mesozoic Reptilian Fossils of California.

[67] Simpson, L.A., and G.E. Treadwell & Rollo, Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In D*FI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

[68] Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* September 8. Prepared for Mission Rock Development.

Each jurisdiction in California may adopt its own building code, based on the 2016 CBC. Local codes are permitted to be more stringent than the 2016 CBC but, at a minimum, are required to meet all state standards and enforce the regulations of the 2016 CBC, beginning January 1, 2017. The Port of San Francisco (Port) has adopted the 2016 CBC with some amendments.

Chapter 16 of the CBC deals with structural design requirements governing seismically resistant construction (Section 1604), including, but not limited to, factors and coefficients used to establish a seismic site class and seismic occupancy category for the soil/rock at the building location and the proposed building design (Sections 1613.5 through 1613.7). Chapter 18 includes, but is not limited to, the requirements for foundation and soil investigations (Section 1803); excavation, grading, and fill (Section 1804); allowable load-bearing values of soils (Section 1806); and the design of footings, foundations, slope clearances (Sections 1808 and 1809), retaining walls (Section 1807), and pier, pile, driven, and cast-in-place foundation support systems (Section 1810). Chapter 33 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 CBC includes, but is not limited to, grading requirements for the design of excavations and fills (Sections J106 and J107) and erosion control (Sections J109 and J110).

California Division of Occupational Safety and Health Regulations. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching, as specified in California Division of Occupational Safety and Health (Cal/OSHA) regulations (CCR, Title 8).

Alquist-Priolo Earthquake Fault Zoning Act. California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] Section 2621 et seq.), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy[69] across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,000

[69] With reference to the Alquist-Priolo Act, a *structure for human occupancy* is defined as one "used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year" (California Code of Regulations, Title 14, Division 2, Section 3601[e]).

years). A fault is considered well defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria, and judgment.

Seismic Hazards Mapping Act. Similar to the Alquist-Priolo Act, the Seismic Hazards Mapping Act (SHMA) of 1990 (PRC Sections 2690–2699.6) is intended to reduce damage resulting from earthquakes. Although the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act (i.e., the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped seismic hazard zones).

A primary purpose of the Seismic Hazards Mapping Act is to assist cities and counties in preparing the safety elements of their general plans and encourage land use management policies and regulations that reduce seismic hazards. The intent of this act is to protect the public from the effects of strong ground shaking, liquefaction, landslides, ground failure, or other hazards caused by earthquakes. Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans. In addition, the California Geologic Survey's Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California, provides guidance for evaluating earthquake-related hazards for projects in designated zones with required investigations and recommending mitigation measures, as required by PRC Section 2695(a).

Liquefaction hazards mapping has been conducted for the part of the Bay that includes the project site. As discussed under *Liquefaction*, the project site is within a mapped liquefaction hazard zone that requires special study and would be subject to the requirements specified above.

National Pollutant Discharge Elimination Program Construction General Permit. Under the authority of the federal Clean Water Action, Section 402 (NPDES, the State Water Resources Control Board (SWRCB) permits all regulated construction activities under Order No. 2009-0009-DWQ (adopted September 2, 2009). Section 402 requires, prior to beginning any construction activities, the permit applicant to obtain coverage under the Construction General Permit by preparing and submitting a Notice of Intent (NOI) to the SWRCB and preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP), in accordance with Construction General Permit requirements, for all construction activities that disturb 1 acre or more of land surface. Construction activities that are 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 1 acre of total land area. The SWPPP 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 implemented under the SWPPP to reduce or eliminate sediment would reduce erosion.

Implementation of the permit requirements would be necessary (and required) to control erosion during construction activities at the project site. Compliance with the state permit is enforced and monitored by the State Water Resources Control Board. See also the discussion in Section 4.N, *Hydrology and Water Quality*.

LOCAL

Port of San Francisco Building Code. The Port Building Code, an amendment to the CBC, applies to projects constructed on Port property. The operative version of the Port Building Code, published 2016, incorporates and amends the 2016 CBC; the effective date is January 1, 2017. The 2016 Port Building Code is administered by the Port Commission through the Chief Harbor Engineer and establishes minimum building requirements to safeguard the public health, safety, and general welfare. Chapter 16 of the 2016 Port Building Code applies to structural design, including seismic considerations. Chapter 16 of the 2016 Port Building Code amends Chapter 16 of the 2016 CBC to address structural design criteria related to flood hazard and wave loads from a 100-year flood event and to reduce the risk of damage to unreinforced masonry buildings, but is otherwise the same as Chapter 16 of the 2016 CBC. The 2016 Port Building Code Chapters 18 and 18A apply to soils and foundations and make no amendments to Chapters 18 and 18A of the 2016 CBC. Chapter 33 applies to safeguards during construction. Appendix J applies to grading.

San Francisco General Plan. The Community Safety Element[70] of the General Plan states the following objective:

- Objective 1: Reduce structural and nonstructural hazards to life safety and minimize property damage resulting from future disasters.

The following four policies related to geology and soils support this objective:

- Policy 1.3: Assure that new construction meets current structural and life safety standards.
- Policy 1.6: Consider site soils conditions when reviewing projects in areas subject to liquefaction or slope instability.

[70] City and County of San Francisco. 2012. *Community Safety Element*. October. Available: http://www.sf-planning.org/ftp/general_plan/community_safety_element_2012.pdf. Accessed: October 5, 2015.

- Policy 1.7: Consider information about geologic hazards whenever City decisions are made that will influence land use, building density, building configurations, or infrastructure are made.
- Policy 1.16: Preserve, consistent with life safety considerations, the architectural character of buildings and structures important to the unique visual image of San Francisco, and increase the likelihood that architecturally and historically valuable structures will survive future earthquakes.

The Community Safety Element includes maps of potential hazard areas, including liquefaction and potential liquefaction areas.

The Environmental Protection Element of the General Plan contains the following objective:

- Objective 7: Ensure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the city's citizens.

The following three policies related to geology and soils support this objective:

- Policy 7.3: Require that filling of land adhere to the highest standards of soils engineering consistent with the proposed use.
- Policy 7.4: Assure the correction of landslide and shore erosion conditions where it is in the public interest to do so.
- Policy 7.5: Prohibit construction, as a general rule, on land subject to slide or erosion.

ENVIRONMENTAL IMPACTS

This section describes the impact analysis related to geology and soils for the proposed project. It describes the methods that were used to determine the impacts of the proposed project and lists the thresholds that were used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

The proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
    - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42).

  - Strong seismic ground shaking.
  - Seismically related ground failure, including liquefaction.
- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable or would become unstable as a result of the project and potentially result in on or offsite landslides, lateral spreading, subsidence, liquefaction, or collapse.
- Be located on expansive soil, as defined in Table 18 1 B of the Uniform Building Code, creating substantial risks to life or property.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

METHODS FOR ANALYSIS

For the purpose of this analysis, it is assumed that the proposed project would be designed and constructed in compliance with all applicable building codes and state law, as described above in the *Regulatory Framework* section.

GEOLOGY AND SOILS

Impacts related to geology and soils were analyzed qualitatively, based in part on analysis presented in the preliminary geotechnical studies and geotechnical evaluations that were conducted for the project site.[71,72,73] The analysis was also based, in part, on data from peer-reviewed and government reports and mapping, including information about landslide and earth flows;[74] soils data from the Natural Resources Conservation Service;[75] mapping of seismic

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[71] Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California*. September 8. Prepared for Mission Rock Development.

[72] Treadwell & Rollo. 2013. *Liquefaction and Lateral Spread Potential at Seawall Lot 337*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, CA. (Project No. 750604203.) December 23.

[73] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[74] Wentworth, C.M., S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron. 1997. Part C, Summary of Distribution of Landslide and Earth Flows in the San Francisco Bay Region, California. In *San Francisco Bay Region Landslide Folio*. (Open File Report 97-745.) Available: http://pubs.usgs.gov/of/1997/of97-745/sf-sef.pdf. Accessed: October 5, 2015.

[75] Natural Resources Conservation Service. 2015. *Soil Survey for San Francisco through SoilWeb Earth*. U.S. Department of Agriculture. Available: http://casoilresource.lawr.ucdavis.edu/soilweb-apps/. Accessed: October 5, 2015.

hazards at and near the project site;[76, 77,78] earthquake probability forecasts;[79] and mapping of Quaternary faults near the project site.[80] The analysis focused on the proposed project's potential to have an impact on the environment as a result of project actions.

Impacts on soils and geology would occur if the proposed project were to result in changes to the environment that would cause or exacerbate erosion, slope failure, subsidence, soil expansion and contraction, or seismically induced lateral spreading. Impacts would also occur if the proposed project would change the topography; destroy a unique geologic feature, physical feature, or paleontological resource; or be located on soils that would be incapable of supporting an alternative wastewater system, if included in the project. As discussed in Chapter 2, *Project Description*, the proposed project would involve soil excavation to a maximum depth of approximately 33 feet below ground surface for the Mission Rock Square garage. Basements within other new structures would have lesser depths, and no excavation would be required for pile driving. Construction of the proposed project would involve pile driving to an average depth of 230 feet for the proposed buildings and a maximum depth of 175 feet for streets, the promenade and boardwalk at China Basin Park, and utilities, which would be within the bedrock (encountered during the boring at between 160 and 260 feet below ground surface). As discussed above under *Project Area Geology*, groundwater is at approximately 6.5 to 9 feet below ground surface. As shown in Table 4.M-3, on the following page, the total volume of excavated materials from the project site with the proposed development would be approximately 208,560 cubic yards.

Based on the *California Building Industry Association v. Bay Area Air Quality Management District* decision, 62 Cal. 4th 369 (2015), the approach to analyzing impacts determines if a project would substantially exacerbate any existing environmental hazards or conditions and evaluates the potential for such exacerbated hazards to affect future residents or users associated with a proposed project. The analysis does not consider the effects of existing environmental conditions on a project's future users or residents. In these specific instances, it is the project's impact on the environment, not the environment's impact on the project, that compels an evaluation of how future residents or users could be affected by exacerbated conditions.

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[76] California Geological Survey. 2002. *Probabilistic Seismic Hazard Assessment for the State of California, Appendix A, in Fault Source Parameters*. (CDMG Open File Report 96-08.) Available: http://www.consrv.ca.gov/CGS/rghm/psha/ofr9608. Accessed: October 1, 2015.

[77] Youd, T.L., and S.N. Hoose. 1978. Historic Ground Failures in Northern California Triggered by Earthquakes. Geological Survey Professional Paper 993.

[78] Youd, T.L. and D.M. Perkins. 1978. *Mapping Liquefaction Induced Ground Failure Potential*. Proceedings of the American Society of Civil Engineers, Journal of the Geotechnical Engineering Division.

[79] UCERF3. 2015. UCERF3: A New Earthquake Forecast for California's Complex Fault System. (Fact Sheet 2015-3009.) Available: http://www.wgcep.org/sites/wgcep.org/files/fs2015-3009.pdf. Accessed: October 5, 2015.

[80] U.S. Geological Survey. 2015b. *Quaternary Faults in Google Earth*. Available: http://earthquake.usgs.gov/hazards/qfaults/google.php. Accessed: October 5, 2015.

TABLE 4.M-3. MAXIMUM DEPTH OF EXCAVATION AND VOLUME OF EXCAVATED MATERIAL

Building	Volume of Excavated Material for Demolition and Grading, Infrastructure, and Foundations (cubic yards)
AREA 1 (Building A, G, K, China Basin Park, Pier 48)	26,650
AREA 2 (Buildings B, C, D)	37,610
AREA 3 (Buildings E, F, Mission Rock Square, Below Grade Parking)	117,000
AREA 4 (Buildings H, I, J, Channel Plaza)	27,300
Total Volume of Excavated Materials	**208,560**

PALEONTOLOGICAL RESOURCES

The fossil-yielding potential of geologic units depends on the geologic age and origin of the underlying rocks as well as on the processes that the rocks have undergone, both geologic and anthropogenic.[81] The methods used to analyze potential impacts on paleontological resources involved the following steps:

- Identify the geologic units in the paleontological study area.
- Evaluate the potential of the identified geologic units to contain significant fossils (their "paleontological sensitivity").
- Identify and evaluate impacts on paleontologically sensitive geologic units as a result of project construction and operations that involve ground disturbance.
- Evaluate impact significance.

Ground disturbance caused by project implementation would take place only during the construction phase; therefore, paleontological impact analysis addresses construction-related impacts only.

To identify the geologic units in the paleontological study area, government reports and peer-reviewed journal articles regarding the geologic units underlying the project site were consulted.[82, 83] To evaluate the paleontological sensitivity of the geologic units, first the

[81] *Anthropogenic* means caused by human activity.

[82] Keller, B.R. 2009. Literature Review of Unconsolidated Sediment in San Francisco Bay and Nearby Pacific Ocean Coast. *San Francisco Estuary and Watershed Science 7(1)*. Available: http://escholarship.org/uc/item/5rh9t1jj. Accessed: April 7, 2016.

[83] Goldman, H.B. 1969. *Geologic and Engineering Aspects of San Francisco Bay Fill.* California Division of Mines and Geology, San Francisco, CA. (Special Report 97.) Prepared for San Francisco Bay Conservation and Development Commission, San Francisco, CA.

University of California Museum of Paleontology database was searched for records of fossils in these geologic units.[84] The database contains records for more than 400,000 specimens and more than 100,000 localities. Searches were based on geologic unit and reviewed by geographic context.

Next, the paleontological sensitivity of the units was assessed. The Impact Mitigation Guidelines Revisions Committee of the Society of Vertebrate Paleontology (SVP) has published Standard Guidelines.[85] The Standard Guidelines include procedures for the investigation, collection, preservation, and cataloging of fossil-bearing sites. The Standard Guidelines are widely accepted among paleontologists and followed by most investigators. The Standard Guidelines identify the two key phases of paleontological resource protection: (1) assessment and (2) implementation. Assessment involves identifying the potential for a project site or area to contain significant nonrenewable paleontological resources that could be damaged or destroyed by project excavation or construction. Implementation involves formulating and applying measures to reduce such adverse effects. *Paleontological potential* is the potential for yielding abundant fossils, a few significant fossils, or evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. The SVP defines the level of potential as one of four sensitivity categories for sedimentary rocks: High, Undetermined, Low, and No Potential as defined below.[86]

- **High Potential.** Assigned to geologic units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered and sedimentary rock units that are suitable for the preservation of fossils (e.g., middle Holocene and older fine-grained fluvial sandstones…fine-grained marine sandstones, etc.).
- **Undetermined Potential.** Assigned to geologic units for which little information is available concerning their paleontological content, geologic age, and depositional environment. In cases where no subsurface data already exist, paleontological potential can sometimes be assessed by subsurface site investigations.

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[84] University of California Museum of Paleontology. 2016. *University of California Museum of Paleontology Advanced Specimen Search.* Available: http://ucmpdb.berkeley.edu/advanced.html. Accessed: April 8, 2016.

[85] Society of Vertebrate Paleontology. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.* Impact Mitigation Guidelines Revision Committee. Available: http://vertpaleo.org/The-Society/Governance-Documents/SVP_Impact_Mitigation_Guidelines.aspx. Accessed: April 8, 2016.

[86] Society of Vertebrate Paleontology. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.* Impact Mitigation Guidelines Revision Committee. Available: http://vertpaleo.org/The-Society/Governance-Documents/SVP_Impact_Mitigation_Guidelines.aspx. Accessed: April 8, 2016.

- **Low Potential.** Field surveys or paleontological research may allow a determination that a geologic unit has low potential for yielding significant fossils (e.g., basalt flows). Mitigation is generally not required to protect fossils.
- **No Potential.** Some geologic units have no potential for containing significant paleontological resources, such as high-grade metamorphic rocks (e.g., gneisses and schists) and plutonic igneous rocks (e.g., granites and diorites). Mitigation is not required.

Data from the University of California Museum of Paleontology database were analyzed to assign each geologic unit in the study area a paleontological sensitivity category, according to the SVP's Standard Guidelines. To identify and evaluate impacts on paleontologically sensitive geologic units resulting from project and program actions, the depth of ground disturbance was assessed, with consideration of the location of geologic units with high potential and undetermined potential.

LAND USE ASSUMPTIONS

As described in Chapter 2, *Project Description*, this environmental impact report (EIR) analyzes two land use assumptions: High Commercial and High Residential. These assumptions represent the full range of land uses and the building program that could be developed on the project site under the proposed flexible zoning for Blocks H, I, and J. Although the land use mix between High Commercial and High Residential would differ, the two assumptions would have similar total square footages, similar building configurations (with the exception of the building heights on Blocks H, I, and J where the High Residential Assumption has greater proposed heights than the High Commercial Assumption), and similar construction characteristics. Therefore, the differences between the two assumptions would not result in any meaningful difference in potential impacts on geology and soils. As such, the following analysis applies to both the High Commercial and High Residential land use assumptions.

TOPICS NOT EVALUATED IN DETAIL

Because of the nature of the proposed project, there would be no impact related to the following topics for the reasons described below:

Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslide. The project site is nearly level and not adjacent to any hillsides where seismically induced landslides or other downslope movements of rock or soil could pose a hazard. The project site is not located within a mapped landslide hazard area,

according to the California Geological Survey Seismic Hazard Zonation Program.[87] The proposed project would not cause or exacerbate a landslide hazard. Because the proposed project would not increase the exposure of people to landslide hazards, this impact is not evaluated further.

Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater. Wastewater produced by the proposed project would be conveyed to the City's combined sewer system. Stormwater would be separated and treated before discharge to the Bay. New construction of alternative wastewater disposal systems is not required as part of the proposed project. Further, existing alternative wastewater disposal systems or septic tanks would not be used as part of the proposed project. Therefore, no impacts related to soils that are incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems would occur, and this impact is not discussed further.

Substantially change the topography or any unique geologic or physical features. The project site, located along the San Francisco Bay waterfront, is generally flat and has no unique geologic or physical features. Therefore, no impacts related to alteration of topography or changes to unique geologic or physical features would occur, and this impact is not discussed further.

IMPACTS AND MITIGATION MEASURES

Impact GE-1a. The project would not expose people or structures to risk of loss, injury, or death involving rupture of a known earthquake fault. (Less than Significant)

As discussed under *Fault Rupture* in the *Environmental Setting* and *Alquist-Priolo Earthquake Fault Zoning Act* in the *Regulatory Framework*, the project site is not located within an Alquist-Priolo Earthquake Fault Zone, nor do any active or potentially active faults exist within or near the project site. The nearest active fault is the San Andreas fault, located approximately 8 miles west of the project site. Therefore, the potential for surface fault rupture to affect the project site is extremely low. Further, no components of the proposed project would cause or worsen rupture of any known or unknown earthquake fault. Therefore, project implementation would not exacerbate the risk of loss, injury, or death from fault rupture compared to existing conditions. The impact would be ***less than significant***. No mitigation is required.

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[87] California Geologic Survey. 2000. *Seismic Hazard Zones: City and County of San Francisco.* Available: http://gmw.consrv.ca.gov/shmp/MapProcessor.asp?MapNavAction=&Action=IMap&Location=NoCal&FClass=Quad&FID=San%20Francisco%20North&Liq=false&Land=false&Bore=false&Road=true&City=false&x1=539765.7922388642&y1=4192422.2105356133&x2=557219.3179211357&y2=4177877.605800387#. Accessed: October 5, 2015.

Impact GE-1b. The project would not expose people or structures to risk of loss, injury, or death involving strong seismic ground shaking. (Less than Significant)

Development of the proposed project would involve the construction and occupancy of new buildings in a location where strong seismic ground shaking can be expected to occur over the life of the project. Buildings would be constructed on piles, with foundations designed to withstand seismic activity. As discussed above, the project site is located near several faults that are capable of generating a large earthquake, and there is a 72 percent likelihood that a magnitude 6.7 earthquake will occur in the Bay Area in the next 30 years. If the project buildings are not properly constructed, ground shaking could result in significant damage to structures, including collapse.

As stated above, the state Seismic Hazards Mapping Act of 1990 (Public Resources Code [PRC] Sections 2690 to 2699.6) was enacted to identify and map seismic hazard zones in order for cities and counties to encourage land use management policies and regulations to reduce and mitigate those seismic hazards to protect public safety. PRC Section 2697 requires that prior to approval of a project within a seismic hazard zone, cities and counties shall require a geotechnical report defining and delineating seismic hazard on the site. In conjunction with these provisions in the Public Resources Code, California Code of Regulations (CCR) Title 14, Section 3724, specifies that a project located in a state seismic hazard zone shall be approved only when the nature and severity of the seismic hazards at the site have been evaluated in a geotechnical report and appropriate mitigation measures have been proposed. The California Department of Conservation, California Geological Survey issued Special Publication 117A, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (2008) to provide considerations for earthquake hazard mitigation.

Chapter 18 and 18A of the 2016 CBC relate to Soils and Foundations. In particular, Section 1803 addresses the purpose, scope, and content of geotechnical investigations, including when a report is required as well as the qualifications for report preparers and reviewers. Section 1808 specifies design criteria for foundations. In addition to Section 1808, shallow foundations shall also comply with the criteria in Section 1809 and deep foundations shall also comply with the criteria in Section 1810. Geotechnical investigations provide design criteria that minimize impacts associated with strong ground shaking during an earthquake. The proposed project would be constructed in phases that may involve other developers. The project sponsor, or subsequent developer, would be required to prepare design-level geotechnical reports for each phase of the proposed project in accordance with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC requirements and implement the project-specific recommendations contained therein. During the final design, development of individual blocks and foundation recommendations, which may involve further geotechnical exploration, would be required. For high-rise structures, a unique foundation recommendation report would be required for each building. The design-level

geotechnical reports would be subject to review and approval by the Port in order to secure project building permits. Preliminary geotechnical recommendations from the geotechnical investigations conducted to date are described below.

Planned seismic upgrade work at Pier 48 would occur over approximately 16 total months. Existing timber piles would be extracted where appropriate. The seismic upgrade would consist of new piles located below a new heavily reinforced concrete apron. The apron would be located at both the northern and southern perimeter of Pier 48, replacing the existing exterior deck in these locations. These piles would include 62 approximately 30-foot-long precast concrete piles and 44 approximately 120-foot-long steel-cased concrete-filled piles. The precast concrete piles would be driven into the soil. The steel casing of the steel-cased piles would be installed in the soil with a vibratory hammer. After the steel casings are installed, each pile would be drilled to remove soil and the soil replaced with reinforced concrete.

Implementation of proper design and construction methods, as outlined in design-level geotechnical reports prepared in accordance with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC, which would be monitored and enforced through the building permit process, would minimize the effects of seismically induced ground shaking. Furthermore, the preliminary geotechnical reports prepared for the proposed project did not identify any seismic or geologic hazards that are unique to the project site or otherwise uncharacteristic of the project area that cannot be mitigated by compliance with standard building code requirements.

Similar to the discussion above under Impact GE-1a, no components of the proposed project would alter the seismic environment or affect the risk of seismically induced ground shaking. Therefore, under project implementation, there would be no change in the exposure of people or structures to risk of loss, injury, or death from seismic ground shaking compared to existing conditions. Therefore, project implementation would not exacerbate existing vulnerability to seismically induced ground shaking at the project site. The impact would be ***less than significant***. No mitigation is required.

Impact GE-1c. The project would not expose people or structures to risk of loss, injury, or death involving seismically related ground failure, including liquefaction. (Less than Significant)

As discussed under Impact GE-1b, the project area could be subject to very strong to violent ground shaking in the event of a major earthquake. As discussed above under *Regional Faulting and Seismic Hazards*, the project site is subject to liquefaction, lateral spreading, and earthquake-induced settlement hazards. Loads, such as buildings or utilities, constructed on the project site would exacerbate soil displacement as a result of strong ground shaking during an earthquake.

The project site is located within a liquefaction hazard zone, as identified by the California Geological Survey. Because of the shallow groundwater table and the relatively shallow liquefiable deposits, lateral spreading, lurch cracking, and the development of sand boils could accompany generalized liquefaction. Potential lateral spreading at Pier 48 would be on the order of 4 to 8 feet. Potential lateral spreading at the shoreline could extend up to approximately 110 feet west of the seawall.[88] As stated above, lateral spreading is generally the most damaging type of seismically induced ground failure. The impact related to lateral spreading is discussed in detail under Impact GE-3, below.

Earthquake-induced settlement due to liquefaction is expected to be up to 5 inches, depending on the location.[89] Because of the variation in subsurface conditions, settlement after liquefaction is expected to be erratic and vary significantly across the project site. Ground settlement would create a downward frictional load on piles that support structures and could have adverse effects on site drainage, utilities, and transitions between on-grade and pile-supported structures.

If project foundations are not properly designed, seismically induced ground failure could expose people at the project site to risk of injury or death. However, as discussed under Impact GE-1b, the proposed project would be required to comply with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC and prepare and implement the recommendations of design-level geotechnical reports, which would minimize impacts associated with strong ground shaking during an earthquake. Recommendations may include installation of stone columns and deep soil mixing.[90]

As evidenced by the level of development throughout the Bay Area, successful building construction is possible in a seismically active zone, even where seismic hazards are known to exist. Implementation of proper design and construction methods, as set forth in the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC, which is monitored and enforced through the building permit process, would minimize the effects of ground failure. Furthermore, the preliminary geotechnical reports prepared for the proposed project did not identify any seismic or geologic hazards that are unique to the project site or otherwise uncharacteristic of the project area that cannot be minimized through compliance with standard building code requirements. Therefore, the impact would be ***less than significant***. No mitigation is required.

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[88] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[89] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[90] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

Impact GE-2. The project would not result in substantial soil erosion or the loss of topsoil. (Less than Significant)

In general, construction activities and pedestrian travel can disturb vegetation and ground cover that serves to stabilize surface soils, making the soils more susceptible to erosion. Without proper soil stabilization controls, construction activities such as excavation, backfilling, and grading can also increase the potential for exposed soils to be eroded by wind or stormwater runoff, resulting in long-term soil loss. Project construction activities could also result in the loss of topsoil, a fertile soil horizon that typically contains a seed base, if there is a well-developed topsoil horizon and it is mixed with other soil horizons or otherwise lost during excavation and backfilling.

Because the soils at the project site are not native soils, as discussed under *Soil Hazards*, there would be no loss of topsoil. With respect to loss of topsoil, there would be ***no impact***.

As discussed in Section 4.N, *Hydrology and Water Quality*, project construction activities such as new building construction, rehabilitation of existing facilities, paving for parking lots, cut-and-fill activities, grading and excavation, and landscaping could increase erosion. However, all project construction activities would be subject to existing regulatory requirements. Because land disturbance associated with the proposed project would be more than 1 acre, coverage under the Construction General Permit would be required, including development of and compliance with a SWPPP. BMPs implemented in the SWPPP would include a range of stormwater control BMPs (e.g., installing erosion control features, such as silt fences, staked straw wattles, and geofabric, to prevent silt runoff to storm drains or waterways). Soils and backfill would be stockpiled, protected, and replaced at the conclusion of construction activities. Disturbed soil would be revegetated as soon as possible with the appropriate selection and schedule for turf, plants, and other landscape vegetation. No disturbed surfaces would be left without erosion control measures in place during the wet season, which generally occurs between October 1 and April 30. In addition, coverage under the Construction General Permit typically covers dewatering activities, which would be required during project construction to accommodate excavation for foundations that would extend below groundwater. Implementation of a SWPPP, as required by law, would reduce this impact to a ***less-than-significant*** *level*.

Impact GE-3. The project would not be located on geologic unit or soil that is unstable or would become unstable and potentially result in lateral spreading, subsidence, liquefaction, or collapse. (Less than Significant)

Collapse is likely when there is an underground void, such as an abandoned mine or utility vault, or weak rock, such as karst limestone. Because underground voids or weak rocks are not present at the project site, there would be no risk of collapse.

The potential for settlement on the undisturbed project site is small, approximately only 1 inch. However, other factors can increase the potential magnitude of settlement, such as liquefaction. At the project site, as discussed above under *Liquefaction and Other Seismically Induced Ground Failure*, the project site is vulnerable to seismically induced liquefaction. Because the liquefiable layers are discontinuous and random across the site, there would be variability in the magnitude of potential liquefaction-induced settlement across the project site if a load were to be placed on the soil. Specifically, under the proposed project, there is potential for seismically induced settlement of 1 to 5 inches. Further, in locations where there is a liquefiable layer between the surface soil and underlying soil on a slope, the surface soil may be transported downslope, initiated by either seismic or gravitational forces, in a phenomenon referred to as lateral spreading. As discussed above under *Lateral Spreading* and in the preliminary geotechnical study prepared for the proposed project, some soil layers in the 40-foot-thick fill layer at the project site have this characteristic and, accordingly, lateral spread potential of approximately 4 feet if the existing seawall limits the lateral spread flow or movement.[91] However, the magnitude of lateral spreading that the seawall could contain is unknown. As discussed under *Lateral Spreading* in the *Regional Faulting and Seismic Hazards* section, above, lateral spreading at the project site could be rotational in nature, leading to a progressive failure that could affect an area as far away as 110 feet west of the seawall.[92] Therefore, the potential for lateral spreading under the proposed project is substantial. However, as discussed under Impact GE-1b, the proposed project would comply with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC, which requires a geotechnical report to be prepared that addresses ground stability and improvements. The geotechnical report would include recommendations for foundation support and ground improvement. Recommendations for ground improvement at the shoreline could include deep dynamic compaction and/or stone column installation to minimize the potential for liquefaction and lateral spreading.[93,94] If deep dynamic compaction is used, uneven compaction of the ground surface and a corresponding

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[91] Treadwell & Rollo. 2013. *Liquefaction and Lateral Spread Potential at Seawall Lot 337*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, CA. (Project No. 750604203.) December 23.

[92] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

[93] Treadwell & Rollo. 2013. *Liquefaction and Lateral Spread Potential at Seawall Lot 337*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, CA. (Project No. 750604203.) December 23.

[94] Compaction grouting and rapid impact compaction for the shoreline were considered in the liquefaction and lateral spread investigation but both were rejected for this site (Treadwell & Rollo 2013, *Liquefaction and Lateral Spread Potential at Seawall 337*). The grout injection process was rejected because there is too little overburden (soil weight) to resist heave, including periods during the grout injection process, which involves high injection pressures. The rapid impact compaction process was rejected because the process has shown only moderate success in improving the ground and mitigating for liquefaction and lateral spreading potential in Mission Bay.

need for regrading are likely to result. Installations of stone columns could result in heave or settlement and a corresponding need for regrading. The use of lightweight geofoam as new fill could be recommended. Recommendations for ground improvement at Pier 48 could include stone columns and deep soil mixing.[95] The ground should be improved to a minimum distance of 35 to 50 feet below ground surface. The stone columns and deep soil mixing should extend at least 3 feet into the Bay Mud and span the width of Pier 48. Similar to the shoreline, installations of stone columns could result in heave or settlement and a corresponding need for regrading.

The preliminary geotechnical reports prepared for the proposed project did not identify any seismic or geologic hazards that are unique to the project site or otherwise uncharacteristic of the project area that cannot be minimized by compliance with standard building code requirements. Therefore, the impact would be ***less than significant***. No mitigation is required.

Impact GE-4. The project would not create substantial risks to life or property through location on expansive or corrosive soil. (Less than Significant)

As discussed under *Soil Hazards*, expansive soils undergo significant volume changes when moisture content changes, which could occur as site conditions are altered by excavation and construction activities. Fill at the project site is not expansive, and the underlying Bay Mud at the project site, although expansive, is not subject to expansion/contraction because it is under the groundwater level and therefore not subject to moisture changes. The risk to structures from construction on expansive soils at the project site is low.

As stated above under *Soil Hazards*, fill at the project site is moderately to severely corrosive, and the Bay Mud at the site is severely corrosive. Chapter 18 and 18A of the 2016 CBC relate to Soils and Foundations. In particular, Section 1803 addresses the purpose, scope, and content of geotechnical investigations, including when a report is required as well as the qualifications for report preparers and reviewers. Section 1808 specifies design criteria for foundations. In addition to Section 1808, shallow foundations shall also comply with the criteria in Section 1809 and deep foundations shall also comply with the criteria in Section 1810. Geotechnical investigations provide design criteria that minimize impacts associated with expansive or corrosive soils. The proposed project would be constructed in phases that may involve other developers. The project sponsor, or subsequent developer, would be required to prepare design-level geotechnical reports, including a soils report, for each phase of the proposed project in accordance with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC requirements and implement the project-specific recommendations contained therein. During the final design, development of individual blocks and foundation recommendations, which may involve further geotechnical exploration, would be required. For

[95] Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48*. Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.

high-rise structures, a unique foundation recommendation report would be required for each building. The design-level geotechnical reports would be subject to review and approval by the Port in order to secure project building permits. The soils report would include recommendations for the treatment of site-specific soils hazards, including corrosive soils.

The proposed project would result in modifications to soils at the project site. The modifications would be associated with site clearing, excavation, grading, paving, and backfilling. Further modifications to the soils would result from implementation of the recommendations in the site-specific soils report. These could include admixtures[96] to minimize corrosivity. Implementation of the project would not cause or worsen the risks associated with expansive or corrosive soils. Therefore, project implementation would not exacerbate risks to life or property due to expansive or corrosive soils compared to existing conditions. The impact would be ***less than significant***. No mitigation is required.

Impact GE-5. The project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. (Less than Significant with Mitigation)

As discussed above, the project site is underlain by artificial fill and sedimentary deposits. No unique geologic features exist at the ground surface at the project site, and there would be no impact related to such resources. The project site is blanketed by approximately 10 to 40 feet of artificial fill, consisting of brick, rock, concrete, debris, gravel, and sand. The artificial fill is underlain by 37 to 47 feet of weak, soft to medium-stiff, compressible Younger Bay Mud. The Younger Bay Mud is underlain by the Colma Formation, which has high paleontological sensitivity. At the project site, borings found that the fill and Younger Bay Mud are underlain by up to 20 feet of Colma Formation of Pleistocene age in some locations and by 60 to 80 feet of Old Bay Clay of Pleistocene age.[97,98,99]

Project activities would involve excavation to a depth of 33 feet for the garage, on-land pile driving to an average depth of 230 feet for the steel piles for buildings and a maximum depth of 145 feet for the steel piles for streets and the promenade and boardwalk at China Basin Park, and in-water vibratory hammer driving to an approximate depth of 120 feet for the steel-cased concrete-filled piles. The soil would then be removed by drilling, and the steel pile casings would be filled with reinforced concrete.

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[96] Chemical admixtures are the ingredients added to soil or concrete to modify the properties of the material.

[97] Treadwell & Rollo. 2001. *Pier 48 Foundation Evaluation, San Francisco, California*. Log of Boring B-2.

[98] Treadwell & Rollo. 2001. *Pier 48 Foundation Evaluation, San Francisco, California*. Log of Boring B-3.

[99] Simpson, L.A., and G.E. Treadwell & Rollo Inc. 2006. Case Studies in Mission Bay, San Francisco: Deep Foundations in Challenging Soil Conditions. In D*FI Proceedings of the 31st Annual Conference on Deep Foundations*. Washington, D.C.

The potential to affect fossils varies with the depth of disturbance and previous disturbance. The logistics of excavation also affect the possibility of recovering scientifically significant fossils because information regarding location, vertical elevation, geologic unit of origin, and other aspects of context is critical to the significance of any paleontological discovery.

The Colma Formation has high paleontological sensitivity and could contain vertebrate fossils. As discussed under *Paleontological Setting*, the Colma Formation at the project site extends from approximately 60 to 80 feet below the ground surface. The Franciscan Formation also has high paleontological sensitivity and could contain vertebrate fossils. As discussed under *Paleontological Setting*, the Franciscan Formation at the project site extends from approximately 160 to 260 feet below the ground surface. Drilling and pile driving to an average depth of 230 feet for the proposed buildings and a maximum depth of 145 feet for streets and the promenade and boardwalk at China Basin Park could affect both geologic units, which could contain significant paleontological remains or traces of paleontological remains.

This constitutes a significant impact. Implementation of Mitigation Measure M-GE-5 would reduce the impact to ***less than significant with mitigation***.

MITIGATION MEASURE. Drilling and pile driving would not result in destruction of significant paleontological resources with incorporation of Mitigation Measure M-GE-5, Accidental Discovery of Paleontological Resources, which calls for training for construction crews to recognize paleontological resources by a qualified paleontologist, stopping work in case of discovering such resources, evaluation of those resources by a qualified paleontologist and, as appropriate, preparation and implementation of a recovery plan. With implementation of this mitigation measure, this impact would be ***less than significant***.

M-GE-5: Accidental Discovery of Paleontological Resource

Given the potential for paleontological resources to be present at the project site at excavation depths within the Colma Formation, the following measures shall be undertaken to avoid any significant adverse effect from the proposed project on paleontological resources. Before the start of any drilling or pile-driving activities, the project sponsor shall retain a qualified paleontologist, as defined by the SVP, who is experienced in teaching non-specialists. The qualified paleontologist shall train all construction personnel who are involved with earthmoving activities, including the site superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils that are likely to be seen during construction, and proper notification procedures should fossils be encountered. Procedures to be conveyed to workers include halting construction within 50 feet of any potential fossil find and notifying a qualified paleontologist, who shall evaluate the significance.

If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work near the find and notify the project sponsor and the San Francisco Planning Department. Construction work in the affected areas shall remain stopped or be diverted to allow recovery of fossil remains in a timely manner. The project sponsor shall retain a qualified paleontologist to evaluate the resource and prepare a recovery plan in accordance with SVP guidelines.[100] The recovery plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan that are determined by the San Francisco Planning Department to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered. The San Francisco Planning Department shall be responsible for ensuring that the monitor's recommendations regarding treatment and reporting are implemented.

CUMULATIVE IMPACTS

Impact C-GE-1. The proposed project, in combination with other development within the city, would not substantially increase the risk of exposure for people or structures to seismic hazards. (Less than Significant)

The study area for analyzing seismic effects is the region. The proposed project would not increase the likelihood of surface fault rupture or the intensity of seismic ground shaking, nor would other proposed development within the city. Although the proposed project would increase the likelihood of liquefaction, lateral spreading, and other ground-failure effects, the effects would not cause ground failure in other parts of the city and would not directly affect other projects.

If the proposed project and other development in the city were not properly designed, the projects would create an urban landscape that would be vulnerable to ground failure. However, construction in California is strictly regulated by the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and CBC, as adopted and enforced by each jurisdiction/authority, including the City and County of San Francisco and the Port, to reduce risks from seismic events to the maximum extent possible. Restrictions on development would be applied in the event that geological or soil conditions pose a risk as a result of site-specific susceptibility to ground failure. Because the City and County of San Francisco and the Port use and enforce the

[100] Society of Vertebrate Paleontology. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.* Impact Mitigation Guidelines Revision Committee. Available: http://vertpaleo.org/The-Society/Governance-Documents/SVP_Impact_Mitigation_Guidelines.aspx. Accessed: April 8, 2016.

requirements of the CBC as part of their respective building codes, new buildings and facilities in the project area would be required to be sited and designed in accordance with the most current geotechnical and seismic guidelines and recommendations. The proposed project and other development projects would implement all necessary design features recommended by site-specific geotechnical studies, as required for all development applications, to reduce the risk from seismic activity, unstable slopes, and soil limitations, as required by law. Therefore, cumulative impacts related to seismic hazards would be ***less than significant***.

Impact C-GE-2. The proposed project, in combination with other development within the city, would not substantially increase soil erosion potential. (Less than Significant)

Because erosion and corresponding sedimentation are processes that operate on the watershed level, the study area for erosion impacts for the proposed project is the Mission Bay watershed (see Section 4.N, *Hydrology and Water Quality*). The Mission Bay watershed is considered already built out. Consequently, potential growth would most likely occur as redevelopment and not extensive new development on vacant land or open space. Nonetheless, construction and operation of reasonably foreseeable projects could expose soil surfaces and alter soil conditions. To minimize the potential for cumulatively considerable erosion, all reasonably foreseeable projects would be required to conform to the provisions of applicable local ordinances and state regulations pertaining to erosion and sedimentation control, including the federal and state NPDES program and BMPs in site-specific SWPPPs. Therefore, cumulative impacts related to soil erosion would be ***less than significant***.

Impact C-GE-3. The proposed project, in combination with other development within the city, would not substantially increase soil hazards. (Less than Significant)

The study area for the analysis of impacts on development from hazardous soil conditions, specifically expansive and corrosive soils, is limited to the project site. The proposed project would not increase the expansive or corrosive properties of the soils that are present at the project site, nor would other proposed development within the city affect the project site. Further, development is required to undergo an analysis of geological and soil conditions that is applicable to the specific individual project. Restrictions on development would be applied in the event that geological or soil conditions pose a risk as a result of site-specific soil hazards. Because the City and County of San Francisco and Port use and enforce the requirements of the CBC as part of their respective building codes, new buildings and facilities in the project area would be required to be sited and designed in accordance with the most current geotechnical guidelines and recommendations. Proposed projects would include all necessary design features, as recommended by the site-specific geotechnical studies, to reduce the risk from seismic activity, unstable slopes, and soil limitations, as required by law. With adherence to the building code and related plans, regulations, and design and engineering guidelines and practices, cumulative impacts related to soil hazards would be ***less than significant***.

Impact C-GE-4. The proposed project, in combination with other development within the city, could result in impacts to paleontological resources. However, the project's contribution would be less than cumulatively considerable. (Less than Significant with Mitigation)

The study area for cumulative impacts on paleontological resources is defined for the proposed project as the San Francisco area, Mission Bay, and San Francisco Bay. In this area, construction activities associated with the proposed project could disturb or destroy paleontological resources that may exist in the study area, thereby contributing to the progressive loss of such resources. Cumulative growth and development in the city could have impacts if important paleontological resources are found during construction activities. Although the potential for other individual projects to affect important paleontological resources is unknown, given the number of projects in the city, it is probable that cumulative growth and development could have impacts on important paleontological resources. Cumulative impacts could be significant. However, Mitigation Measure M-GE-5, Accidental Discovery of Paleontological Resource, would reduce potential impacts to a less-than-significant level. Therefore, although cumulative development impacts related to paleontological resources would be considered significant, the incremental effects of the proposed project, after mitigation, would not be cumulatively considerable.

4.N HYDROLOGY AND WATER QUALITY

This section describes the regulatory and environmental setting for hydrology and water quality. It also describes impacts on hydrology and water quality that would result from implementation of the Seawall Lot 337 and Pier 48 Mixed-Use Project (Mission Rock Project or proposed project) and mitigation measures that would reduce these impacts.

Issues identified in response to the notice of preparation (NOP) (Appendix 1) were considered in preparing this analysis. Applicable issues that were identified include potential impacts related to sea-level rise (SLR), flood inundation, and contaminated runoff.

ENVIRONMENTAL SETTING

CLIMATE AND PHYSIOGRAPHY

The project site has a Mediterranean climate, characterized by dry, cool summers and mild and moderately wet winters. The city receives, on average, approximately 21.14 inches of rainfall per year,[1] with most occurring from November through March and accounting for more than 80 percent of the total.[2] Within the project vicinity, there are minimal topographic features, and the grading is generally flat. The majority of the site is currently a large surface parking area, encompassing Pier 48, which is built on landfill along San Francisco Bay (Bay).[3] The project site has existing grades that vary in elevation from 8.3 to 11.8 feet NAVD88 Datum[4]; however, the majority of the proposed development footprint is at about 10.3 feet NAVD88, or about 4.7 feet above the mean high water (MHW) elevation of 5.61 feet (NAVD88). Prior to filling during the early part of the 20th century, the project site historically was open water, part of Mission Bay.[5]

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1 Western Regional Climate Center. n.d. *San Francisco, Mission Dolores, California Monthly Total Precipitation (inches) (047772).* Available: www.wrcc.dri.edu. Accessed: September 16, 2015.

2 Moffat and Nichol. 2011. *Seawall Lot 337 Redevelopment – Waterside Improvements*. M&N Job No: 7530. November.

3 Museum of California. 2008. *San Francisco Historical Creek Map*. Last updated: 2008. Available: http://explore.museumca.org/creeks/SFTopoCreeks.html. Accessed: October 26, 2015.

4 BKF Engineers, Surveyors, Planners. 2011. *Sea Wall 337 Infrastructure Analysis*. September 14.

5 Moffat and Nichol. 2011. *Seawall Lot 337 Redevelopment – Waterside Improvements.* M&N Job No: 7530. November.

SURFACE WATER HYDROLOGY

The project site is located within the Mission Creek subwatershed of the larger Lower San Francisco Bay watershed,[6] in an area known as China Basin. The project site is southeast of China Basin, in the area where Mission Creek meets San Francisco Bay. Although no natural surface waters go through the project site, it is bordered by major surface waters (i.e., Mission Creek to the north and San Francisco Bay to the east).

Upstream of where Interstate 280 crosses it, Mission Creek is culverted beneath urban development. Before urbanization, it was once a creek that was formed when several smaller creeks converged. It was also part of a large salt marsh and lagoon. Later, the area was filled and the creek was culverted.[7]

EXISTING DRAINAGE PATTERNS ON THE PROJECT SITE

Prior to industrialization, a large portion of stormwater flow in San Francisco percolated into the ground, while the remaining water ran off to local creeks and streams, eventually flowing to the ocean or the Bay. San Francisco's development altered the natural landscape of many of the city's drainage basins. Mission Bay and the surrounding wetlands were filled, and contributing creeks and streams were put into pipes and covered. Because of reduced percolation and the infill of wetlands and streams, stormwater in most of the city is now collected in the city's combined sewer system or in a separated stormwater system, depending on the location in the city, instead of draining overland to a creek or the Bay.

The project site is generally flat and paved. The existing storm drain infrastructure within the vicinity of the project site has a separated storm sewer system to the west, south, and east and two separate outfalls that drain to the Bay.[8] However, some stormwater from the site is collected by a combined storm drain system in the Mission Bay area, with the stormwater system on Third Street currently discharging into the combined system and with surface runoff generated at Pier 48 directly or indirectly discharging to the Bay.[9] The combined system is discussed further in Section 4.K, *Utilities and Service Systems.*

The west side of the project site is served by an existing storm drain system within Third Street. This system will be routed to future Mission Bay Stormwater Pump Station No. 3 for discharge to Mission Creek. Until Stormwater Pump Station No. 3 is constructed, runoff will discharge to

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[6] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Originally published January 18, 2007. Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

[7] Museum of California. 2008. *San Francisco Historical Creek Map.* Last updated: 2008. Available: http://explore.museumca.org/creeks/SFTopoCreeks.html. Accessed: October 26, 2015.

[8] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

[9] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock DEIR Hydrology Description Memorandum*. October 13.

an existing 11- by 11-foot combined sewer (Figure 4.N-1, page 4.N-4). The realigned Mission Rock Street has a new storm drain system that conveys stormwater to Mission Bay Stormwater Pump Station No. 6 to the south, which discharges to the Bay adjacent to the Radiance Development. Both China Basin Park and Terry A. Francois Boulevard have storm drain systems that discharge directly to the Bay through existing outfalls.[10]

The project site is located in the Bayside drainage basin. A San Francisco Public Utilities Commission (SFPUC) sewage and stormwater pumping station is present at the west end of Mission Creek.[11] A combination of Port of San Francisco (Port) and SFPUC sanitary, storm, and combined sanitary-storm sewers exist in the public rights-of-way adjacent to the project site. Portions of the project area are under Port jurisdiction, such as Seawall Lot 337; however, stormwater is conveyed to the Mission Bay separated system under SFPUC jurisdiction. Figure 4.N-1 shows the four drainage areas and the jurisdiction of their respective drains.

GROUNDWATER HYDROLOGY

San Francisco overlies all or part of seven unadjudicated groundwater basins. These groundwater basins include the Westside, Lobos, Marina, Downtown San Francisco, Islais Valley, South, and Visitation Valley basins. The Lobos, Marina, Downtown San Francisco, and South Basins are located wholly within city limits, while the remaining three extend south into San Mateo County.[12] The project site is situated above the Downtown San Francisco groundwater basin (ID 2-40).[13] The Downtown San Francisco groundwater basin is located in the northeastern portion of the San Francisco peninsula. It is one of five basins in the eastern part of the city, each separated from the other by bedrock ridges. The groundwater basin is made up of shallow, unconsolidated alluvium that is underlain by less permeable bedrock within the watershed located east and northeast of the Twin Peaks area, including Nob Hill and Telegraph Hill to the north and Potrero Point to the east as well as most of the downtown area. Bedrock outcrops along much of the ridge form the northeastern and southern basin boundaries. In general, groundwater flow is toward the northeast and the San Francisco Bay, following the downward slope of the topography.

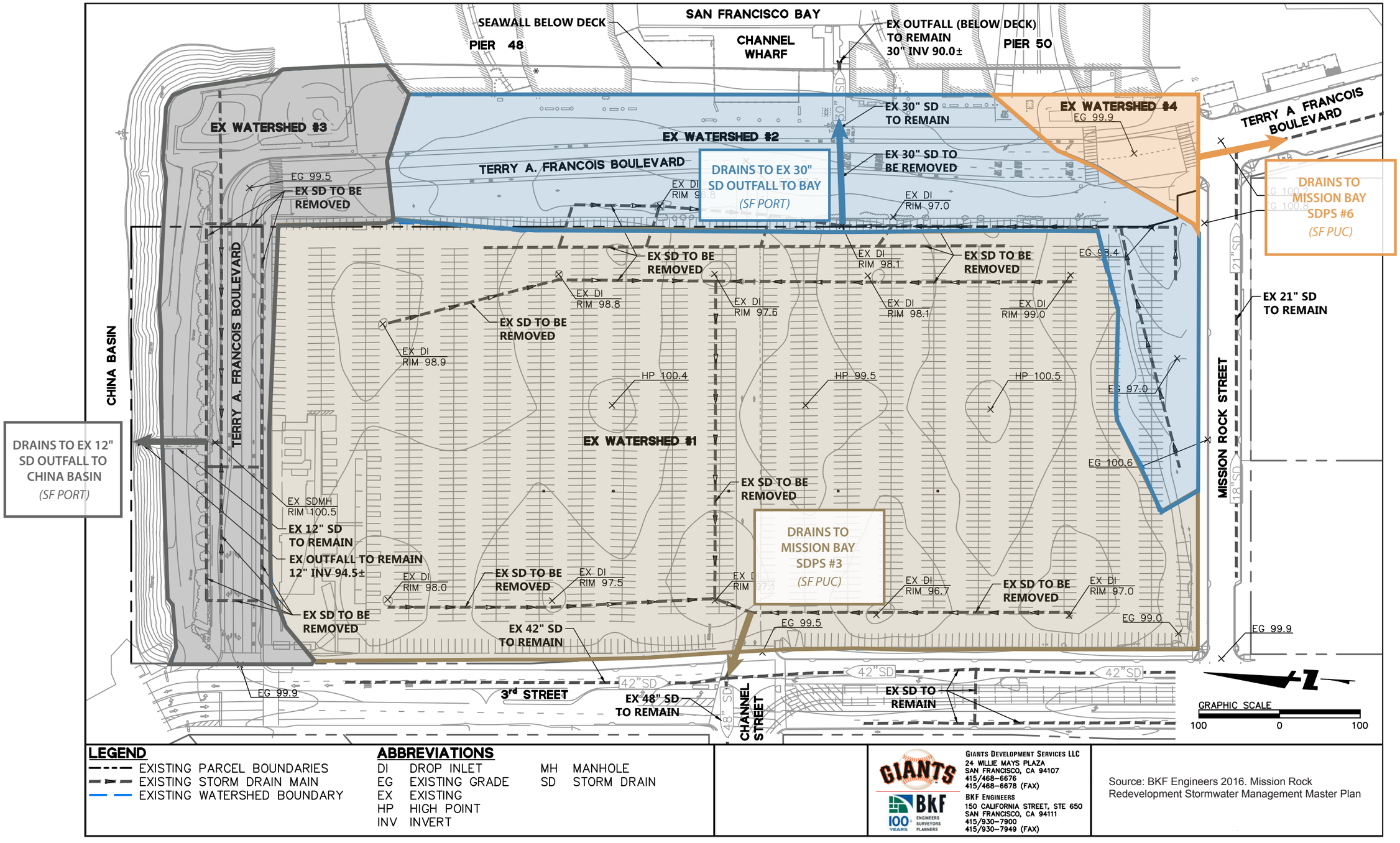
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[10] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock DEIR Hydrology Description Memorandum*. October 13.

[11] Wijsman, P., J. LaClair. 2013. Adapting to Rising Tides: Mission Creek San Francisco, California. June, 25.

[12] San Francisco Public Utilities Commission. 2016. *2015 Urban Water Management Plan for the City and County of San Francisco.* June. Available: http://sfwater.org/modules/showdocument.aspx?documentid=9300. Accessed: September 27, 2016.

[13] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.



LEGEND

- EXISTING PARCEL BOUNDARIES
- EXISTING STORM DRAIN MAIN
- EXISTING WATERSHED BOUNDARY

ABBREVIATIONS

DI	DROP INLET	MH	MANHOLE
EG	EXISTING GRADE	SD	STORM DRAIN
EX	EXISTING		
HP	HIGH POINT		
INV	INVERT		

GIANTS DEVELOPMENT SERVICES LLC
24 WILLIE MAYS PLAZA
SAN FRANCISCO, CA 94107
415/468-6676
415/468-6678 (FAX)

BKF ENGINEERS
150 CALIFORNIA STREET, STE 650
SAN FRANCISCO, CA 94111
415/930-7900
415/930-7949 (FAX)

Source: BKF Engineers 2016. Mission Rock Redevelopment Stormwater Management Master Plan

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.N-1
Existing Drainage Plan

Groundwater recharge to the groundwater basin occurs from infiltration of rainfall, landscape irrigation, and leakage of water and sewer pipes. Recharge to the Downtown San Francisco groundwater basin has been estimated to be 5,900 acre-feet per year.[14] Recharge due to leakage from municipal water and sewer pipes accounts for about half of the total recharge of groundwater in the San Francisco area.[15] Groundwater in the Downtown San Francisco groundwater basin is not currently used for water supply, nor do plans exist for this basin to be used for future water supply.

WATER AND SEDIMENT QUALITY

SAN FRANCISCO BAY AREA

As described under *Section 303 – Impaired Waters*, impaired water bodies are defined as those water bodies that do not meet water quality standards. The proposed project would be located along Mission Creek and Lower San Francisco Bay, which extends from approximately the Bay Bridge on the north to the Dumbarton Bridge on the south. The Regional Water Quality Control Board (Regional Water Board) has listed Mission Creek as an impaired water body for ammonia, chlordane (sediment), dieldrin (sediment), hydrogen sulfide, lead (sediment), polycyclic aromatic hydrocarbons (PAH) (sediment), polychlorinated biphenyls (PCBs), silver (sediment), and zinc (sediment). San Francisco Bay[16] is listed as an impaired water body for chlordane, dichlorodiphenyltrichloroethane (DDT), dieldrin, dioxin compounds, furan compounds, invasive species, mercury, PCBs (including dioxin-like compounds), selenium, and trash.

SURFACE WATER

Water quality in a typical surface water body is influenced by processes and activities that take place within the watershed. The quality of the stormwater runoff from the project site and surrounding development is typical of urban watersheds where water quality is affected primarily by discharges from both point and nonpoint sources. Point-source discharges are discharges that one can point to as known sources of pollutants, while nonpoint source discharges generally result from diffuse sources, such as land runoff, precipitation, or seepage. Point and nonpoint sources include outfalls, winter storms, overland flow, exposed soil, roofs, parking lots, and streets. Water quality in the vicinity of the proposed project is directly affected

[14] California Department of Water Resources. 2004. California's Groundwater Bulletin 118, San Francisco Hydrologic Region, Downtown San Francisco Groundwater Basin. February 27.

[15] California Department of Water Resources. 2004. California's Groundwater Bulletin 118, San Francisco Hydrologic Region, Downtown San Francisco Groundwater Basin. February 27.

[16] This section of the Bay is known as Central San Francisco Bay, as defined by the State Water Resources Control Board for the 2012 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report). Central San Francisco Bay extends from approximately Oakland International Airport and Hunters Point on the south to San Pablo Bay on the north.

by stormwater runoff from adjacent streets and properties that deliver fertilizers, pesticides, automobile and traffic pollutants (e.g., oil, grease, metals), sediment with associated pollutants from soil erosion, trash, and other pollutants.

The San Francisco Bay Basin Plan (Basin Plan)[17] specifies the beneficial uses that apply to the project area, as shown in Table 4.N-1, below. Beneficial uses form the cornerstone of water quality protection under the Basin Plan. Once beneficial uses are designated, appropriate water quality objectives can be established, and programs that maintain or enhance water quality can be implemented to ensure the protection of beneficial uses. The designated beneficial uses, together with water quality objectives, form water quality standards.

TABLE 4.N-1. BENEFICIAL USES OF SURFACE WATERS WITHIN THE PROJECT VICINITY

Water Body	Beneficial Uses
Lower San Francisco Bay	Industrial service water supply (IND), commercial and sport fishing (COMM), shell fish harvesting (SHELL), estuarine habitat (EST), fish migration (MIGR), preservation of rare and endangered species (RARE), fish spawning (SPWN), wildlife habitat (WILD), water contact recreation (REC-1), noncontact water recreation (REC-2), navigation (NAV)
Mission Creek	Commercial and sport fishing (COMM), estuarine habitat (EST), wildlife habitat (WILD), water contact recreation (REC-1), noncontact water recreation (REC-2), navigation (NAV)

Source: San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: April 18, 2016.

Constituents or pollutants in stormwater runoff vary with surrounding land uses, impervious surface area, and topography as well as with the intensity and frequency of rainfall or irrigation. Stormwater runoff generated at the onset of the wet season, or the "first-flush," typically contains the highest pollutant concentrations. The project site is located within a developed area of the city where the majority of the ground surface is covered by pavement (roads and parking lots) and structures (office, commercial, and residential). Street surfaces are the primary source of pollutants in stormwater runoff in urban areas. Common sources of stormwater pollution in the project vicinity include construction sites, parking lots, large landscaped areas, and household and industrial sites. Grading and earthmoving activities associated with new construction can accelerate soil erosion. Grease, oil, hydrocarbons, and metals deposited by vehicles and heavy equipment can accumulate on streets and paved parking lots. From there, they are carried into storm drains by runoff. PCBs are also listed as Clean Water Act Section

[17] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

303(d) impairments in the Lower San Francisco Bay. PCBs can be found in automobile engines and other sources that are common in urban areas. Pesticides, herbicides, fungicides, and fertilizers that are used for landscape maintenance can be washed into storm drains when irrigation exceeds the rate of soil infiltration and plant uptake or when the chemicals are applied in excess.

As shown in Table 4.N-2 on the following page, pesticides chlordane, dieldrin, and DDT, which is no longer permitted for use, are listed as 303(d) impairments in Mission Creek and San Francisco Bay. Paints, solvents, soap products, and other toxic materials may be inadvertently or deliberately deposited in storm drains in residential and industrial areas. Trash, as well as some metals, including lead, zinc, mercury, and silver, are also listed as 303(d) impairments. Trash can threaten aquatic life and recreational beneficial uses, as designated by the Basin Plan. Trash and litter can collect in storm drain inlets and ultimately be discharged into nearby waterways. The University of California, San Francisco (UCSF) Medical Center, which is committed to reducing the amount of medical waste, follows the guidelines of the UCSF Medical Waste Management Plan. Medical waste produced from research laboratory operations and clinical and patient care activities is subject to strict state requirements, including the California Medical Waste Management Act. Medical waste is treated onsite or steam sterilized and, therefore, would not be a threat to water quality.

SEDIMENT

Suspended sediments and turbidity, terms that are often used interchangeably, are key components of the estuarine system. The term "suspended sediments" refers to the actual sediment component in the water column. "Turbidity" refers to a number of different suspended particulates, including plankton and sediments. Most nearshore environments, particularly estuaries, tend to have higher levels of turbidity or suspended sediment loads than environments located farther off-shore because of discharges from rivers, drainages, and the relative shallow nature of the environment. Sediments in shallow regions of the estuary are highly susceptible to resuspension from wind, tides, and freshwater flows as well as subsequent advection to deeper channels of the Bay.[18]

Several groups, including the San Francisco Estuary Institute (SFEI) and the U.S. Geological Survey (USGS), have monitored suspended sediment loads throughout San Francisco Bay for many years and found that suspended sediment concentrations in the Bay tend to be highly variable and strongly correlated to season and water depth. Suspended sediment concentrations can range from well over 1,000 milligrams per liter (mg/l) near the bottom to as little as 10 mg/l

[18] Buchanan, P.A., and D.H. Schoellhamer. 1996. *Summary of Suspended-Solids Concentration Data, San Francisco Bay, California, Water Year 1995.* U.S. Geological Survey, Open File Report 96-591.

TABLE 4.N-2. 303(D) LISTED WATER BODIES IN THE PROJECT AREA

Water Body	Pollutant	Expected TMDL Completion Date
Mission Creek	Ammonia	2019
	Chlordane (sediment)	2013
	Dieldrin (sediment)	2013
	Hydrogen sulfide	2019
	Lead (sediment)	2019
	Mercury (sediment)	2019
	PAH (sediment)	2019
	PCBs (sediment)	2008
	Silver (sediment)	2019
	Zinc (sediment)	2019
Central San Francisco Bay	Chlordane	2013
	DDT	2013
	Dieldrin	2013
	Dioxin compounds (including 2,3,7,8-TCDD)	2019
	Furan compounds	2019
	Invasive species	2019
	Mercury[1]	
	PCBs	2008
	PCBs (dioxin-like compounds)	2008
	Selenium	2010
	Trash	2021

TMDL = total maximum daily load; EPA = U.S. Environmental Protection Agency

PAH = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; DDT = dichlorodiphenyltrichloroethane

[1] The EPA approved the mercury TMDL on February 29, 2008. Potential Sources of mercury in Central San Francisco Bay are atmospheric deposition, industrial point sources, municipal point sources, natural sources, nonpoint sources, and resource extraction.

Source: State Water Resources Control Board *2012 Integrated Report* (Clean Water Act Section 303(d) List/305(b) Report). Last updated: 2015. Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml. Accessed: February 1, 2017.

in near-surface measurements.[19] Water depths along the San Francisco waterfront and piers are relatively shallow. Suspended sediment loads are strongly influenced by nearshore discharges and wind- and wave-generated sediment disruption, similar to the higher sediment concentrations found near the bottom of the Bay or in other shallow environments.

The only data available on the quality of the sediment within Piers 48 and 50 were collected by the Port of San Francisco in 1990 and 1998 to characterize sediment proposed for dredging. Results from these investigations exhibited metal concentrations in sediment samples that were generally comparable to Bay ambient conditions. In comparison to current regional criteria, only mercury concentrations exceeded the essential fish habitat bioaccumulation trigger of 0.33 milligram per kilogram (mg/kg) but were lower than the total maximum daily load (TMDL) of 0.47 mg/kg.[20] All organic analytes (e.g. PAHs, PCBs, and pesticides) were either not detected or lower than any regional criteria. Biological toxicity test results confirmed that chemicals were not at concentrations that would cause unacceptable adverse environmental impacts. This previous sediment characterization effort was for sediment that has since been dredged from the area and disposed of at an approved location. The sediments currently located in the vicinity of Pier 48 may contain higher or lower concentrations of contaminants. No data for existing sediment quality in the vicinity of Pier 48 are available.

GROUNDWATER

In general, groundwater quality throughout most of the region is suitable for most urban and agricultural uses, with only local impairments. The primary constituents of concern are high total dissolved solids, nitrate, boron, and organic compounds.[21] Although there is no published groundwater quality information available for the Downtown San Francisco basin, limited water quality data for the surrounding basins are available and show that the general character of groundwater for all basins beneath the entire San Francisco peninsula is similar. Groundwater beneath the San Francisco peninsula has high mineral content and is considered generally "hard." It also has high concentrations of iron and manganese [22] Elevated concentrations of nitrate and chloride are common, especially at shallower depths.[23]

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[19] Buchanan, P.A., and T.L. Morgan. 2014. *Summary of Suspended-Sediment Concentration Data, San Francisco Bay, California, Water Year 2010*. Data Series 808.

[20] Anchor Environmental CA, L.P. (Anchor). 2003. *Port of San Francisco Dredging Support Program – Programmatic Sampling and Analysis Plan.* San Francisco, CA.

[21] California Department of Water Resources. 2003. *California's Groundwater Bulletin 118, Update 2003, San Francisco Bay Hydrologic Region*. Available: http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003_/bulletin118_2-sf.pdf. Accessed: August 31, 2015.

[22] California Department of Water Resources. 2003. *California's Groundwater Bulletin 118, Update 2003, San Francisco Bay Hydrologic Region.* Available: http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003_/bulletin118_2-sf.pdf. Accessed: August 31, 2015.

[23] California Department of Water Resources. 2004. *California's Groundwater Bulletin 118, San Francisco Hydrologic Region, Downtown San Francisco Groundwater Basin*. February 27.

High concentrations of nitrates and elevated chloride, boron, and total dissolved solids concentrations are typically found in groundwater within the Downtown San Francisco basin. Groundwater recharge from sewer pipe leakage and possibly fertilizer introduced by irrigation return flows may account for high nitrate levels. Elevated chloride and total dissolved solids levels are most likely due to a combination of leaky sewer pipes, historic and current seawater intrusion, and geologically confined water.[24] In addition, improperly abandoned wells or leaking underground storage tanks (LUSTs) also have the potential to contaminate groundwater supplies. Groundwater contamination can also be the result of historical industrial activities. From around 1900 to the 1940s, the project site was an active rail yard[25]; thus, the potential exists for contamination to be present in the groundwater beneath the project site. Historical rail use and other activities are discussed further in Section 4.D, *Cultural Resources*.

The Site History Report found that residual contamination from historical uses or imported fill material is present on the project site.[26] Because there had been no change in land use at the project site since the 1999 subsurface investigation, the San Francisco Department of Public Health (SFDPH) determined that concentrations of residual contamination in soil and/or groundwater at the project site are limited to low levels of volatile organic compounds (VOCs), PAHS, and heavy metals and that no new subsurface investigations are required for the proposed project. However, SFDPH does require preparation and implementation of an approved Site Mitigation Report prior to commencement of construction and earthwork activities. The Site Mitigation Report must outline the soil and groundwater handling procedures to be followed in all areas that would be disturbed during construction on the land portion of the project site (i.e., not sediments submerged in the Bay beneath Pier 48).[27] See Section 4.O, *Hazards and Hazardous Materials*, for more information.

Prior operations at the project site resulted in potential groundwater contamination from hazardous substances, including diesel fuel and gasoline, at a number of onsite and nearby locations. Potential releases of total petroleum hydrocarbons as diesel and/or chlorinated solvents from warehouses west of the project site and a roundhouse, which is used for oil storage, south of the project site may have affected groundwater and migrated beneath the project site.[28]

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[24] California Department of Water Resources. 2004. California's Groundwater Bulletin 118, *San Francisco Hydrologic Region, Downtown San Francisco Groundwater Basin.* February 27.

[25] SPUR. 2016. *Mission Creek Sea-Level Rise Adaptation Study*. Waterfront Strategies for Long-Term Urban Resiliency. September. Available: http://www.spur.org/sites/default/files/publications_pdfs/Mission_Creek_Sea_Level_Rise_Adaptation_Study.pdf. Accessed: September 30, 2016.

[26] BASELINE Environmental Consulting. 2014. *Site History Report; Seawall Lot 337/Pier 48 Mixed-Use Project, San Francisco, California*. April 14.

[27] San Francisco Department of Public Health, Environmental Health Branch, Site Assessment and Mitigation. December 22, 2016—letter to Seawall Lot 337 Associates, LLC, regarding Mission Rock, Seawall Lot 337, and Pier 48, San Francisco, CA.

[28] BASELINE Environmental Consulting. 2014. *Site History Report Seawall Lot 337/Pier 48 Mixed-Use Project San Francisco, California.* April.

Two land use covenants between the City and County of San Francisco (City) and the California Department of Toxic Substances Control (DTSC) have been recorded to govern future land use within portions of the project site. All of the project site is subject to the San Francisco Maher Ordinance, but the land use covenants apply to only a portion of the project site. The land use covenants require excavated soils at subject portions of the project site to be evaluated and managed in accordance with the Maher Ordinance. Construction dewatering within areas that would be subject to the covenants would also be prohibited without prior approval from the DTSC. A review of the hazardous soils report suggests that there are "hot spots," or areas of affected soil or groundwater. Groundwater beneath the site was found 10 to 20 feet below ground surface,[29] and dissolved arsenic was found in groundwater at up to 180 micrograms per liter (µg/l). The California drinking water standard for arsenic is 50 µg/l.[30]

Beneficial uses, as designated by the Basin Plan, are identified for the Downtown San Francisco groundwater basin, as follows:[31]

- Municipal and domestic supply (MUN),[32]
- Industrial process supply (PROC),
- Industrial service supply (IND), and
- Agricultural supply (AGR).

Groundwater objectives consist primarily of narrative objectives, combined with a limited number of numerical objectives. The primary groundwater objective is the maintenance of existing high-quality groundwater. At a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances that produce taste and odor in excess of the objectives described in Table 4.N-3 on the following page, unless naturally occurring background concentrations are greater. Under existing law, the San Francisco Bay Regional

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[29] Section 4.M, *Geology and Soils,* section reports that groundwater was encountered between 6.5 and 9 feet below ground surface (Treadwell & Rollo. 2011. *Preliminary Geotechnical Investigation: Seawall Lot 337 – Mission Bay, San Francisco, California.* Prepared for Mission Rock Development. September 8 and Langan Treadwell Rollo. 2014. *Geotechnical Evaluation of Shoreline Conditions at Pier 48.* Mission Rock Development, Seawall Lot 337 and Pier 48, San Francisco, California. (Langan Project No. 750604203.) March 5.). This slight discrepancy does not affect the findings in this analysis.

[30] Department of Toxic Substances Control. 2002. *Hazardous Soils Report – Covenant to Restrict Use of Property Environmental Restriction, H&H Site located at China Basin Channel and Terry A. Francois Boulevard, City and County of San Francisco.*

[31] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Last updated: March 2015. Accessed: August 31, 2015.

[32] Although the downtown basin has MUN as a beneficial use, it is not currently used for MUN water supply because of low yield, contamination, or potential subsidence concerns.

TABLE 4.N-3. WATER QUALITY OBJECTIVES FOR GROUNDWATER IN THE PROJECT AREA

Constituent	Groundwater Quality Objective
Bacteria	Median of the most probable number of coliform organisms over any 7-day period shall be less than 1.1 most probable number per 100 milliliters (MPN/100 mL).
Organic and Inorganic Chemical Constituents	All groundwater shall be maintained free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, shall not contain concentrations of constituents in excess of the maximum contaminant levels (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the provisions of Title 22.
Radioactivity	At a minimum, shall not contain concentrations of radionuclides in excess of the MCLs specified in Table 4 (Radioactivity) of Section 64443 of Title 22.
Taste and Odor	Shall not contain taste- or odor-producing substances in concentrations that cause a nuisance or adversely affect beneficial uses. At a minimum, shall not contain concentrations in excess of the SMCLs specified in Tables 64449-A (Secondary MCLs-Consumer Acceptance Limits) and 64449-B (Secondary MCLs-Ranges) of Section 64449 of Title 22.

Source: San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

Water Board regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards.[33]

FLOODING

100-YEAR FLOOD EVENT

Because the City was not part of the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA) until 2008, there were no regulatory floodplain designations for the city prior to that time. Presently, FEMA is working on producing Flood Insurance Rate Maps (FIRMs) for the city. In the interim, the City has adopted the San Francisco Interim Floodplain Maps (Final Draft July 2008), which are based on preliminary information published by FEMA in 2007. The maps identify Special Flood Hazard

[33] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

Areas (SFHAs). SFHAs are areas that are subject to a 100-year flood, which means that, in any given year, the risk of flooding in the designated area is 1 percent. The 100-year flood event mapped by FEMA is typically referred to as the Base Flood Elevation (BFE) and based on current conditions without considering SLR, which is discussed in the next section. However, the elevation of the BFE was not determined as part of the Interim Floodplain Mapping.

Although the project site is close to low-lying areas along the San Francisco Bay shoreline, the Interim Floodplain Map (Figure 4.N-2 on the following page) indicates that the site is outside of a SFHA. Under current elevations of the project site, which varies from 8.3 to 11.8 feet (NAVD88), flooding may occur at the perimeter of the project site from a 100-year flood event.

San Francisco Bay experiences extreme high tides at various locations, coupled at times with storm surges and wind wave action, which makes it challenging to accurately estimate the 1 percent annual chance event. Although historical tide data have been collected for the area, they do not provide the information necessary for a prediction of extreme water levels, information that would be required to assess flood risk. The U.S. Army Corps of Engineers (USACE) estimates extreme high-tide levels on San Francisco Bay at Pier 22½ to be about 8.66 feet (NAVD88) for the 10-year tide event and 9.16 feet (NAVD88) for the 100-year tide event.[34] More recently, results from FEMA's region-wide mapping efforts in San Francisco Bay[35] indicate an elevation of 9.7 feet (NAVD88) for the noncoastal areas as the 1 percent annual chance event for this area.

FLOODING AS A RESULT OF SEA-LEVEL RISE

Flooding conditions at the project site and along San Francisco's Bay shoreline would be exacerbated with projected SLR due to climate change over the remainder of the century. This section discusses the factors that contribute to coastal flooding and the potential for increased flooding in the future as a result of SLR, assuming that no flood protection measures are implemented.

FACTORS CONTRIBUTING TO COASTAL FLOODING

Coastal areas can be vulnerable to periodic or episodic flooding due to extreme tides, storm surge, storm waves, and El Niño storm events. These conditions can result in many effects, including severe flooding of low-lying areas (e.g., roads, boardwalks, waterfront promenades), storm drain backup, wave damage to coastal structures, and erosion of natural shorelines. Rising sea levels due to climate change have the potential to increase the frequency, severity, and extent of flooding as a result of these conditions, each of which is described below.

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[34] Moffat and Nichol. 2011. *Seawall Lot 337 Redevelopment – Waterside Improvements*. M&N Job No: 7530. November.

[35] AECOM. 2016. *San Francisco Bay Tidal Datums and Extreme Tides Study, Final Report*. February.



Note: As of this date, CCSF uses the 2008 interim flood maps to determine the existing 100-year flood zone.

Source: City and County of San Francisco. 2008. San Francisco Interim Floodplain Map: Northeast. July.

Special Flood Hazard Area

0 1,000 2,000

Feet

N

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.N-2
San Francisco Interim 100-year Flood Plain Map

EXTREME TIDES

Diurnal (twice daily) high tides along San Francisco's Bay shoreline typically range from approximately 5 to 7 feet NAVD88; annual maximum tides may exceed 7 feet NAVD88.[36] The twice yearly extreme high and low tides are called "king tides." These occur each year during the winter and summer when the earth, moon, and sun are aligned; the winter event may be amplified by weather. A portion of The Embarcadero Promenade near Pier 14 and the Marina area in San Francisco experience inundation under current king tide conditions.[37] Development in the Mission Creek subwatershed is vulnerable to exposure to more extreme tides, storms, and annual flooding events (e.g., king tides). Third and Fourth Street Bridges are already vulnerable to inundation, including king tide events. However, daily high tides and king tides are not causing major inundation or disruptions in Mission Creek but, rather, more extreme but less frequent storm events could lead to flooding in the area. [38]

STORM SURGE

Storm surge occurs when persistent high winds and changes in air pressure elevate Bay water levels above normal tide levels, which can raise the water level near the shoreline by several feet and may persist for several days. Along the Bay shoreline, storm surge typically raises the surface water elevation from 0.5 to as much as 3 feet during major winter storms.[39] The degree of storm surge depends on the severity of the storm as well as tidal levels at the time of the storm. Storm surge is characterized using a return period that represents the expected frequency of a storm event occurring, based on historical information. One-year storm surge is expected to occur each year, while 100-year storm surge (which represents more extreme conditions) has a 1 percent chance of occurring in any year.

STORM WAVES

Waves and wave run-up affect primarily a narrow band along the shoreline where wave energy can damage structures and overtop both natural embankments and shoreline protection structures such as seawalls and levees. The influence of waves diminishes inland as wave energy dissipates. In addition, Pacific Ocean waves, which are generally larger than those originating in the Bay, are substantially dampened along the Bay shoreline because of transformation processes within the Bay. Along shoreline of the Bay, storm waves typically raise the surface water elevation by 1 to 4 feet during major winter storms several times a year.[40]

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[36] SFPUC. 2014a. *Climate Stressors and Impact: Bayside Sea-Level Rise Mapping, Final Technical Memorandum* (hereinafter *Bayside Sea-Level Rise Mapping Technical Memorandum*). June, p. 10.

[37] SFPUC, *Bayside Sea-Level Rise Mapping Technical Memorandum*, p. 7.

[38] SPUR. 2016. *Mission Creek Sea-Level Rise Adaptation Study.* Waterfront Strategies for Long-Term Urban Resiliency. September. Available: http://www.spur.org/sites/default/files/publications_pdfs/Mission_Creek_Sea_Level_Rise_Adaptation_Study.pdf. Accessed: September 30, 2016.

[39] SFPUC, *Bayside Sea-Level Rise Mapping Technical Memorandum*, p. 10.

[40] SFPUC, *Bayside Sea-Level Rise Mapping Technical Memorandum*, p. 10.

EL NIÑO WINTER STORMS

During El Niño events,[41] atmospheric and oceanographic conditions in the Pacific Ocean bring warmer, higher waters to the Bay Area and can produce severe winter conditions that bring intense rainfall to the Bay Area. Tides are often elevated 0.5 to 1.0 feet above normal along the coast and in the Bay for months at a time; additional storm surges and wind effects during storm events can elevate water levels even further. El Niño conditions prevailed in 1977–1978, 1982–1983, 1997–1998, 2009–2010,[42] and 2015–2016.[43]

SEA-LEVEL RISE

Sea levels are rising globally because of climate change, and they are expected to continue to rise at an accelerating rate for the foreseeable future. The sea level at the San Francisco tidal gage has risen approximately 8 inches over the past century.[44] The National Research Council's (NRC's) 2012 report, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (NRC Report) provides a scientific review of SLR for the West Coast and the most recent regional SLR predictions for 2030, 2050, and 2100, relative to year 2000 sea level.[45] In this report, the NRC projects that sea levels in the San Francisco Bay Area will rise 11 inches by 2050 and 36 inches by 2100, as presented in Table 4.N-4 on the following page. As presented in the NRC Report, these SLR projections represent likely SLR values, based on the current understanding of global climate change, assuming a moderate level of greenhouse gas (GHG) emissions,[46] and extrapolation of continued accelerating land ice-melt patterns.

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41 El Niño Southern Oscillation (ENSO) is a natural oceanic-atmospheric cycle. El Niño conditions are defined by prolonged warming in Pacific Ocean sea-surface temperatures. Typically, this happens at irregular intervals of 2 to 7 years but can last anywhere from 9 months to 2 years.

42 SFPUC, *Bayside Sea-Level Rise Mapping Technical Memorandum*, p. 8.

43 NOAA. 2016. *El Niño and La Niña* (El Niño Southern Oscillation). Available: https://www.climate.gov/enso. Accessed: June 13, 2016.

44 NOAA. No date. *Mean Sea-Level Trend 9414290.* San Francisco, California. Available: https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9414290. Accessed: June 22, 2016.

45 National Research Council. 2012. *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*. Washington, DC: The National Academies Press. Available: http://www.nap.edu/catalog.php?record_id=13389. Accessed: November 28, 2015.

46 Future emissions of greenhouse gases depend on a collection of human decisions at local, regional, national, and international levels as well as potential unknown technological developments. For this reason, future changes in greenhouse gas emissions cannot be accurately estimated, and a range of emissions levels is considered in the NRC Report. Estimates of SLR relative to thermal expansion of the oceans were formulated using the mid-level, or moderate level, of predicted changes in greenhouse gas emissions (from a combination of fossil and nonfossil fuels) as well as an assumption of high economic growth; this represents scenario "A1B," as described by the Intergovernmental Panel on Climate Change.

TABLE 4.N-4. SEA-LEVEL RISE ESTIMATES FOR SAN FRANCISCO BAY RELATIVE TO THE YEAR 2000

Year	Projection (inches)	Upper Range (inches)
2030	6	12
2050	11	24
2100	36	66

Source: National Research Council, 2012.[47]

The NRC Report also includes ranges of SLR that could occur, based on different estimates of GHG emissions and ice-melt patterns. The extreme upper limit of the ranges represents unlikely but possible levels of SLR that are based on very high GHG emissions scenarios and significant ice melt, which is not currently anticipated but could occur. Assuming the maximum level of GHG emissions and ice melt, the NRC anticipates that sea levels in the Bay Area could rise up to 24 inches by 2050 and 66 inches by 2100, as presented in Table 4.N-4, above.

These estimates represent the long-term increase in mean sea level and the associated average daily high tide conditions (represented by mean higher high water, or MHHW)[48] that could result from SLR; they do not take into account extreme tides, storm surge, storm waves, or El Niño storm events, all of which can result in water levels that are temporarily higher than MHHW, as discussed above.

In March 2013, the California Ocean Protection Council updated its 2010 statewide SLR guidance to adopt the NRC Report as the current best available science on SLR for California.[49] The California Coastal Commission supported the use of the NRC Report as the best science currently available in its *Sea-Level Rise Policy Guidance*, which it adopted in 2015. The California Coastal Commission guidance emphasizes the importance of regularly updating SLR projections as the science continues to advance.[50] The San Francisco Bay Conservation and Development Commission (BCDC) also considers the NRC Report to be the best available

[47] National Research Council. 2012. *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*. Washington, DC: The National Academies Press. Available: http://www.nap.edu/catalog.php?record_id=13389. Accessed: November 28, 2015.

[48] Mean higher high water is the higher of each day's two high tides averaged over time.

[49] Ocean Protection Council. 2013. *State of California Sea-Level Rise Guidance Document.* Developed by the Coastal and Ocean Working Group of the California Climate Action Team, with science support provided by the Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust. Updated: March 2013. (Hereinafter "*State of California Sea-Level Rise Guidance Document*"). Available: http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf. Accessed: November 28, 2015.

[50] California Coastal Commission. 2015. *Sea-Level Rise Policy Guidance, Interpretive Guidelines for Addressing Sea-Level Rise in Local Coastal Programs and Coastal Development Permits.* Unanimously adopted August 12, 2015. Available: http://documents.coastal.ca.gov/assets/slr/guidance/August2015/0_Full_Adopted_Sea_Level_Rise_Policy_Guidance.pdf. Accessed: November 28, 2015.

science-based prediction of SLR for the Bay. Accordingly, the San Francisco Planning Department (Planning Department) considers the NRC Report to be the best science currently available on SLR, affecting San Francisco for both CEQA and planning purposes.

Although the NRC Report provides the best available SLR projections for the Bay at this time, scientific uncertainty remains regarding the rate and magnitude of SLR. SLR projections beyond 2050 are highly dependent on assumptions regarding future global GHG emissions and changes in the rate of land ice melting. As a result of the uncertainties inherent in these assumptions, the range of SLR predictions becomes substantially broader beyond 2050. In recognition of this uncertainty, the State of California Sea-Level Rise Guidance recommends an adaptive management approach for development in areas that may be subject to SLR beyond 2050.[51] Adaptive management is an iterative process that involves monitoring conditions to evaluate whether an area could be inundated as a result of SLR and identifying actions to be implemented to ensure that the area and existing structures are resilient to future flooding conditions.

SEA-LEVEL RISE INUNDATION MAPPING

The SFPUC, as part of planning for its Sewer System Improvement Program, developed a series of maps, published in 2014, that identify areas of inundation along both the Bay and Pacific Ocean shorelines of San Francisco. These maps use a 1-meter horizontal grid resolution,[52] based on the 2010/2011 California Coastal Mapping Program LiDAR.[53] The inundation maps use data from FEMA's California Coastal Mapping and Analysis Project, which includes detailed coastal engineering analyses and mapping of the Bay shoreline.

The SFPUC inundation maps evaluate scenarios that represent NRC projections of SLR in combination with the effects of storm surge. They represent permanent inundation that could occur as a result of total water-level rise (over and above year 2000 MHHW), based on daily tidal fluctuations. Each scenario also addresses temporary inundation that could occur from extreme tides and 1-year, 2-year, 5-year, 25-year, 50-year, and 100-year storm surge. Flooding as a result of storm surge would occur on a temporary basis, during and immediately after a storm event or extreme tide.

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[51] *State of California Sea-Level Rise Guidance Document*; p. 3.

[52] The horizontal grid resolution of a digital elevation model (DEM) defines the scale of the features that are modeled; this is generally the minimum resolution necessary to depict levees, berms, and other topographic features important to diverting floodwaters.

[53] LIDAR, Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses combined with other data generate precise, three-dimensional information about the shape of the Earth and its surface characteristics.

The scenarios listed below are representative of Bay water elevations that could occur by 2050 and 2100, based on the NRC's projected levels of SLR and consideration of a 100-year storm surge:

- 12 inches above year 2000 MHHW (representative of NRC's projected SLR by 2050);
- 36 inches above year 2000 MHHW (representative of NRC's projected SLR by 2100);
- 52 inches above year 2000 MHHW (representative of NRC's projected SLR by the year 2050 in combination with a 100-year storm surge); and
- 77 inches above year 2000 MHHW (representative of NRC's projected SLR by the year 2100 in combination with a 100-year storm surge).

The following scenarios are representative of the maximum Bay water elevations that could occur by 2100, based on the NRC's upper range of SLR and consideration of a 100-year storm surge:

- 66 inches above year 2000 MHHW (representative of NRC's upper range of SLR by 2100); and
- 107 inches above year 2000 MHHW (representative of NRC's upper range of SLR by the year 2100 in combination with a 100-year storm surge).

The SFPUC cautions that its maps represent a "do nothing" scenario in which no site-specific measures are taken to prevent future flooding and no area-wide measures, such as waterfront protection structures, are implemented. In the event that the City undertakes area-wide measures to protect against inundation in the future, the mapping would need to be revised to reflect the modified inundation areas with implementation of these measures. In addition, because the SFPUC SLR maps are based on 2010/2011 topographic mapping, they do not account for planned increases in the base elevation of the project site, as would occur with implementation of the proposed project, to prevent future flooding due to SLR.

Pier 48, Pier 50, and the coastal perimeter along China Basin Park have a 100-year BFE of 11 feet NAVD88. The detailed Preliminary Flood Insurance Study indicates a 1 percent annual chance total water-level elevation (TWLE) of 11.4 feet NAVD88, which is the assumed 100-year BFE value for the pier structure for the purposes of this analysis. The TWLE is the maximum combined seawater elevation, wave setup, and wave run-up considered for coastal BFEs.[54] MHHW near the project site is at an elevation of 6.33 feet NAVD88.[55] Table 4.N-5 on the following page presents the water elevations near the project site associated with each of the SLR scenarios discussed above, based on the existing MHHW elevation.

[54] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

[55] Moffat and Nichol. 2011. *Seawall Lot 337 Redevelopment – Waterside Improvements*. M&N Job No: 7530. November.

TABLE 4.N-5. WATER ELEVATIONS ASSOCIATED WITH SEA-LEVEL RISE PROJECTIONS

Sea-Level Rise Scenario	Water Level Above MHHW Inches	Elevation (feet, NAVD88)	Elevation (feet, Project Datum[1])
2000 MHHW with no SLR	0	6.33	95.03
2000 MHHW plus 12 inches of SLR	12	7.33	96.03
2000 MHHW plus 100-year storm surge	41	9.75	98.45
2000 MHHW plus 12 inches of SLR and 100-year storm surge	53	10.75	99.45
2000 MHHW plus 36 inches of SLR	36	9.33	98.03
2000 MHHW plus 36 inches of SLR and 100-year storm surge	77	12.75	101.45
2000 MHHW plus 66 inches of SLR (upper range)	66	11.83	100.53
2000 MHHW plus 66 inches of SLR and 100-year storm surge (upper range)	107	15.25	103.95

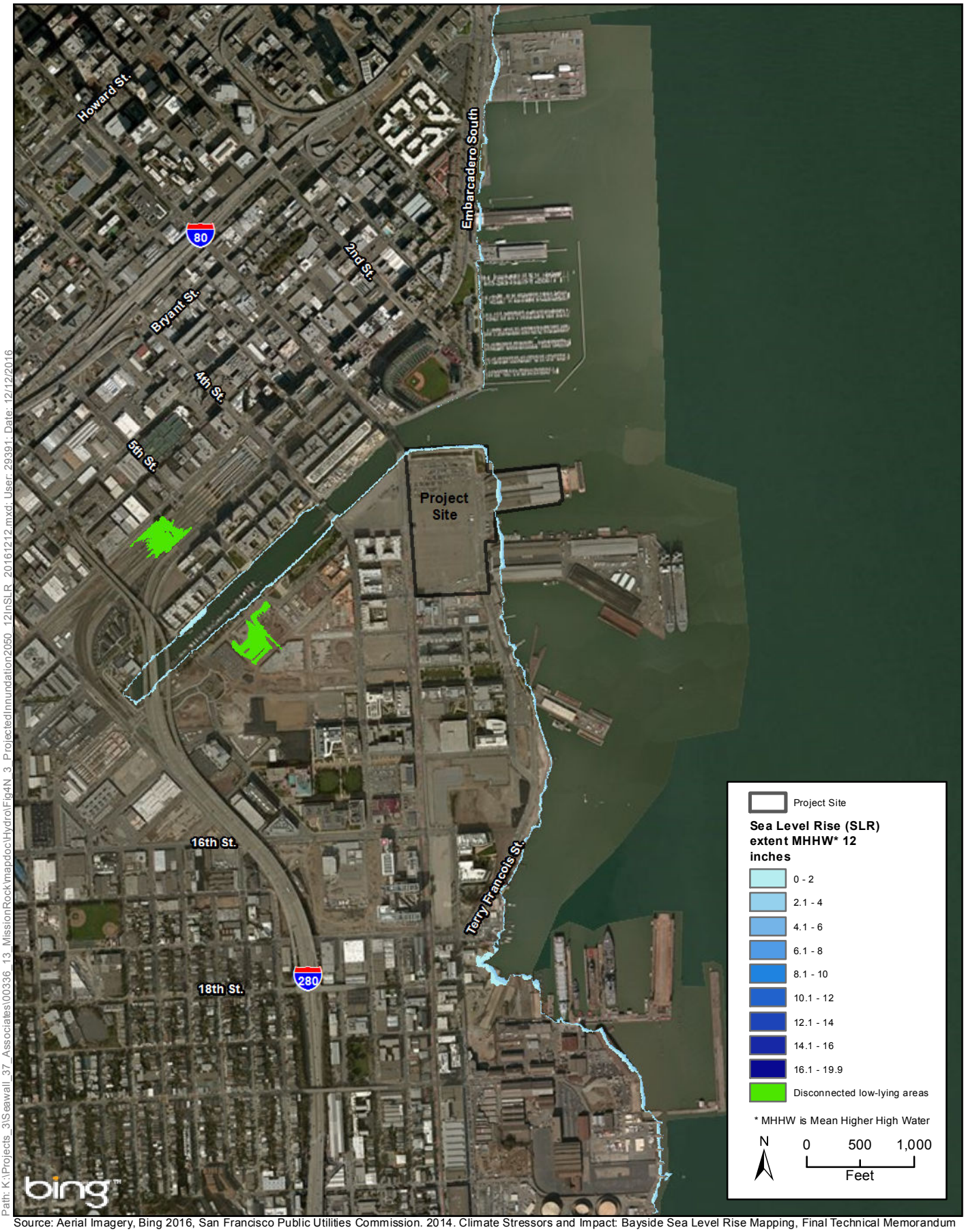
Notes:
MHHW – mean higher high water
[1] The project datum is equal to City and County San Francisco datum plus 100 feet. This is 88.7 feet higher than NAVD88.
Sources: SFPUC, *Bayside Sea-Level Rise Mapping Technical Memorandum*, 2014.

The SFPUC inundation maps indicate that, under existing conditions, only the immediate waterfront portions of the project site (along Mission Creek and Lower San Francisco Bay) would be inundated with 12 inches of SLR, which is expected by 2050 (Figure 4.N-3 on the following page).[56] Pier 48 sits at a higher surface elevation, and no part of the pier is within an anticipated future flood zone. However at the mid-century level of the SLR scenario, pier decks on Pier 48 may be affected where utility infrastructure is currently located beneath the pier decks. In addition, the structural integrity of the pier's substructure can be threatened, and wave action underneath the piers can create uplift.[57] However, when the effects of 100-year storm surge are considered in addition to 12 inches of SLR, the flood level would be approximately 10.75 feet NAVD88. Under this scenario, more than half of the project site could be temporarily flooded with the current site grade. Flooding would occur in the southern portion of the site and the waterfront portions of the project site (Figure 4.N-4, page 4.N-23). Similar to the 12 inches of SLR expected by 2050, only the immediate waterfront portions of the project site (along Mission Creek and Lower San Francisco Bay) would be inundated with projected end-of-century SLR (i.e., 36 inches by 2100) (Figure 4.N-5, page 4.N-24). However, when the effects of 100-year storm surge are considered in addition to 36 inches of SLR, the entire area west of Pier 48 could be subject to daily tidal inundation and flooding (Figure 4.N-6, page 4.N-25). The flood level would be approximately 12.75 feet NAVD88. Flooding would extend southward and westward, with the exception of a small area immediately south of the project site where flooding would not occur. Similarly, with the exception of Pier 48, the site would be inundated with 66 inches of SLR with a flood level of approximately 11.83 feet NAVD88. When the effects of 100-year storm surge are considered with 66 inches of SLR, the flood level would be approximately 15.25 feet NAVD88. The entire area west of Pier 48 could be temporarily flooded under this worst-case scenario.

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[56] SFPUC maps assume no improvements on the site. The inundation maps and the associated analyses are intended as planning-level tools to illustrate the potential for inundation and coastal flooding under a variety of future SLR and storm-surge scenarios. The maps depict possible future inundation that could occur if nothing is done to adapt or prepare for SLR over the next century. The maps do not represent the exact location or depth of flooding. The maps relied on a 1-meter digital elevation model created from LiDAR data collected in 2010 and 2011. Although care was taken to capture all relevant topographic features and coastal structures that may affect coastal inundation, it is possible that structures narrower than the 1-meter horizontal map scale may not be fully represented. The maps are based on model outputs and do not account for all of the complex and dynamic San Francisco Bay processes or future conditions such as erosion, subsidence, future construction or shoreline protection upgrades, or other changes to San Francisco Bay or the region that may occur in response to SLR. For more context about the maps and analyses, including a description of the data and methods used, please see the Climate Stressors and Impacts Report: Bayside Sea-Level Rise Inundation Mapping Technical Memorandum, March 2014.

[57] SPUR. 2016. *Mission Creek Sea-Level Rise Adaptation Study.* Waterfront Strategies for Long-Term Urban Resiliency. September. Available: http://www.spur.org/sites/default/files/publications_pdfs/Mission_Creek_Sea_Level_Rise_Adaptation_Study.pdf. Accessed: September 30, 2016.

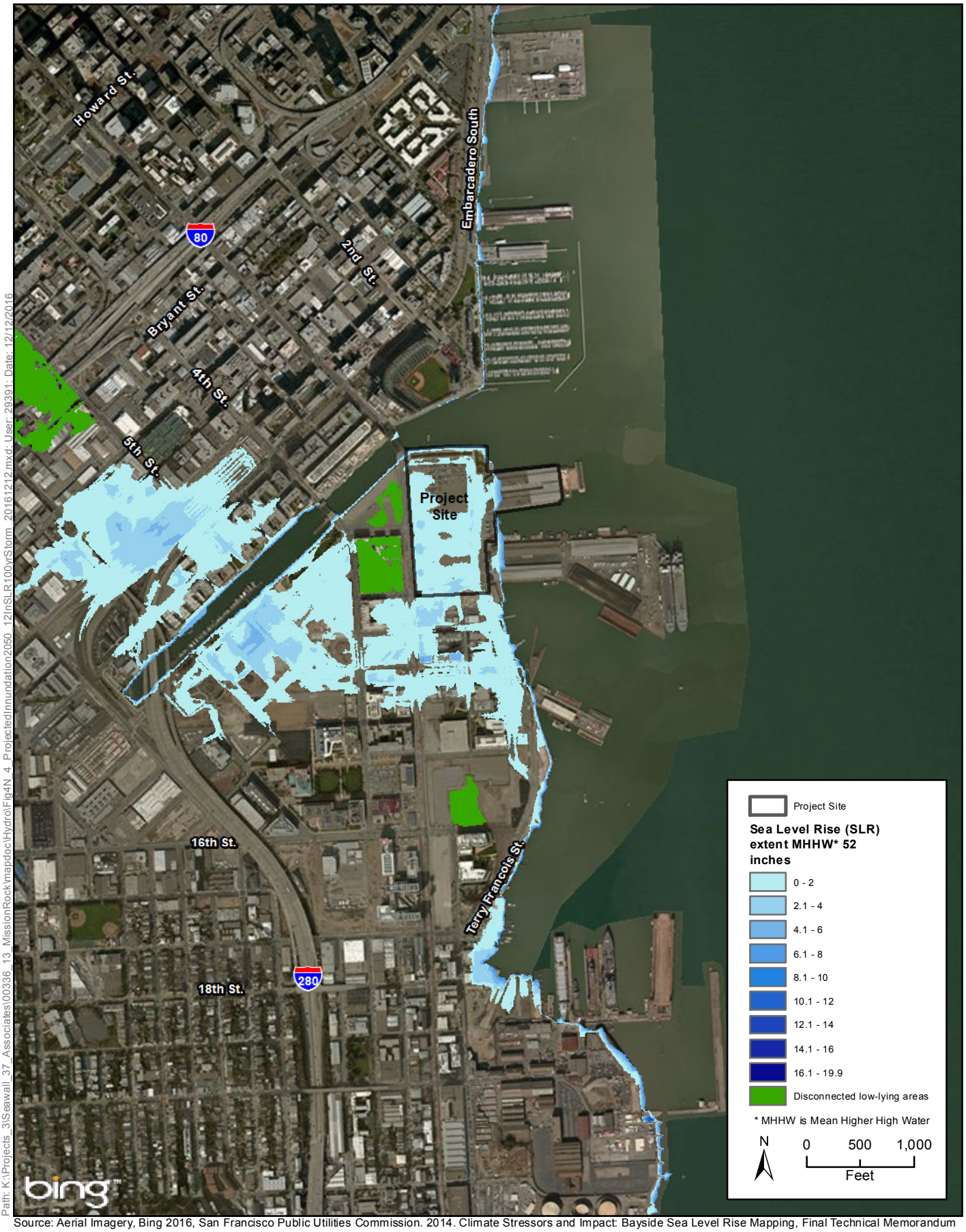


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Source: Aerial Imagery, Bing 2016, San Francisco Public Utilities Commission. 2014. Climate Stressors and Impact: Bayside Sea Level Rise Mapping, Final Technical Memorandum

Seawall Lot 337/Pier 48 Mixed-Use Project,
Case No. 2013.0208E

Figure 4.N-3
Projected Inundation by 2050, with 12 Inches of Sea Level Rise

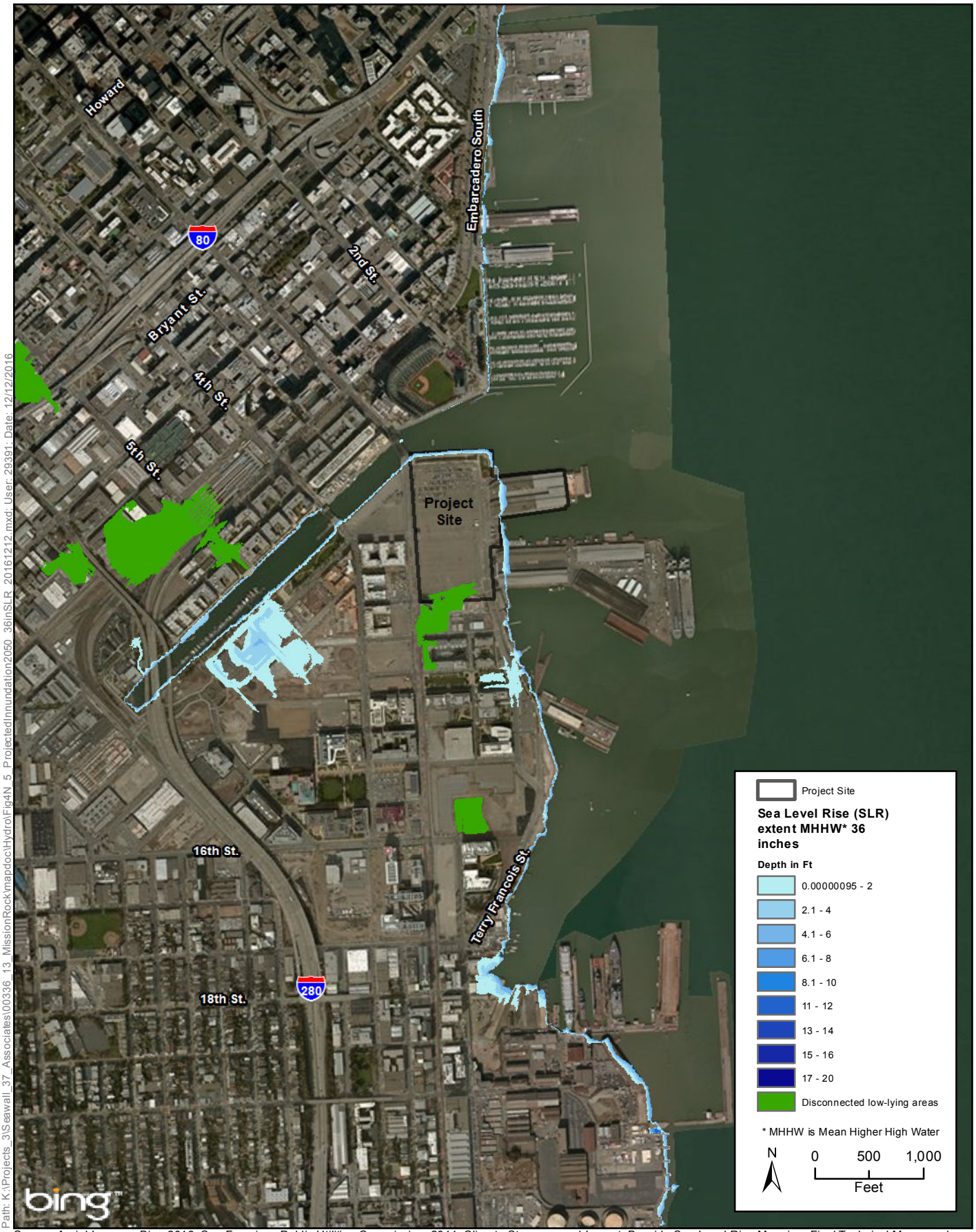


Path: K:\Projects_3\Seawall_37_Associates\00336_13_MissionRock\mapdoc\HydroFig4N_4_ProjectedInundation2050_12InSLR100yrStorm_20161212.mxd; User: 29391; Date: 12/12/2016

Source: Aerial Imagery, Bing 2016, San Francisco Public Utilities Commission. 2014. Climate Stressors and Impact: Bayside Sea Level Rise Mapping, Final Technical Memorandum

Seawall Lot 337/Pier 48 Mixed-Use Project,
Case No. 2013.0208E

Figure 4.N-4
Projected Inundation by 2050, with 12 Inches of Sea Level Rise Plus 100-year Storm Surge

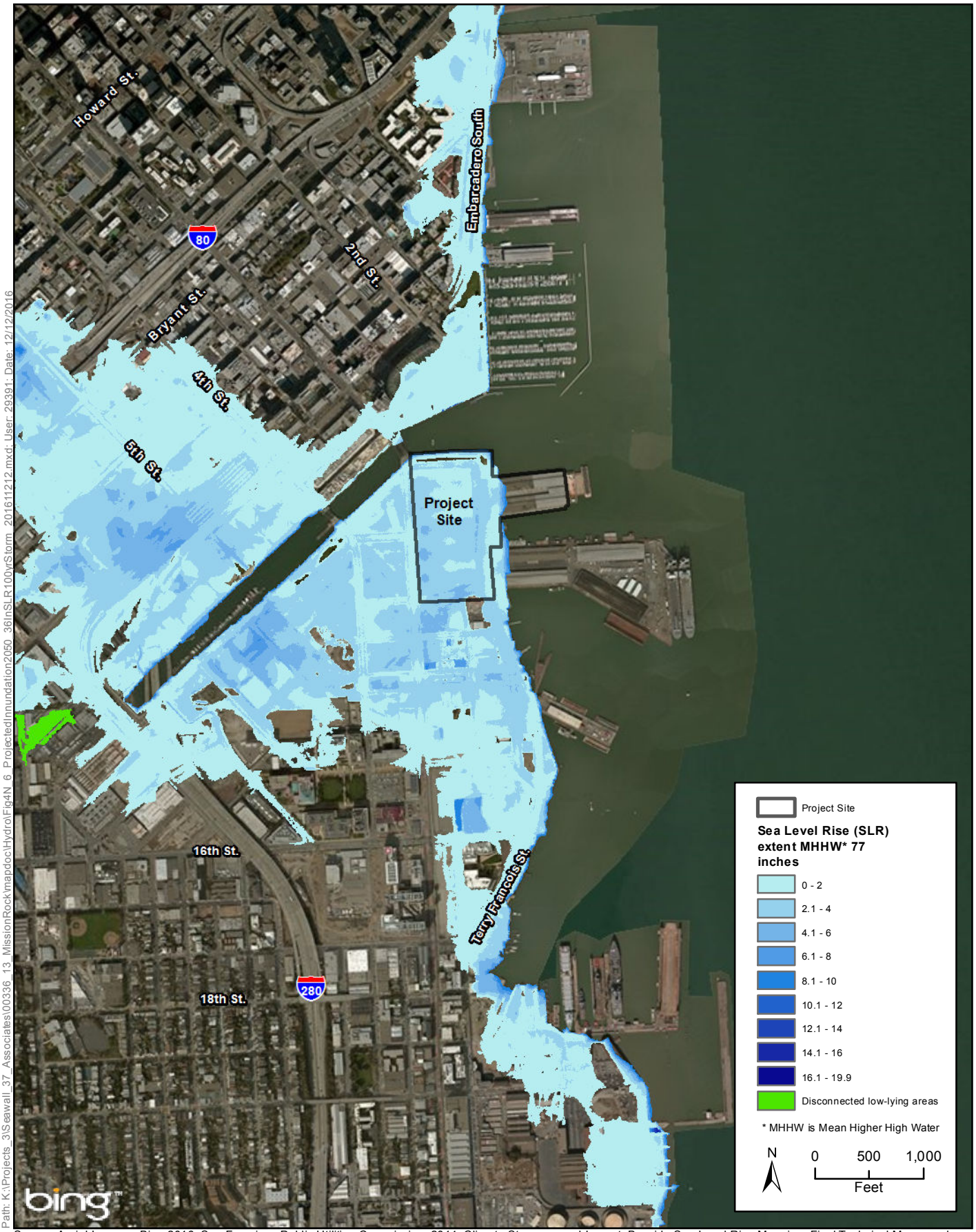


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Source: Aerial Imagery, Bing 2016, San Francisco Public Utilities Commission. 2014. Climate Stressors and Impact: Bayside Sea Level Rise Mapping, Final Technical Memorandum

Seawall Lot 337/Pier 48 Mixed-Use Project,
Case No. 2013.0208E

Figure 4.N-5
Projected Inundation by 2100, with 36 Inches of Sea Level Rise



Path: K:\Projects_3\Seawall_37_Associates\00336_13_MissionRock\mapdoc\HydroFig4N_6_ProjectedInundation2050_36InSLR100yrStorm_20161212.mxd; User: 29391; Date: 12/12/2016

Source: Aerial Imagery, Bing 2016, San Francisco Public Utilities Commission. 2014. Climate Stressors and Impact: Bayside Sea Level Rise Mapping, Final Technical Memorandum

Seawall Lot 337/Pier 48 Mixed-Use Project,
Case No. 2013.0208E

Figure 4.N-6
Projected Inundation by 2100, with 36 Inches of Sea Level Rise Plus 100-year Storm Surge

PLANNING FOR SEA-LEVEL RISE IN SAN FRANCISCO

The City has convened an inter-agency Climate Adaptation Working Group to identify ways to make sure that it is prepared to adapt to the effects of SLR.[58] Participating agencies include the Department of the Environment, the SFPUC, Planning Department, City Administrator's Office, the Port, San Francisco International Airport (SFO), San Francisco Public Works (SFPW), the San Francisco Municipal Transportation Agency (SFMTA), Department of Public Health, and Department of Recreation and Parks. The working group is focusing its effort on the City's most imminent adaptation concerns, including SLR along Ocean Beach and the shores, flooding from storm surge and extreme rain events, an increased likelihood of extreme heat, and a decreased likelihood of fog that supports local ecosystems, such as redwoods. It is working on ways to improve the existing coastal flood protection infrastructure in time to prevent significant flooding impacts from SLR. The working group will establish requirements to address issues such as proper flood insurance for structures in low-lying areas, flood-resilient construction of new development within inundation areas, and a low-carbon footprint for new development. It is also assessing the use of natural solutions, such as wetlands, to protect the shoreline.

San Francisco Mayor Edwin M. Lee established two interdepartmental committees to manage the City's efforts to address SLR: the SLR Coordinating Committee and the SLR Technical Committee. The SLR Coordinating Committee, established in February 2015, is a director-level committee. It is co-chaired by the Port's Deputy Director of Planning and Development along with a senior planner from the Planning Department. SLR Coordinating Committee members also include the chief resiliency officer and senior staff from the mayor's office, City Administrator's Office, SFO, the Port, the SFPUC, SFMTA, the Department of Building Inspection (DBI), Office of Community Investment and Infrastructure, Office of Economic and Workforce Development, and the Capital Planning Committee. The responsibilities of the SLR Coordinating Committee are as follows:

1. Coordinate the efforts of City departments and advise the mayor's office on policies, strategies, initiatives, and resolutions to deal with and plan for the potential impact on San Francisco from SLR;

2. Coordinate local efforts and initiatives with the work of other governmental entities and various stakeholders at the regional, state, and national levels, such as the U.S. Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development, the Department of the Interior, the California Coastal Commission, the California Ocean Protection Council, and BCDC;

[58] San Francisco Department of the Environment. No date. *Adaptation*. Available: http://www.sfenvironment.org/article/climate-change/adaptation. Accessed: March 4, 2016.

3. Provide guidance and specific recommendations to City departments with regard to land use and strategies to protect assets and communities along the shoreline;
4. Oversee and guide the existing SLR Technical Committee and implementation of the Capital Planning Guidance to address related to vulnerability and risks as well as the adaptability of the City's physical infrastructure; and
5. Promote coordination and collaboration among City departments, private utility providers, and other stakeholders.

The SLR Coordinating Committee is first charged with assessing the city's risk to SLR. Once the data-analysis phase is complete, the SLR Coordinating Committee will coordinate the City's SLR vulnerability assessment and adaptation planning efforts with local, regional, and national governmental and nongovernmental organizations as well as community stakeholders, as needed. Key to this effort will be determining how to best involve the community.

The SLR Technical Committee, established in February 2015, comprises the same agencies that developed the Capital Planning Committee's Sea-Level Rise Guidance, including the SFPUC, the Port, SFPW, SFO, SFMTA, the Capital Planning Committee, and the Planning Department. This committee is charged with assisting all City agencies with consistent implementation of the guidance; revising the guidance, as needed; and assisting the SLR Coordinating Committee, as requested.

GUIDANCE FOR INCORPORATING SEA-LEVEL RISE INTO CAPITAL PLANNING

On September 22, 2014, the City's Capital Planning Committee adopted the Guidance for Incorporating Sea-Level Rise into Capital Planning in San Francisco: Assessing Vulnerability and Risk to Support Adaptation, which was prepared by the SLR Coordinating Committee.[59] The guidance document has been revised to simplify the analysis of specific SLR scenarios and clarify how to select the appropriate scenario for design and planning purposes. The revised document also provides a methodology for determining the design tide for use in project design and planning. It was adopted by the Capital Planning Committee on December 14, 2015.[60]

[59] City and County of San Francisco Sea-Level Rise Committee. 2014. *Guidance for Incorporating Sea-Level Rise into Capital Planning in San Francisco: Assessing Vulnerability and Risk to Support Adaptation*. September 14. Available: http://onesanfrancisco.org/wp-content/uploads/San%20Francisco%20SLR%20Guidance%20Adopted%209.22.14%2012182014.pdf. Accessed: March 15, 2016.

[60] City and County of San Francisco Sea-Level Rise Committee. 2015. *Guidance for Incorporating Sea-Level Rise into Capital Planning in San Francisco: Assessing Vulnerability and Risk to Support Adaptation.* December 14. Available: http://onesanfrancisco.org/wp-content/uploads/Guidance-for-Incorporating-Sea-Level-Rise-into-Capital-Planning1.pdf. Accessed: January 22, 2016.

SAN FRANCISCO SEA-LEVEL RISE ACTION PLAN

In March 2016, the SLR Coordinating Committee released the San Francisco Sea-Level Rise Action Plan, with lead City staffing from the Planning Department and SFPW, along with other City departments and a consultant team.[61] The plan is intended to guide City departments in their understanding of and adaptation to the impacts of SLR; it also identifies what long-term SLR means for San Francisco's residents, visitors, the economy, and the waterfront.

The action plan establishes an overarching vision, goals, and a set of guiding principles for SLR planning; summarizes current climate science, relevant policies and regulations, and vulnerability and risk assessments conducted to date; identifies data gaps and establishes a framework for further assessment, adaptation planning, and implementation; and provides the foundation and guidance to develop the Citywide Sea-Level Rise Adaptation Plan.

The action plan is the first step in the development of the Citywide Sea-Level Rise Adaptation Plan, expected to be complete in 2018, which will incorporate the adaptation strategies identified in the action plan and help prioritize investments to best improve climate resilience while protecting economic and environmental value. The adaptation plan will also identify potential funding sources, governance structures, and implementation timelines.

PLANNING FOR CLIMATE CHANGE UNDER THE SFPUC SEWER SYSTEM IMPROVEMENT PROGRAM

The SFPUC is addressing SLR as part of its Sewer System Improvement Program and conducting a detailed analysis of the potential for new and existing combined sewer infrastructure to be affected by SLR.[62] Accordingly, all new facilities will be built with use of a climate change criterion so that the combined sewer system will be better able to respond to rising sea levels. Rising sea levels and storm surge could inundate the combined sewer system and exacerbate existing flooding that results from backups of the sewer system in some areas of San Francisco. Rising sea levels and storm surge can also cause new flooding. To address these issues, the SFPUC is evaluating alternatives such as the installation of backflow preventers on the combined sewer discharge structures to restrict the intrusion of Bay water into the combined sewer system.

LEVEE OR DAM FAILURE

There are no levees or dams upstream of the project vicinity; therefore, the project site is not vulnerable to inundation by levee or dam failure.

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[61] City and County of San Francisco. 2016. *Sea-Level Rise Action Plan*. March. Available: http://default.sfplanning.org/plans-and-programs/planning-for-the-city/sea-level-rise/160309_SLRAP_Final_ED.pdf.

[62] SFPUC. 2014b. *Bayside Drainage Basin Urban Watershed Opportunities, Final Draft Technical Memorandum*. July.

SEICHE, TSUNAMI, AND MUDFLOWS

In June 2015 the California Emergency Management Agency (CalEMA) released statewide tsunami inundation maps for emergency planning purposes. The specific map for the project area (San Francisco North Quadrangle/San Francisco South Quadrangle) shows the project site within a tsunami run-up area, with potential flooding up to an elevation of about 12.7 feet (NAVD88). The maps point out that this elevation does not have a probability associated with it; the elevation was based on a worst-case scenario seismic event for emergency planning purposes rather than hazard mapping.[63,64] Other, more probabilistic studies, which evaluated the statistical likelihood of specific tsunami events, indicate a 100-year return period tsunami run-up elevation of 8.2 feet (NAVD88) and a 500-year return period tsunami run-up of 11.4 feet (NAVD88).[65]

A tsunami is a series of ocean waves caused by displacement of a large volume of water, typically as a result of an undersea earthquake or landslide. In the open ocean, tsunamis can travel more than 500 miles per hour. However, as tsunami waves reach shallow water, they slow in speed and grow in height. At the shoreline, tsunami waves may range in height from a few inches to more than 30 feet.[66] Seiche occurs in an enclosed or partially enclosed body of water, such as a lake or reservoir. San Francisco Bay is a large, open body of water with no immediate risk of seiche. Therefore, there would be minimal to no risk of damage from a seiche event in the project vicinity.

Large waves can affect people or damage structures along shoreline areas. Waves generated by winds within San Francisco Bay are typically minor but can cause shoreline erosion over time and affect boat launch areas. Larger waves generated in the Pacific Ocean undergo considerable refraction and diffraction upon passing through the Golden Gate, thereby greatly reducing their height by the time they reach the project site.

The project site is relatively flat and outside the potentially affected zones for earthquake-induced or rainfall-induced landslides;[67] therefore, no mudflows or debris slides are expected to occur within the project site.

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[63] California Emergency Management Agency, the University of Southern California, and the California Geological Survey. 2009. *Tsunamic Inundation Map for Emergency Planning*. State of California, City and County of San Francisco. San Francisco North Quadrangle/San Francisco South Quadrangle. June 15.

[64] Moffat and Nichol. 2011. *Seawall Lot 337 Redevelopment – Waterside Improvements*. M&N Job No: 7530. November.

[65] Moffat and Nichol. 2011. *Seawall Lot 337 Redevelopment – Waterside Improvements*. M&N Job No: 7530. November.

[66] City and County of San Francisco. 2016. *Emergency Response Plan, an Element of the CCSF Emergency Management Program, Tsunami Annex*. August. Available: http://sfdem.org/sites/default/files/Documents/CCSF%20Tsunami%20Annex%20Public%20Version%2020160907.pdf. Accessed: January 30, 2017.

[67] Association of Bay Area Governments. n.d. *Resilience Program Hazard Map.* Available: http://gis.abag.ca.gov/website/Hazards/?hlyr=femaZones. Accessed: September 22, 2015.

REGULATORY FRAMEWORK

The following federal, state, and local regulations are relevant to hydrology and water quality and apply to implementation of the proposed project unless otherwise specified.

The primary federal law for regulating water quality is the federal Clean Water Act (CWA). EPA has delegated enforcement of the CWA in California to the State Water Resources Control Board (State Water Board) and its nine Regional Water Boards. All proposed project activities need to be in compliance with, at a minimum, the CWA, the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act), and the San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).

FEDERAL

Clean Water Act. Several sections of the CWA pertain to regulating impacts on waters of the United States. The CWA sections below pertain to the proposed project. The term *waters of the United States* refers to all surface waters, such as all navigable waters and their tributaries; all interstate waters and their tributaries; all wetlands adjacent to these waters; and all impoundments of these waters. EPA is the overarching authority for protecting the quality of waters of the United States. However, the State Water Board administers CWA Sections 303, 401 and 402; USACE has jurisdiction over waters of the United States under CWA Section 404.

Section 303 – Impaired Waters. The State of California adopts water quality standards to protect beneficial uses of waters of the state, as required by Section 303(d) of the CWA and the Porter-Cologne Act. Section 303(d) of the CWA established the TMDL process to guide the application of state water quality standards (refer to the discussion of state water quality standards below). To identify candidate water bodies for TMDL analysis, a list of water quality–limited segments was generated by the State Water Board. These stream or river segments are impaired by the presence of pollutants such as sediment and are more sensitive to disturbance because of this impairment.

In addition to the impaired water body list required by CWA Section 303(d), CWA Section 305(b) requires states to develop a report that assesses statewide surface water quality. Both CWA requirements are addressed through the development of a 303(d)/305(b) Integrated Report, which addresses both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board's statewide 2012 California Integrated Report was based on Integrated Reports from each of the nine Regional Water Boards. After approval of the 303(d) list portion of the California Integrated Report by the State Water Board, the 2012 California Integrated Report was approved by EPA on July 30, 2015.

Section 401 – Water Quality Certification. Section 401 of the CWA requires an applicant who pursues a federal permit for conducting an activity that may result in a discharge of a pollutant to obtain Water Quality Certification (or waiver). Water Quality Certification requires the evaluation of water quality considerations associated with dredging or the placement of fill

materials into waters of the United States. Water Quality Certifications are issued by one of the nine geographically separated Regional Water Boards in California. Under the CWA, the Regional Water Board must issue Section 401 Water Quality Certification for a project to be permitted under CWA Section 404.

The proposed project would be required to obtain Water Quality Certification from the San Francisco Bay Regional Water Board because of in-water work, such as pile driving, which is proposed for seismic upgrades at the Pier 48 structure.

Section 402 – National Pollutant Discharge Elimination System. The 1972 amendments to the federal Water Pollution Control Act established the National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants from point sources. NPDES is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States.

The 1987 amendments to the CWA created a new section that was devoted to stormwater permitting (Section 402). EPA has granted the State of California primacy in administering and enforcing the provisions of the CWA and NPDES within state boundaries. NPDES permits are issued by one of the nine Regional Water Boards.

The proposed project is required to comply with both construction and municipal NPDES stormwater requirements. More information is provided in the *State Regulations* section, below.

Section 404 – Dredge/Fill Permitting. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of the CWA and, specifically, Section 404 (Discharges of Dredged or Fill Material) of the CWA. Section 404 of the CWA regulates the placement of fill materials into the waters of the United States. Section 404 permits are administered by USACE.

River and Harbors Act. Section 10 of the Rivers and Harbors Act of 1899 (RHA) prohibits work that affects the course, location, conditions, or capacity of navigable waters of the United States without a permit from USACE. *Navigable waters* under the act are "subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (Title 33 Code of Federal Regulations Section 3294). Section 10 of the RHA requires permits for all structures (such as riprap) and activities (such as dredging or pile driving).

The proposed project would be required to obtain a CWA Section 404 permit and an RHA Section 10 permit from USACE (San Francisco District) because of in-water work, such as pile driving, which is proposed for seismic upgrades at the Pier 48 structure.

National Flood Insurance Program. In response to the increasing cost of disaster relief, Congress passed the National Flood Insurance Act (NFIP) of 1968 and the Flood Disaster Protection Act of 1973. FEMA administers the NFIP to provide subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains. A FIRM is an official FEMA-

prepared map of a community. It is used to delineate both the SFHAs and the flood-risk premium zones that are applicable to the community. As discussed above, the proposed project is not located within a SFHA; therefore, the NFIP does not apply.

STATE

Porter-Cologne Water Quality Control Act. The Porter-Cologne Act was established and implemented by the State Water Board and nine Regional Water Boards. The State Water Board is the primary state agency with responsibility for protecting the quality of the state's surface and groundwater, or *waters of the state*. Waters of the state are defined more broadly than *waters of the United States* (i.e., any surface water or groundwater, including saline waters, within the boundaries of the state). This includes waters in both natural and artificial channels. It also includes surface waters that are not waters of the United States or nonjurisdictional wetlands, which are essentially distinguished by whether they are navigable. If waters are not navigable, they are considered to be isolated and, therefore, fall under the jurisdiction of only the Porter-Cologne Act and not the CWA. The Regional Water Boards are responsible for implementing CWA Sections 303(d), 401, and 402, as mentioned above and described in detail below.

The Porter-Cologne Act authorizes the State Water Board to draft state policies regarding water quality. The act requires projects that are discharging, or proposing to discharge, wastes that could affect the quality of the state's water to file a Report of Waste Discharge (RWD) with the appropriate Regional Water Board. The act also requires the State Water Board or a Regional Water Board to adopt basin plans for the protection of water quality, as described below.

San Francisco Bay Water Quality Control Plan (Basin Plan). San Francisco Bay waters are under the jurisdiction of the San Francisco Bay Regional Water Board, which established regulatory standards and objectives for water quality in San Francisco Bay in its Water Quality Control Plan for the San Francisco Bay Basin, commonly referred to as the Basin Plan. The board is required to develop, adopt (after public hearing), and implement a basin plan for the region. Basin plans are updated and reviewed every 3 years. They provide the technical basis for determining waste discharge requirements (WDRs), taking enforcement actions, and evaluating clean water grant proposals. A basin plan must include (1) a statement of beneficial water uses that the Regional Water Board will protect, (2) the water quality objectives needed to protect the designated beneficial water uses, and (3) strategies to be implemented, with time schedules for achieving the water quality objectives.[68] The San Francisco Bay Basin Plan was last updated in 2015.[69]

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[68] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

[69] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

In basin plans, Regional Water Boards designate beneficial uses for all water body segments in their jurisdictions and then set the criteria necessary to protect these uses. Consequently, the water quality objectives developed for particular water segments are based on the designated use and vary, depending on such use. Each Regional Water Board has region-wide and water body–specific beneficial uses and sets numeric and narrative water quality objectives for several substances and parameters in numerous surface waters in its region. For water bodies that do not have specific beneficial uses or water quality objectives designated in the Basin Plan, the tributary rule[70] applies. Specific objectives for concentrations of chemical constituents are applied to bodies of water according to their designated beneficial uses.[71] In addition, the State Water Board identifies waters that fail to meet standards for specific pollutants, which are then state listed in accordance with CWA Section 303(d), described previously.

The proposed project lies within the jurisdiction of the San Francisco Bay Regional Water Board, which is responsible for protection of the beneficial uses of water resources in San Francisco Bay, from Tomales Bay south to Pescadero Creek, an area that encompasses Alameda, Contra Costa, San Francisco, Santa Clara (north of Morgan Hill), San Mateo, Marin, Sonoma, Napa, and Solano Counties. More information on beneficial uses, water quality objectives, and the 303(d) impairments that apply to the proposed project are provided in the surface water quality discussions in the *Environmental Setting* section.

NPDES General Construction Stormwater Permit. The General NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit) regulates stormwater discharges related to construction activities. Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that, in total, disturbs 1 or more acres, are required to obtain coverage under the Construction General Permit. The Construction General Permit requires development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must list best management practices (BMPs) that the discharger will use to reduce or eliminate pollutants associated with construction activities in stormwater runoff and document the placement and maintenance of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "nonvisible" pollutants, to be implemented in case of a BMP failure; and a monitoring plan for turbidity and pH for projects

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[70] The "tributary rule" refers to any water body or stream not specifically listed in the Basin Plan that is deemed to have the same beneficial uses and water quality objectives of the listed stream, river, or lake to which they are a tributary.

[71] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

that meet defined risk criteria.[72] The requirements of the SWPPP are based on the construction design specifications detailed in the final design plans of a project and the hydrology and geology of the site expected to be encountered during construction. The local or lead agency requires proof of coverage under the Construction General Permit prior to building permit issuance. The SWPPP is submitted to the State Water Board, and a copy is kept at the jobsite where it is updated during different phases of construction. The SWPPP must be available for inspection and review upon request. The proposed project would involve more than 1 acre of land disturbance; therefore, a NPDES Construction General Permit would be required.

NPDES General Municipal Stormwater Permit. CWA Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4s). Phase I MS4 regulations cover municipalities with more than 100,000 residents, certain industrial processes, or construction activities that disturb an area of 5 acres or more. Phase II "small" MS4 regulations require stormwater management plans to be developed by municipalities with fewer than 100,000 residents and construction activities that disturb 1 or more acres of land. The State Water Board adopted a Statewide Phase II Small MS4 General Permit in 2013 to efficiently regulate discharges from numerous qualifying small MS4s under a single permit. Small MS4s were categorized as either "traditional" or "nontraditional." Traditional MS4s operate throughout a community. Nontraditional MS4s are similar to traditional MS4s but operate at a separate campus facility. Most nontraditional MS4s in California are not designated as having to comply with the Statewide Phase II Small MS4 General Permit, although the State Water Board reserved the right to allow the Regional Water Boards to designate through due process any single nontraditional MS4 if it deemed necessary.

MS4 permits require cities and counties to develop and implement programs and measures, including management practices, control techniques, system design and engineering methods, and other measures, as appropriate, to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible. As part of permit compliance, permit holders have created Stormwater Management Plans (SWMPs) for their respective locations. These plans outline the requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. The requirements may include multiple measures to control pollutants in stormwater discharges. During implementation of specific projects under the program, project applicants are required to follow the guidance contained in the SWMPs, as defined by the permit holder in that location.

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[72] State Water Resources Control Board. 2013. *Construction General Permit Stormwater Program*. Last updated: 2013. Available: http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml. Accessed: August 31, 2015.

The State Water Board is advancing low-impact development (LID) in California as a means of complying with municipal stormwater permits. LID incorporates site design, including, among other things, the use of vegetated swales and retention basins and minimizing impermeable surfaces, to manage stormwater and maintain a site's predevelopment runoff rates and volumes.

State Water Board Phase II MS4 Permit. Both the City and County of San Francisco and the Port of San Francisco are considered to be traditional small MS4 permittees under the State Water Board's WDRs for stormwater discharges from small MS4s (NPDES Order No. 2013-001-DWQ; General Permit No. CAS000004). Stormwater infrastructure connected to the Mission Bay separate stormwater system is under the jurisdiction of the SFPUC and covered under the City and County's MS4 Permit. The Port of San Francisco's MS4 Permit covers Port facilities that are not connected to the system operated by the SFPUC.

Traditional small MS4 permittees are required to comply with Section E of the Statewide Phase II MS4 Permit, which specifies requirements for site design measures, LID design standards, a post-construction stormwater management program, and operation and maintenance (O&M) of post-construction stormwater management measures as part of a Post-Construction Stormwater Management Program (Provision E.12).

LID design standards are required to be implemented for all development (or redevelopment) projects that create and/or replace 5,000 square feet (sf) or more of impervious surface. Redevelopment is any land-disturbing activity that results in the creation, addition, or replacement of an exterior impervious surface area on a site where some past development has occurred. If a redevelopment project increases the impervious surface of an existing development by more than 50 percent, runoff from the entire project, including all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible. If a redevelopment project increases the impervious surface of an existing development by less than 50 percent, only runoff from the new and/or replaced impervious surface of the project must be included.

The Statewide Phase II MS4 Permit specifies criteria for site design measures and stormwater treatment measures. Compliance with stormwater quality regulations would be addressed during the planning and construction phases on a block-by-block basis. The Port coordinates with all Port divisions to ensure that all new projects along the waterfront are reviewed with respect to the applicability of construction and post-construction stormwater controls. All new building permits and leases are reviewed with respect to the applicability of post-construction controls. The water quality analysis sections of all major CEQA documents for projects in Port jurisdiction now consider both construction and post-construction stormwater impacts.[73]

[73] Port of San Francisco. 2003. *Port of San Francisco Storm Water Management Plan 2003–2004.* December. Available: http://www.sfport.com/ftp/uploadedfiles/about_us/divisions/engineering/storm_water/SWMP2003-04.pdf. Accessed: October 27, 2015.

Waste Discharge Requirements for Dewatering and Other Low-threat Discharges to Surface Waters. CWA Section 402 also includes WDRs for dewatering activities. Although small amounts of construction-related dewatering are covered under the Construction General Permit, the San Francisco Bay Regional Water Board has regulations specific to dewatering activities that typically involve reporting and monitoring requirements. If dewatering to storm drains that lead to the San Francisco Bay occurs as part of the project, the contractor is required to comply with San Francisco Bay Regional Water Board dewatering requirements. Because there is potential for groundwater to be contaminated with fuel products during construction at the project site, the project sponsor would be required to comply with the San Francisco Bay Regional Water Board's Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds, Fuel Leaks, and Other Related Wastes (VOC and Fuel General Permit; Order No. R2-2012-0012). In addition, the land use covenants that are in effect over portions of the project site prohibit the use of groundwater as a drinking water source and require any activities that disturb the soil (e.g., excavation and grading) within areas that are subject to the land use covenants to be managed in accordance with applicable regulations. The SFDPH determination that the project complies with the Maher Ordinance is conditioned upon submittal of a Site Management Plan, including health and safety measures, to SFDPH prior to beginning any soil-disturbing activities at the project site.[74]

California Department of Pesticides Regulation. The California Department of Pesticides Regulation (DPR) is the lead agency for regulating the registration, sale, and use of pesticides in California. It is required by law to protect the environment, including surface waters, from adverse effects of pesticides by prohibiting, regulating, or controlling the uses of such pesticides. DPR has both a Surface Water and Groundwater Protection Program that address sources of pesticide residue in surface waters and preventive and response components that reduce the presence of pesticides in surface and groundwaters. The preventive component ranges from local outreach to the promotion of management practices to reduce pesticide runoff and prevent continued movement to groundwater in contaminated areas. To protect water from the adverse effects of pesticides, DPR and the State Water Board signed a Management Agency Agreement (MAA). The intent of the MAA and its companion document, California Pesticide Management Plan for Water Quality, is to coordinate interaction, facilitate communication, promote problem solving, and ultimately ensure the protection of water quality. The operation and maintenance of landscaped areas and lawns may require the use of pesticides; however, landscaping would be required to comply with DPR regulations. San Francisco has adopted local regulations that require use of Integrated Pest Management practices, as discussed below.

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[74] Department of Toxic Substances Control. 2002. *Hazardous Soils Report – Covenant to Restrict Use of Property Environmental Restriction, H&H Site located at China Basin Channel and Terry A. Francois Boulevard, City and County of San Francisco*.

Surface and Submerged Lands Lease Agreement. The California State Lands Commission (CSLC) has exclusive jurisdiction over all of California's tidelands and submerged lands as well as the beds of naturally navigable rivers and lakes, sovereign lands, swamp and overflow lands, and state school lands (proprietary lands). CSLC has statutory authority (Division 6 of the California Resources Code) to approve appropriate uses for public property rights within these sovereign lands, such as water-borne commerce, navigation, fisheries, open space, recreation, or other recognized public trust purposes.

CSLC management responsibilities include activities within submerged lands (from the mean high-tide line) as well as activities within an area 3 nautical miles offshore. These activities include oil and gas development, harbor development and management oversight, construction and operation of offshore pipelines or other facilities, dredging, reclamation, use of filled sovereign lands, topographical and geological studies, and other activities that occur on these lands. CSLC also surveys and maintains the title records of all state sovereign lands and settles issues regarding title and jurisdiction.

The proposed project would be replacing piles within CSLC jurisdiction for the purposes of changing some of the land uses and redeveloping and seismically upgrading Pier 48. Therefore, authorization from CSLC would be required for implementation of the pile-driving/removal component of the proposed project.

Inland Surface Waters, Enclosed Bays, and Estuaries Plan. On April 7, 2015, the State Water Board adopted an amendment to the Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California. Referred to as the "Trash Amendment," this amendment prohibits the presence of trash in inland surface waters, enclosed bays, estuaries, and along shorelines in amounts that adversely affect beneficial uses or cause nuisance. Compliance with this prohibition is achieved through compliance with NPDES permit limitations, WDRs, and waivers. Discharges that are not subject to these regulatory requirements are also required to comply.

MS4 permittees with authority over priority land uses that would be developed under the proposed project[75] are required to comply with the discharge prohibitions. Compliance may be achieved using a full capture system for all storm drains (Track 1) or a combination of full capture systems, multi-benefit projects, other treatment controls, and institutional controls (Track 2). These Track 2 measures must achieve a level of control equivalent to full capture under Track 1. The amendment requires that MS4 permits are modified or reissued to address this amendment within 18 months of adoption of the amendment.

[75] Under the Trash Amendment, priority land uses include high-density residential areas with at least 10 developed dwelling units per acre. Commercial uses and mixed urban developments with high-density residential and commercial land uses are also considered priority land uses.

The Trash Amendment also requires that trash is eliminated from all stormwater and nonstormwater discharges from construction activities regulated under the Construction General Stormwater Permit. If this is not economically feasible, dischargers must meet the requirements of Track 1 or Track 2, which are described above.

Existing NPDES permits must be modified or reissued to include the requirements of the Trash Amendment within 18 months of adoption of the amendment. Permittees must submit an implementation plan within 3 months of adoption of the implementing permit.

MS4 permittees must achieve full compliance with the requirements of the Trash Amendment within 10 years of the effective date of the first implementing permit and must achieve interim milestones during the first 10 years to show progress toward achieving full implementation.

REGIONAL AND LOCAL

Bay Conservation and Development Commission. The BCDC has permitting authority for most projects in San Francisco Bay and along the shoreline, which is defined in the McAteer-Petris Act to include Bay waters up to the mean high-water line and the area 100 feet landward of and parallel to the mean high-water line of San Francisco Bay. Under the McAteer-Petris Act, an agency or individual must secure a permit from BCDC if it proposes to place fill, dredged sediment, or dredged materials in San Francisco Bay or certain tributaries within BCDC jurisdiction. Most activities within the 100-foot shoreline band are also subject to a permit from the BCDC. The type of permit issued depends on the nature and scope of the proposed activities. Construction of those elements of the project within BCDC's jurisdiction would require a Major Permit under the McAteer-Petris Act.

San Francisco Waterfront Special Area Plan. BCDC completed and adopted the Bay Plan in 1968. The plan has been periodically amended since its adoption, most recently in 2011, to address climate change and shoreline protection. In 1975, after a collaborative planning process with the San Francisco Planning Department, BCDC adopted the San Francisco Waterfront Special Area Plan (Special Area Plan). The Special Area Plan was substantially amended in 2000. This plan, together with the McAteer-Petris Act and the Bay Plan, as well as subsequent amendments to all three documents, prescribes a set of rules for shoreline development along the San Francisco waterfront. Several policies of the Bay Plan are aimed at protecting San Francisco Bay's water quality, ensuring the safety of fills, and guiding dredging of the Bay's sediment.

San Francisco Public Utilities Commission and Port of San Francisco Stormwater Management Plans. San Francisco has obtained coverage under the updated Phase II General MS4 Permit for separate storm sewer systems under its jurisdiction, which includes the Port of San Francisco, Hunters Point Shipyard, Mission Bay, Treasure Island, Candlestick Point, and areas that discharge to inland receiving waters, such as Lake Merced. Ownership of the separate storm sewer system within San Francisco is divided between the

Port of San Francisco for areas along the city waterfront and SFPUC for all other areas within the city. Both the SFPUC and the Port are permittees that manage different portions of the San Francisco separate MS4 system and, therefore, have two different SWMPs. As a result, there are separate SWMPs for each jurisdiction (i.e., one SWMP that covers areas of the city that are under the jurisdiction of the Port[76] and another SWMP, produced by the SFPUC, that covers non-Port areas of San Francisco).[77] Portions of the project area, such as the existing 12-inch outfall at China Basin Park and the existing 30-inch outfall to the Bay in between Piers 48 and 50, are under Port jurisdiction; however, Seawall Lot 337 connects to Third Street and stormwater conveyed to the Mission Bay separated system is under SFPUC jurisdiction.

San Francisco Public Works Code Article 4.2 – Sewer System Management. In April 2010, San Francisco passed an ordinance (San Francisco Public Works Code, Article 4.2, Section 147–147.6) that requires stormwater controls to be implemented for development projects that discharge stormwater to either the combined sewer system or a separate stormwater system. If a large project creates and/or replaces 5,000 sf or more of impervious surface, it would be subject to San Francisco's stormwater management requirements, as outlined in the Stormwater Management Ordinance and the San Francisco Stormwater Management Requirements and Design Guidelines (SMR).[78]

Projects that trigger stormwater management requirements must prepare a Stormwater Control Plan, demonstrating project adherence to the performance measures outlined in the SMR, including a reduction in the total volume and peak flow rate of stormwater in areas with combined sewer systems or capture and treatment of the 90th percentile, 24-hour storm in areas with separate sewer systems. Responsibility for review and approval of the Stormwater Control Plan lies with the SFPUC, Wastewater Enterprise, Urban Watershed Management Program, as well as the Port, depending on the jurisdiction. Without SFPUC or Port approval of a Stormwater Control Plan, no site or building permits can be issued. The Stormwater Control Plan will be submitted to either SFPUC or the Port, or both, as required.

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[76] Port of San Francisco. 2003. *Port of San Francisco Stormwater Management Plan 2003–2004.* December. Available: http://www.sfport.com/ftp/uploadedfiles/about_us/divisions/engineering/storm_water/SWMP2003-04.pdf. Accessed: October 27, 2015.

[77] San Francisco Public Utilities Commission. 2004. *San Francisco Public Utilities Commission Stormwater Management Plan 2003–2004.* City and County of San Francisco. January. Available: http://www.waterboards.ca.gov/water_issues/programs/stormwater/swmp/sfpuc_swmp.pdf. Accessed: October 27, 2015.

[78] San Francisco Public Utilities Commission. 2016. *San Francisco Stormwater Management Requirements and Design Guidelines.* City and County of San Francisco. May. Available: http://sfwater.org/modules/showdocument.aspx?documentid=9025. Accessed: September 19, 2016.

The SFPUC and the Port developed the SMR[79] in accordance with the requirements of the NPDES Phase II General MS4 Permit and San Francisco's Stormwater Ordinance to govern post-construction stormwater runoff. The 2016 SMR updated the former Stormwater Design Guidelines to include new requirements, based on modifications to the Phase II General MS4 Permit. The SMR requires compliance with specified stormwater management requirements and provides tools to help project developers achieve compliance. The SMR also requires a signed maintenance agreement and Certification of Acceptable Construction to ensure construction and proper care of the necessary stormwater controls. A project's environmental evaluation should generally assess how and where the implementation of necessary stormwater controls would reduce the potential negative impacts of stormwater runoff.

The proposed project would involve creation and/or replacement of 5,000 sf or more of impervious surface and, therefore, would be subject to San Francisco's stormwater management requirements, as outlined in the Stormwater Management Ordinance and the corresponding SMR. BMPs must be implemented to improve the quality of stormwater before going into the separate stormwater system. For covered projects within SFPUC jurisdiction, the stormwater management approach must manage the 90th percentile, 24-hour storm. As a result, downstream water pollution would be reduced or eliminated by reducing impervious cover, eliminating sources of contaminants, and treating pollutants in stormwater runoff or increasing onsite infiltration. For areas that are within the Port's jurisdiction, the SMR would require projects to capture and treat the stormwater volume for the 85th percentile, 24-hour storm.

Green Building Standards – Stormwater Management. The Port of San Francisco Green Building Standards Code includes stormwater management requirements. The Port of San Francisco building codes became effective in January 2017 and are included as Chapter 1A of the Port of San Francisco Building Code (Section 106A.3.2.4). Sections 4.103.1.2 and 4.103.2.4 of the Port's Building Standards Code describes stormwater management requirements. The City also requires new projects, larger than 250,000 gross square feet, to use onsite "alternate sources" of graywater, rainwater, and foundation water to meet the project's nonpotable demands under Ordinance No. 109-15. Alternate water sources are discussed further in Section 4.K, *Utilities and Service Systems*.

San Francisco Construction Site Runoff Ordinance. To reduce the discharge of pollution to the local storm drain system, the City adopted the Construction Site Runoff Ordinance in 2013. SFPUC manages the Construction Site Runoff Control Program to ensure that all construction sites implement BMPs to control construction site runoff. To help construction professionals

[79] San Francisco Public Utilities Commission. 2016. *San Francisco Stormwater Management Requirements and Design Guidelines.* City and County of San Francisco. May. Available: http://sfwater.org/modules/showdocument.aspx?documentid=9025. Accessed: September 19, 2016.

comply with the requirements, SFPUC developed a construction BMPs handbook.[80] Construction activity within the city that disturbs 5,000 sf or more of ground surface must also submit an Erosion and Sediment Control Plan (ESCP) and an application for a Construction Site Runoff Control Permit prior to commencing construction-related activities. An ESCP is a site-specific plan that details the use, location, and emplacement of sediment and erosion control devices.

San Francisco Batch Wastewater Discharges Permit. Provisions of San Francisco Public Works Code, Article 4.1 (hereinafter referred to as the Sewer Use Ordinance, or SUO), specify pollutant limitations for the discharge of wastewater into the City's sewerage collection system on a temporary basis. Such temporary, or "batch," discharges may result from dewatering construction sites, drilling wells to investigate or mitigate a contaminated site, using water for cleaning or hydrostatic testing of pipes or tanks, or conducting any other activity that generates wastewater, other than routine commercial or industrial processes. If the dewatered water is discharged to the city's combined sewer system, a batch wastewater discharges permit will need to be obtained.

Soil Boring and Well Regulations. If wells are to be used for groundwater dewatering during construction, well use would need to be approved by the San Francisco Department of Public Health, SFPUC, and DTSC. The project would be required to comply with San Francisco's Soil Boring and Well Regulation Ordinance, adopted as Article 12B of the San Francisco Health Code. The use of a groundwater well may affect the beneficial uses of San Francisco's aquifers and, therefore, is required to be reviewed and approved by the San Francisco Department of Public Health and the SFPUC.

San Francisco Maher Ordinance. Properties with potential subsurface chemical contamination that require a grading or building permit may be regulated under the San Francisco Maher Ordinance, Article 22A of the San Francisco Health Code and Article 106A.3.4.2 of the San Francisco Building Code. The Maher Ordinance covers areas with current or historical industrial use or zoning; areas within 100 feet of current or historical underground tanks; former filled Bay, marsh, or creek areas; and areas within 150 feet of a current or former elevated highway.

According to the Expanded Maher Area Map (March 2015), the project site is located within a Maher Area. Compliance with the Maher Ordinance is discussed further in Section 4.O, *Hazards and Hazardous Materials*.

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[80] San Francisco Public Utilities Commission. 2013. *San Francisco Public Utilities Commission Construction Best Management Practices Handbook*. August. Available: http://sfwater.org/modules/showdocument.aspx?documentid=4282. Accessed: October 27, 2015.

San Francisco Integrated Pest Management (IPM) Ordinance. All property leased from the City, including Port land, is subject to the City's IPM Ordinance. The IPM Ordinance requires use of IPM practices, mandates that pesticides be used as a last report, and limits the types of pesticides and conditions under which they can be used.

San Francisco Floodplain Management Ordinance. In 2008, the City adopted the Floodplain Management Ordinance in order to meet the requirements of the NFIP. The ordinance was amended for the floodplain management program established by Chapter 2A, Article XX, Sections 2A.280–2A.285 of the San Francisco Administrative Code, providing requirements for designating floodplains and construction and development in floodplains. The Floodplain Management Ordinance requires new or substantially improved structures in designated flood hazard areas to be protected against flood damage and prohibits uses that would increase flood risks. In areas that have been delineated on the City's Interim Floodplain Map, the ordinance incorporates standards for construction, such as a requirement to elevate new structures above flood elevations, and requires the first floor of structures in flood zones to be constructed above the floodplain or flood-proofed, as set forth in the San Francisco Building Code. The code also requires that subdivision proposals in flood-prone areas be reviewed to ensure that all proposals are consistent with requirements to minimize flood damage within the flood-prone area; all public utilities and facilities, such as sewer, gas, electrical, and water systems, are located and constructed to minimize or eliminate flood damage; and adequate drainage is provided to reduce exposure to flood hazards. The floodplain management ordinance applies only to areas in the existing 100-year flood zone. The project site is not located within a 100-year floodplain, according to the City's Interim Floodplain Map, as illustrated in Figure 4.N-2, page 4.N-14.

San Francisco General Plan. The following objectives and policies within the Environmental Protection Element of the General Plan are relevant to the proposed project:

- Objective 1: Achieve a proper balance among the conservation, utilization, and development of San Francisco's natural resources.
- Policy 1.1: Conserve and protect the natural resources of San Francisco.
- Policy 1.2: Improve the quality of natural resources.
- Policy 1.3: Restore and replenish the supply of natural resources.
- Policy 1.4: Assure that all new development meets strict environmental quality standards and recognizes human needs.
- Objective 3: Bay, Ocean, and Shorelines – Maintain and improve the quality of the bay, ocean, and shoreline areas.

The following policies and actions from the Recreation and Open Space Element of the General Plan pertain to the proposed project:

- Policy 2.4: Support the development of signature public open spaces along the shoreline.
- Policy 3.2: Establish and implement a network of green connections that increase access to parks, open spaces, and the waterfront.
- Policy 3.3: Develop and enhance the city's recreational trail system, linking to the regional hiking and biking trail system and considering restoring historic water courses to improve stormwater management.
- Policy 4.4: Include environmentally sustainable practices in construction, renovation, management, and maintenance of open space and recreation facilities.

The following policies and actions from the Community Safety Element of the General Plan pertain to the proposed project:

- Policy 1.9: Mitigate and assess the risk of flooding in San Francisco by incorporating the Flood Insurance Rate Map for San Francisco and related programs from this map to mitigate against flood risks.
- Policy 1.10: Examine the risk of flooding due to climate change–related effects, such as storm surges, changes in precipitation patterns, and SLR, as well as adaptation actions that will reduce population, built environment, and ecosystem vulnerability due to these threats.
- Policy 1.11: Continue to promote green stormwater management techniques.

ENVIRONMENTAL IMPACTS

This section describes the impact analysis related to hydrology and water quality for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

The proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion of siltation onsite or offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

METHODS FOR ANALYSIS

All project elements were analyzed by comparing baseline conditions, as described in the *Environmental Setting*, to conditions during construction and/or operation of the proposed project. The analysis focused on issues related to surface hydrology, flood hazards, groundwater supply, and surface and groundwater quality. The key construction-related impacts were identified and evaluated qualitatively, based on the physical characteristics of the project site and the magnitude, intensity, location, and duration of activities.

Surface Water Hydrology. The surface water hydrology impact analysis considered potential changes in the physical characteristics of water bodies, impervious surfaces, and drainage patterns throughout the project area as a result of project implementation.

Groundwater Hydrology. Impacts on groundwater supply and recharge were assessed by comparing existing groundwater use and recharge capabilities with project conditions. Recharge is determined by the ability of water to infiltrate into the soil.

Water Quality. Impacts of the proposed project on surface water and groundwater quality were analyzed by comparing existing water quality conditions and potential project water quality conditions. Potential project-related sources of water contaminants generated by industrial and project operational activities, such as vehicle use, building maintenance, pesticide use, trash generation, and the storage or inadvertent release of hazardous materials during project construction, are considered. The potential for water quality objectives to be exceeded and beneficial uses to be compromised is also considered.

Flooding. As discussed in the *Environmental Setting* section, above, the project site is not located within an existing 100-year flood hazard area. Under existing conditions, even 12 inches of SLR plus the 100-year storm surge would cause significant inundation over half of the site. However, after the proposed grading for the project, none of the structures would be in a flood zone, even in 2100 and the highest estimate of SLR of 66 inches.

Under the City's Initial Study Checklist, a project could have a significant impact if it would:

- Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows; or
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

Based on these criteria, the Planning Department considers whether projects located in areas that are prone to flooding, under existing conditions or future conditions with projected SLR, would expose people or structures to significant risks due to flooding. However, in the *California Building Industry Association v. Bay Area Air Quality Management District* case that was decided in 2015, the California Supreme Court held that CEQA does not *generally* require lead agencies to consider how existing hazards or conditions might affect a project's users or residents, except where the project would exacerbate an existing environmental hazard.[81] Accordingly, hazards resulting from a project that places development in an existing or future flood hazard area are not considered impacts under CEQA unless the project would exacerbate the flood hazard. Thus, the analysis below evaluates whether the proposed project would exacerbate existing or future flood hazards in the project area, resulting in a substantial risk of loss injury or death. The impact would be considered significant if the proposed project were to exacerbate future flood hazards by increasing the frequency or severity of flooding or cause flooding to occur in an area that would not be subject to flooding without the project.

The proposed project could exacerbate the anticipated future flood hazards in the project area if it were to increase the frequency or severity of flooding or cause flooding to occur in an area that would not be subject to flooding without the project.

LAND USE ASSUMPTIONS

As described in Chapter 2, *Project Description*, this Draft EIR analyzes two land use assumptions: High Commercial and High Residential. These assumptions represent the full range of land uses and the building program floor area that could be developed on the

[81] *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369.

project site under the proposed flexible zoning for Blocks H, I, and J. Although the land use mix between High Commercial and High Residential would differ, the two assumptions would have similar total square footage, building configuration (with the exception of building height on Blocks H, I, and J), and construction characteristics. Building footprints and excavation depths and volumes would be the same under the two land use assumptions. Therefore, the differences between the two assumptions would not result in any meaningful difference in potential impacts on hydrology and water quality. As such, the following analysis applies to both the High Commercial and High Residential land use assumptions.

TOPICS NOT EVALUATED IN DETAIL

Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. There are no major reservoirs or levees located upstream of the project site. Because there are no major reservoirs or levees upstream of the project site, there would be no exposure of people or structures to flood impacts as a result of dam or levee failure.

Remaining topics for which impact conclusions are reached because construction or operation of the project has the potential to exacerbate site conditions are addressed under Impacts HY-1, violate water quality standards or degrade water quality; HY-2, affect groundwater supplies or recharge; HY-3, alter existing drainage, resulting in erosion or siltation; HY-4, alter existing drainage, resulting in flooding; HY-5, create or contribute to runoff, HY-6 and HY-7, place housing or structures in 100-year flood hazard area or an area affected by flooding due to SLR; and HY-8, result in flooding from tsunami or seiche inundation.

IMPACTS AND MITIGATION MEASURES

Impact HY-1. The proposed project would not violate water quality standards or waste discharge requirements and/or otherwise substantially degrade water quality. (Less than Significant)

CONSTRUCTION

LAND-BASED ACTIVITIES

Implementation of the proposed project would include construction activities, such as asphalt demolition, rough grading and excavation, new building construction, rehabilitation of existing facilities (Pier 48 and associated aprons), paving, and landscaping. Proposed seismic upgrades on the Pier 48 aprons could include demolition, removal of the current asphalt surface, new asphalt or concrete placed on rebuilt surfaces, wood decking, wood framing, and the replacement of deteriorated wood piles where needed. The replacement of existing piles would

be part of Pier 48 rehabilitation, which would involve removal of 675 existing and installation of approximately 106 new piles. Potential impacts related to this component of the proposed project are discussed further below.

Land-disturbing activities and the placement of stockpiles in proximity to storm drain inlets or nearby surface waters may result in a temporary increase in sediment loads in San Francisco Bay. Pollutants, such as nutrients, trace metals, and hydrocarbons attached to sediment, can be transported with sediment to downstream locations and degrade water quality. The delivery, handling, and storage of construction materials and wastes (e.g., concrete debris), as well as the use of heavy construction equipment, could also result in stormwater contamination, thereby affecting water quality. Construction activities may involve the use of chemicals and operation of heavy equipment, which could result in accidental spills of hazardous materials (e.g., fuel and oil) during construction activities. Such spills could enter the groundwater aquifer or nearby surface water bodies from runoff or storm drains. Constituents in fuel, oil, and grease can be acutely toxic to aquatic organisms and/or bioaccumulate in the environment.

All project construction activities would be subject to existing regulatory requirements. Because the area of land disturbance for the proposed project would be more than 1 acre, coverage under the Construction General Permit would be required. The Construction General Permit contains standards to ensure that water quality is not degraded.[82] As part of compliance with the Construction General Permit, standard erosion and sediment control measures and other housekeeping BMPs, such as vehicle and equipment maintenance, material delivery and storage, and solid waste management, would be identified in the SWPPP. These measures would be implemented during construction to reduce contamination and sedimentation in waterways. As a performance standard, BMPs included in the SWPPP would represent the best available technology that is economically achievable and the best conventional pollutant control technology to reduce pollutants. Commonly practiced BMPs consist of a wide variety of measures that can be implemented to reduce pollutants in stormwater and other nonpoint-source runoff. Permittees would also have to comply with the appropriate water quality objectives for the region.

Other measures in the SWPPP would include a range of stormwater control BMPs (e.g., installing silt fences, staked straw wattles, or geofabric to prevent silt runoff to storm drains or waterways). Topsoil and backfill would be stockpiled, protected, and replaced at the conclusion of construction activities. Disturbed soil would be revegetated as soon as possible with the appropriate selection and schedule for turf, plants, and other landscape vegetation.

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[82] State Water Resources Control Board. 2013. *Construction General Permit Stormwater Program*. Last updated: 2013. Available: http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml. Accessed: August 31, 2015.

Construction Dewatering. Construction dewatering in areas of shallow groundwater may be required during excavation activities, which could result in the exposure of pollutants from spills or other activities and may contaminate groundwater. For water to be discharged to the Bay, the contractor would need to notify the San Francisco Bay Regional Water Board and comply with the board's requirements related to the quality of water and discharges. The Construction General Permit includes dewatering activities as authorized nonstormwater discharges, provided that dischargers prove the quality of water to be adequate and not likely to affect beneficial uses. However, there would be requirements in addition to those outlined in the Construction General Permit, including compliance with discharge sampling, monitoring, and reporting requirements, and compliance with the Monitoring and Reporting Program requirements of the VOC and Fuel General Permit (Order No. R2-2012-0012) as well as other approvals by DTSC if contaminated groundwater is encountered. Compliance with WDRs require confirmation that discharges would not require the construction or expansion of existing facilities and also include regulations specific to dewatering activities. If it is found that the groundwater does not meet water quality standards, it must either be treated as necessary prior to discharge so that all applicable water quality objectives (as designated in the Basin Plan) are met or hauled offsite for treatment and disposal at an appropriate waste treatment facility that is permitted to receive such water.

If wells are to be used for groundwater dewatering during construction, the project would be required to comply with San Francisco's Soil Boring and Well Regulation Ordinance, adopted as Article 12B of the San Francisco Health Code. Compliance with WDRs and other dewatering and groundwater regulations will ensure no violations of any water quality standards or WDRs.

Groundwater. Construction activities could result in short-term surface and groundwater quality impacts associated with the input of sediment loads that exceed water quality objectives or chemical spills into storm drains or groundwater aquifers if proper minimization measures are not implemented. However, the proposed project would be required to comply with the Construction General Permit as well as local stormwater and construction site runoff ordinances. These requirements involve development and implementation of a Construction General Permit SWPPP, an ESCP, and a Stormwater Control Plan specific to the project site to minimize water quality impacts related to spills or other activities that could contaminate groundwater. The plans would be developed according to the guidance provided in documents such as the SFPUC SMR and construction BMP handbook.[83] In addition, the proposed project would be required to comply with hazardous material requirements, such as the San Francisco Maher Ordinance for soil and groundwater contamination and

[83] California Stormwater Quality Association. 2015. *Construction BMP Handbook*. Available: https://www.casqa.org/resources/bmp-handbooks/construction. Accessed: April 17, 2017.

Spill Response and Countermeasure Plan (SPCC) requirements, as necessary. More information on hazardous material requirements is provided in Section 4.O, *Hazards and Hazardous Materials*. Compliance with WDRs and dewatering regulations will ensure that dewatering activities are monitored and treated as required and that no violations of any water quality standards or waste discharge requirements occur. Because the project would be required to comply with the regulatory controls described above, potential water quality impacts associated with construction activities and degradation of stormwater runoff would be ***less than significant***.

IN-WATER ACTIVITIES

In-water activities under the proposed project would include the removal of an existing deck and existing creosote-treated timber piles and the installation of both new precast concrete piles and steel-cased concrete-filled piles. Under the proposed project, demolition of the existing perimeter deck would include extracting approximately 675 24-inch rounded creosote-treated timber piles with a vibratory extractor. These piles would be replaced with the installation of 62 new precast concrete piles and 44 new cylindrical, steel-cased concrete-filled piles. The precast concrete piles would be installed using an impact hammer, and the steel-cased piles would be installed with a vibratory driver, located below the proposed reinforced concrete apron.

It is anticipated that the pier deck would be removed first by saw cutting the slab and breaking it up, then catching it in netting or on platforms below. Once the piles are exposed (with the deck portion removed or cut to access piles, if necessary), they would be pulled out of the Bay sediment with use of a barge-mounted crane that would support a vibratory extractor. Rigging straps would be secured to a pile, then the crane would apply a large and steady upward force to dislodge the pile. If the pile cannot be pulled out or breaks, it would be cut approximately 3 feet below the mudline.

The steel shells would be installed using a vibratory driver to provide the appropriate embedment into the dense sand-bearing stratum underlying the Bay Mud layer. The concrete piles would be installed with an impact hammer. Construction work schedules, noise attenuation measures, and other requirements to prevent project construction from affecting aquatic species or habitats are discussed in Section 4.L, *Biological Resources*.

Suspended sediments in the water column can lower levels of dissolved oxygen, increase salinity, increase concentrations of suspended solids, and possibly release chemicals present in sediments into the water. The degree of turbidity resulting from the suspended sediments would vary substantially with the quantity and duration of the construction activity. This would also depend on the methods used, the quality of equipment, and the care of the operator. In all cases, increased turbidity levels would be relatively short in duration and generally confined to within a few hundred yards of the activity. After initial resuspension of sediment,

dispersion would occur, and background levels would be restored within a short time frame. Normal circulation and tidal effects in the Bay would generally disperse and dilute the water that was temporarily affected by construction activities.

Historic pilings along the waterfront, including those that support Pier 48, are typically constructed of wood that has been treated with creosote. Creosote-treated wood is no longer permitted for use in structures on the Bay because of the toxicity to marine organisms. Temporary water quality effects could occur during removal because of resuspension of sediments that contain organic compounds and the debris that could be produced during removal. These in-water construction activities would result in short-term disturbance of localized Bay sediments and temporary impacts on water quality. Although the removal of creosote pilings may release some organic substances, the replacement pilings would be made of steel and concrete and would therefore be nontoxic, resulting in long-term improvement in water quality. Water quality may be temporarily affected by the disturbance of bottom sediments in the project area, but elevated levels of turbidity are expected to be minor, localized, and short-term.

Construction activities within the Bay would be subject to the requirements of a Section 10 permit from USACE, which would receive Water Quality Certification from the Regional Water Board and require a Major Permit from BCDC. As part of the Section 10 permitting, the Regional Water Board would conduct formal consultations with the National Marine Fisheries Service and California Department of Fish and Wildlife for the protection of biological resources (see Section 4.L, *Biological Resources*). The permits would specify BMPs and require preparation and implementation of plans for the protection of water quality (e.g., a Debris Management Plan; a Spill Resource and Countermeasure Plan; equipment fueling requirements to require proper fuel transfer procedures; equipment maintenance requirements to minimize fuel leaks and spills; a Materials Management Disposal Plan; barge mooring requirements to capture construction debris; measures to avoid cement, concrete, and saw water from entering the San Francisco Bay; and measures to ensure proper disposal of construction material).

The limited extent and temporary nature of construction activities in the Bay, as well as implementation of water quality control measures as part of compliance with permit requirements, would ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses, as defined in the Basin Plan. Therefore, water quality impacts related to construction activities in the Bay would be ***less than significant***.

In summary, potential water quality impacts associated with construction activities (including both stormwater quality degradation and degradation of Bay water quality due to resuspension of sediment) would be ***less than significant***.

OPERATION AND MAINTENANCE

The project would involve operation and maintenance of residential, commercial, and active/retail uses, along with associated structured parking, open space and public parks, and landscaping. In addition, the existing Pier 48 would be rehabilitated for a range of uses, including industrial/manufacturing (specifically analyzed as a proposed brewery use), retail, restaurant, exhibition space/museum, and event-related uses. The proposed project would provide public access on the aprons and Channel Wharf, with the potential for expanded maritime uses for recreational/boat launch and other Port maritime tenants. These land uses and operational activities could increase existing or generate new levels of potential pollutants of concern within the project area, such as trash, sediments, pesticides, bacteria, nutrients, metals, oils, and other toxins. These pollutants could reach surface waters in the vicinity through storm drains or direct discharge into China Basin or Lower San Francisco Bay.

Operation and maintenance activities under the proposed project would generate pollutants of concern from landscape maintenance, building maintenance, the storage of materials and substances, maritime operations, and vehicle use. In addition, restaurant uses can result in additional pollutants, such as organic materials (food waste) and oil and grease. However, good housekeeping practices, such as regular trash collection and sweeping, would continue to be implemented onsite.

Runoff from impervious surfaces could contain nonpoint pollution sources that are typical of urban settings. These are normally associated with automobiles, trash, cleaning solutions, and landscaped areas. Stormwater would be drained by new pipes, drainage inlets, and other storm drain facilities, which would be connected to the existing storm drain system that serves the site (Figure 4.N-7, page 4.N-53). All flows from the project site would discharge to new and existing storm drainage facilities and then to the Bay.

For areas that drain directly to Lower San Francisco Bay, the proposed project would be required to comply with San Francisco's stormwater management requirements, as outlined in the Stormwater Management Ordinance and the corresponding SMR, because it would involve creation and/or replacement of 5,000 sf or more of impervious surface. The stormwater management measures at Seawall Lot 337 would utilize LID techniques, such as green roofs, pervious pavements, rain gardens or bio-retention areas, and flow-through planters, to reduce pollutant discharges. These LID features would treat stormwater runoff through biological uptake. Plant materials filter pollutants through their sandy loam substrate while aesthetically enhancing landscape designs. Stormwater management measures would be designed according to the SMR.

The project would comply with the City's SMR for collection and treatment of stormwater prior to discharging to storm drain infrastructure maintained by either the SFPUC or the Port. Both of these jurisdictions control portions of the project site. The project would comply with the SMR

sizing criteria applicable to the jurisdiction responsible for the specific drainage area within the site. Stormwater management performance requirements are based on the available sewer system as well as the jurisdiction of the sewer system. The SFPUC and Port requirements from the SMR are summarized below.

SFPUC Requirement. For project areas that would connect to the City's existing separated storm drain system in Third Street and/or Mission Rock Street, the SMR requires the project to implement a stormwater management plan that results in capture and treatment of all stormwater runoff from the 90th-percentile storm event prior to discharge to the separated storm sewer system.

Port Requirement. For project areas that would be served by the Port's separated storm drain system that outfalls directly to the Bay or China Basin, the SMR requires the project to implement a stormwater management plan that results in capture and treatment of all stormwater runoff from the 85th percentile storm event. [84]

Improvements would be considered parcel by parcel. Improvements to Pier 48 would be limited to proposed life-safety structural and internal building improvements and would not involve ground disturbance (or impervious surface creation/replacement) or alter the current stormwater management system at Pier 48.[85]

Stormwater treatment would be handled through self-contained treatment within specific streets (or "self-treating" streets) and within large-feature rain gardens in China Basin Park, along the Shared Public Way, and in Mission Rock Square, as shown in Figure 4.N-7 on the following page. Runoff would be conveyed by gravity or force main for treatment**.** Self-contained treatment would include pump stations for stormwater treatment flows and overflow from storm flows in excess of treatment flows, which would be applied at the north and south ends of the project site. Rain gardens would receive permanent irrigation from efficient drip irrigation systems.[86] In addition, the proposed project's sustainable stormwater quality control strategy would be designed to achieve compliance with both SFPUC and Port SMR performance requirements, as applicable.

Compliance with the Storm Water Management Ordinance and the corresponding SMR would allow the project to achieve its long-term sustainable approach to planning and design as well as comply with stormwater requirements established by the SFPUC and the Port's MS4 requirements.[87] Therefore, potential surface water quality impacts from project operation would be ***less than significant***.

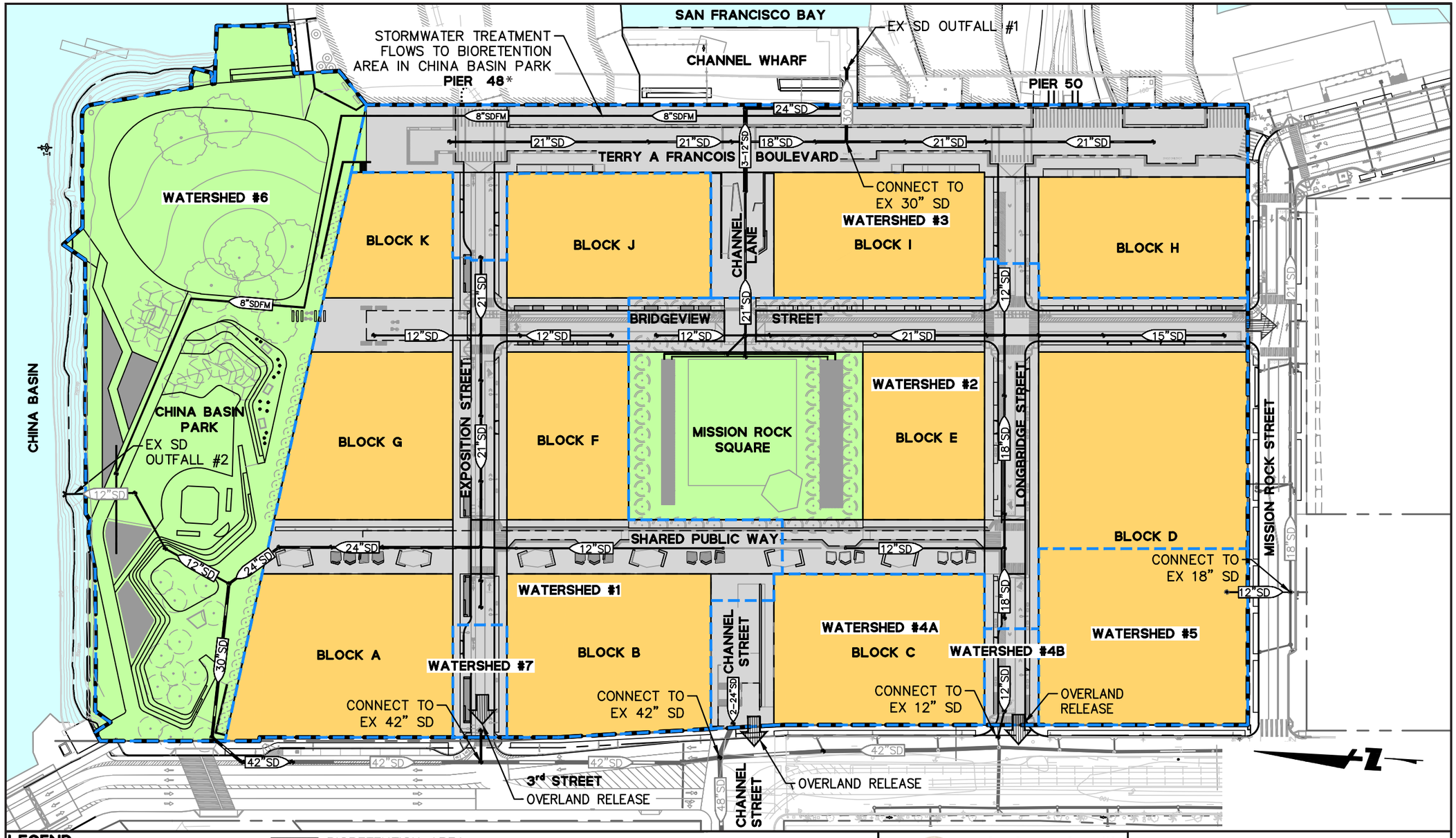
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84 BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

85 BKF Engineers, Surveyors, Planners. 2011. *Sea Wall 337 Infrastructure Analysis*. September 14.

86 Mission Rock DCDG. 2014. *Sustainable Water Systems*. May 16.

87 BKF Engineers, Surveyors, Planners. 2011. *Sea Wall 337 Infrastructure Analysis*. September 14.



GIANTS DEVELOPMENT SERVICES LLC
24 WILLIE MAYS PLAZA
SAN FRANCISCO, CA 94107
415/468-6676
415/468-6678 (FAX)

BKF ENGINEERS
150 CALIFORNIA STREET, STE 650
SAN FRANCISCO, CA 94111
415/930-7900
415/930-7949 (FAX)

Source: BKF Engineers, Surveyors, Planners 2016

* *No drainage changes are expected at Pier 48 with the proposed project.*

Figure 4.N-7
Conceptual Hydrology Plan

Impact HY-2. The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level. (Less than Significant)

CONSTRUCTION

Groundwater beneath the site was found approximately 10 to 20 feet bgs.[88] The maximum excavation depth on land (i.e., for the Mission Rock Square Garage basement) would be approximately 33 feet, including the bottom of the lowest-level foundation slab. Basements within other new buildings constructed under the proposed project would have lesser depths. Although pile driving would be required, the piles would be impacted into the ground and would not require excavation. Construction dewatering in areas of shallow groundwater may be required during excavation activities, which could result in a temporary reduction in groundwater volumes. In the event that groundwater is encountered during construction, dewatering would be conducted on a one-time or temporary basis during the construction phase and would not result in a loss of water that would substantially deplete groundwater supplies. If wells are to be used for groundwater dewatering during construction, the project would be required to comply with San Francisco's Soil Boring and Well Regulation Ordinance. Approval from DTSC must be obtained prior to excavation or other soil-disturbing activities to reduce impacts on groundwater sources. In addition, groundwater within the Downtown San Francisco groundwater basin is not used for water supply. The water supply for construction activities (e.g., dust control, concrete mixing, material washing) would most likely come from nearby hydrants and existing surface supplies and/or would be trucked to the site. Therefore, impacts on groundwater supplies from construction activities would be ***less than significant***.

OPERATION

Natural groundwater recharge of the Downtown San Francisco groundwater basin occurs primarily from infiltration of rainfall, landscape irrigation, and leakage of water and sewer and pipes. New impervious areas can reduce infiltration capacities so that more precipitation runs off into storm sewers or nearby surface waters instead of infiltrating and recharging the underlying aquifer. However, the proposed project would not substantially interfere with groundwater recharge because it would not increase groundwater demand or decrease the size of groundwater recharge areas. The 27-acre project site would include approximately 5.4 acres of new open space, for a total of approximately 8.0 acres of open space on the site, compared to approximately 2.2 acres under the baseline conditions, allowing for an increase in groundwater recharge potential. Additionally, stormwater treatment areas, such as bio-retention areas/large-

[88] Department of Toxic Substances Control. 2002. *Hazardous Soils Report – Covenant to Restrict Use of Property Environmental Restriction, H&H Site located at China Basin Channel and Terry A. Francois Boulevard, City and County of San Francisco.*

feature rain gardens, "self-treating" streets, and other landscape features and open space areas, would allow for increased groundwater infiltration. Furthermore, new vegetation zones would slow water, allowing it to percolate into the ground, thereby providing increased benefits for groundwater recharge. Operation of the proposed project would not utilize groundwater supplies and therefore would not substantially deplete groundwater supplies. Therefore, the proposed project's impact on groundwater supplies and recharge would be ***less than significant***.

Impact HY-3. The proposed project would alter the existing drainage pattern of the site but would not result in substantial erosion or siltation onsite or offsite. (Less than Significant)

CONSTRUCTION

LAND-BASED ACTIVITIES

The proposed project would implement BMPs, described in the project SWPPP, to minimize the potential for erosion and sedimentation in nearby storm drains and temporary changes in drainage during construction. For example, exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways would be enclosed and covered. Efforts would be made by the contractor to conduct the majority of land-disturbing work outside of the typical wet season and minimize the potential for large rain events to mobilize loose sediment during construction.

Where possible, soil excavated onsite would be stockpiled on the site for reuse where fill is required. However, soil import and export would be necessary. Soil would be imported in all areas during the demolition and grading (first) phase (ranging from 15,791 to 33,570 cubic yards [cy]) and during the infrastructure (second) phase (ranging from 3,024 to 4,050 cy). Approximately 9,870 cy of soil would also be imported during the foundation and building (third) phase in Area 3. Soil would be exported from all areas during the demolition and grading (first) phase (ranging from 10,000 to 20,000 cy), the infrastructure (second) phase (ranging from 3,360 to 4,500 cy), and the foundation and building (third) phase (ranging from 7,650 to 103,200 cy). No soil would be imported during the paving and landscaping (fourth) phase. Approximately 23 total acres would be graded during project construction. The finished park and open space grades would be achieved with the placement of either lightweight soil or geofoam (styrofoam blocks), which would both replace and supplement existing fill to achieve no net increase in overall soil weight.

Because the project would disturb more than 5,000 sf, an ESCP must be submitted, further reducing the potential for substantial erosion or siltation onsite/offsite because the ESCP would comprise a site-specific plan that would detail the use, location, and placement of sediment and erosion control devices. The proposed project would be required to comply with existing NPDES Construction General Permit requirements, the City's Construction Site Runoff

Ordinance, and SFPUC Stormwater Management Requirements. The NPDES Construction General Permit requires stormwater discharges not to contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards, including designated beneficial uses of surface waters. The monitoring requirements for sampling and analysis procedures in the Construction General Permit would help determine whether the installed and maintained BMPs would prevent pollutants that may cause or contribute to an exceedance of water quality standards from being discharged from the construction site. Compliance with the Construction General Permit and other regulations would ensure that water quality standards, as defined by the Basin Plan, would be met; therefore, discharges would not violate any waste discharge requirements or otherwise substantially degrade water quality. There are no streams or rivers within the project site, and thus, the proposed project would not alter the course of an existing stream or river. For the above reasons, this impact would be ***less than significant***.

IN-WATER ACTIVITIES

The proposed project would include rehabilitation of existing facilities and seismic upgrades. However, no new structures would be placed on Pier 48; therefore, little to no alteration of the existing drainage pattern would occur on this portion of the project site. Surface runoff would continue to flow from Pier 48 by either directly or indirectly discharging into San Francisco Bay. During rehabilitation of Pier 48, in-water work could result in soil disturbance, with resulting turbidity spikes and siltation in Lower San Francisco Bay. As discussed under Impact HY-1, impacts would be minimized through implementation of BMPs and other measures specified in the Construction General Permit SWPPP, 401 Water Quality Certification, and the 404 Permit. Water quality monitoring for turbidity and other pollutants during construction may be required as part of permit compliance. Therefore, potential impacts to the alteration of existing drainage patterns that could result in substantial erosion or siltation onsite or offsite from construction activities would be ***less than significant***.

OPERATION

New storm drainage infrastructure would replace existing onsite storm drains and be connected to the existing storm drain system that serves the site and convey approximately 37 cubic feet per second of stormwater as shown in Figure 4.N-7, page 4.N-53, and summarized below.

- Watersheds #1 and #6 –Would drain to Third Street (through China Basin Park Promenade)
- Watersheds #2 and #3 – Would drain to existing outfall at Terry A. Francois Boulevard between Pier 48 and Pier 50
- Watershed #4A – Would drain to Third Street at Channel Street
- Watershed #4B – Would drain to Third Street at Longbridge Street

- Watershed #5 – Would drain to Mission Rock Street
- Watershed #7 – Would drain to Third Street at Exposition Street [89]

For the 5-year storm event, the onsite storm drain system would be designed to convey stormwater runoff from the development parcels and streets. For the 100-year storm event, the storm drain system, street section, and street grading would be designed to convey stormwater runoff from the development parcels and streets. In addition, storm drain lateral connections would be installed to serve the proposed development blocks, with sizes based on individual block demands. Although drainage patterns on the project site would be altered, as discussed in detail above, drainage would ultimately be improved because the project design would include new high-quality drainage infrastructure as well as bio-retention areas, rain gardens, and flow-through planter areas to minimize runoff, erosion, and siltation. The existing, largely impervious 27-acre project site would include approximately 5.4 acres of new open space, for a total of approximately 8.0 acres of open space on the site, allowing for a significant increase in pervious surfaces at the project site. Additionally, stormwater treatment areas, such as bio-retention areas/large-feature rain gardens, "self-treating" streets, and other landscape features and open space areas, would provide additional pervious surfaces. The proposed conceptual plan for project storm drain system improvements is shown in Figure 4.N-7, page 4.N-53.

New and renovated facilities would be drained by a combination of new and existing storm drains. As part of redevelopment, existing storm drainage infrastructure within the Seawall Lot 337 site, China Basin Park, and Terry A. Francois Boulevard would be removed. Storm drainage infrastructure within Pier 48 would remain intact. A series of inlets located at low points or overflow structures within stormwater management facilities located throughout the site would discharge storm drainage runoff to the proposed storm drain collection system.

Operation of the proposed project would require soil stabilization (e.g., vegetation or other protective cover, stabilized slopes and fills) in accordance with San Francisco stormwater requirements. With implementation of LID features, such as bio-retention areas, and additional open space, the potential for erosion and siltation at the project site would be reduced. Additionally, operation of the proposed project would not alter the course of an existing stream or river because these features do not exist onsite. Based on the above, impacts related to substantial erosion or siltation onsite or offsite from project alterations to existing drainage patterns would be ***less than significant***.

[89] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock DEIR Hydrology Description Memorandum*. October 13.

Impact HY-4. The proposed project would alter the existing drainage pattern of the site but would not result in a substantial increase in the rate or amount of surface runoff in a matter that would result in flooding onsite or offsite. (Less than Significant)

CONSTRUCTION

Project construction activities may alter existing drainage patterns and result in temporary increases in the rate or amount of local surface runoff (onsite) and temporary flooding. The existing onsite storm drain system would be replaced with a new storm drain system and be connected to the existing storm drain systems that serve the project site. The proposed conceptual drainage areas and outfalls for the project are shown in Figure 4.N-7, page 4.N-53, and summarized in Impact HY-3, above.[90] The proposed separated storm drain system would be designed in accordance with applicable regulations and the 2016 SMR Guidelines. The onsite storm drain system would be designed to convey stormwater runoff from development parcels and streets for the 5-year storm event. For the 100-year storm event and overland release, the storm drain system, street section, and street grading would convey stormwater runoff.

Although drainage patterns on the project site would be altered, drainage would ultimately be improved because project implementation would result in new drainage infrastructure and connections to the existing storm drain systems that serve the site, as discussed above. Preparation and implementation of the project SWPPP would reduce the potential for flooding onsite/offsite as a result of altering existing drainage patterns or substantially increasing the rate or amount of runoff. As part of the SWPPP, erosion and sediment control measures, such as silt fences and straw wattles, to prevent sediment from entering storm drains and surface waters, would be implemented during construction. The proposed project would be required to comply with existing NPDES Construction General Permit requirements, the City's Construction Site Runoff Ordinance, and SFPUC Stormwater Management Requirements. The NPDES Construction General Permit aims to match post-construction runoff to pre-construction runoff for the 85th-percentile storm event. In addition, the SWPPP is required to include a description of all post-construction BMPs. Preparation and implementation of the grading plan and the SWPPP would reduce the potential for a substantial increase in the rate or amount of runoff as well as the potential for flooding onsite or offsite. An effective stormwater management strategy must address the full suite of storm events, including consideration of water quality, overbank flood protection, and extreme flood protection. Through compliance with these regulations, this impact would be ***less than significant***.

[90] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

OPERATION

The project design would incorporate soil stabilization measures (e.g., vegetation and other protective cover, stabilized slopes and fills) as part of stormwater management measures, in accordance with San Francisco stormwater requirements. LID techniques within the project area, such as bio-retention areas, rain gardens, and flow-through planter areas, would allow for infiltration and minimize runoff volumes as well as the potential for ponding and onsite or offsite flooding during rain events. Because the proposed project would involve creation and/or replacement of 5,000 sf or more of impervious surface, the project would be subject to San Francisco's stormwater management requirements, as outlined in the Stormwater Management Ordinance and the San Francisco SMR.

The proposed project must prepare a Stormwater Control Plan(s), demonstrating project adherence to the performance measures outlined in the SMR, including stormwater treatment in areas with separate sewer systems. The MS4 requires a post-construction BMP condition assessment to inventory and assess the maintenance condition of structural post-construction BMPs. In addition, the NPDES Construction General Permit aims to match post-construction runoff to pre-construction runoff for the 85th-percentile storm event. Therefore, impacts related to altering existing drainage patterns or substantially increasing the rate or amount of runoff would be ***less than significant***.

Impact HY-5. The proposed project would not create or contribute runoff water that would exceed the capacity of the planned stormwater drainage system or provide additional sources of polluted runoff. (Less than Significant)

CONSTRUCTION

During construction, the proposed project would be required to meet several criteria (e.g., Stormwater Control Plan, ESCP, Construction Site Runoff Ordinance), including capture and treatment of the 90th percentile, 24-hour storm and implementation of BMPs to control construction site runoff, ensure proper stormwater control, reduce the discharge of pollution to the storm drain system, and ensure sufficient storm drain capacity for the proposed project. The proposed project would not create or contribute runoff water that would exceed the capacity of the existing stormwater drainage systems. The impact associated with project construction would be ***less than significant***.

OPERATION

New and renovated facilities would be drained by a combination of new and existing storm drains. To serve proposed development parcels, storm drain lateral connections would be installed, with sizes based on individual parcel demands, as shown in Figure 4.N-7, page 4.N-53.[91]

[91] BKF Engineers, Surveyors, Planners. 2011. *Sea Wall 337 Infrastructure Analysis*. September 14.

A 42-inch storm drain main between Channel Street and the proposed Exposition Street and a 30-inch main between Exposition Street and Lefty O'Doul Bridge are planned on Third Street. Construction and design of the 42- and 30-inch mains within Third Street would be the responsibility of the Mission Bay Development Group and initiated with the development of adjacent properties, which include Block 1. To ensure that the size of the infrastructure for Mission Bay development would be adequate with respect to serving the proposed project, the existing parking lot, which is part of Mission Bay Drainage Area D, was used to size Stormwater Pump Station No. 3, which discharges stormwater to China Basin Channel. Stormwater Pump Station No. 3 is located within the east corner of Mission Creek Park, at the west corner of Channel Street and Fourth Street. Stormwater Pump Station No. 3 was sized for the 5-year storm event to serve Giants Lot A, which includes drainage from the 30- and 42-inch storm drain within Third Street. In addition, the proposed project would reduce the amount of impervious area and overall stormwater runoff draining to the 30- and 42-inch storm drains within Third Street; therefore, the 30- and 42-inch mains would have capacity for the project. Drainage areas have been designed with more proposed flows being directed to the existing Port outfalls compared to the SFPUC system in Mission Bay. Analysis has shown that there is sufficient capacity for flows to the outfalls.[92] Within the new streets that would serve the proposed project, new 12- to 36-inch storm drainage pipe infrastructure would be installed. This would include the proposed realignment of Terry A. Francois Boulevard.[93]

The majority of the existing project site is paved, and therefore, the amount of new impervious surface would be minimal and would not increase stormwater runoff rates and volumes. In addition, the project design would include stormwater management measures, such as bio-retention areas, rain gardens, and flow-through planter areas, all of which would reduce the volume of runoff entering the storm sewer system. The Construction Site Runoff Ordinance includes implementation of BMPs to control construction site runoff and reduce the discharge of pollution to storm drain system. It also ensures that water quality standards and objectives, as designated by the Basin Plan, are achieved. The project would be designed to meet the SMR. Development parcels would be required to implement stormwater treatment measures either at the parcel or within centralized stormwater management areas within China Basin Park and Mission Rock Square to meet the guidelines prior to connecting to the storm drain system. In addition, through compliance with the Port's Green Building Standards Code requirements and implementation of San Francisco Stormwater Management Requirements, runoff water from the project site would not exceed the capacity of existing or planned stormwater drainage systems, and this impact would be ***less than significant***.

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[92] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock DEIR Hydrology Description Memorandum*. October 13.

[93] BKF Engineers, Surveyors, Planners. 2011. *Sea Wall 337 Infrastructure Analysis*. September 14.

Impact HY-6. The proposed project would not place housing within a 100-year flood hazard area. The proposed project may place housing in areas that could be inundated by flooding due to SLR but would not exacerbate the frequency or severity of flooding or cause flooding in areas that otherwise would not be subject to flooding without the project. (Less than Significant)

Factors that could exacerbate flooding issues along the waterfront portion of the project site include changes in the shape and configuration of the shoreline as well as construction of in-bay structures or enclosures such as jetties, breakwaters, or marinas that could change circulation patterns in San Francisco Bay in the vicinity of the project site. China Basin Park would maintain shoreline elevations close to the existing grade of approximately 11.3 feet NAVD88. When the sea level rises above 48 inches, the park would function as a space where future adaptations would provide flood protection for public access features, such as the promenades. Pier 48 and Pier 50 would also be maintained at existing elevations. [94] The final shape of the shoreline along the waterfront portion of the project site would be substantially the same as existing conditions. Further, the proposed project would not include the construction of any new in-water structures other than the removal and replacement of existing piles at Pier 48. For these reasons, the project would not substantially affect the patterns of flood flows at the project site or in the vicinity.

The proposed project would raise grades up to an elevation of 15.3 feet NAVD88 to finished floor elevations, which would provide 5.5 feet (66 inches) of freeboard[95] above present-day BFE for the development area, to accommodate for the projected 2100 SLR estimates. The Project would review adaptive management strategies in the future and determine the feasibility of solutions if and when the need for such strategies arises. Strategies have been developed for the project site, the shoreline, and the pier. Strategies include setting minimum grades and raising the Promenade and Bay Trail within China Basin Park to provide projection from inundation.[96] Although the proposed project would include construction of housing, any proposed housing or structures would be constructed more than 100 feet inland from the shoreline and would not be constructed within an identified 100-year flood zone. When the effects of SLR are considered with both the projected 2050 (12 inches of SLR) and 2100 (36 inches of SLR), only the perimeter of the site is vulnerable to flooding. But, when the effects of 100-year storm surge are considered, over half of the site east of Pier 48 would be vulnerable to flooding at the mid-century level of the SLR scenario, and the entire site west of Pier 48 would be vulnerable to flooding with projected end-of-century SLR.

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94 BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

95 Freeboard is a factor of safety, usually expressed in feet above a flood level for purposes of floodplain management. Freeboard tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

96 BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

However, development of the proposed project would raise minimum elevation of the development footprint to the BFE plus an allowance of 66 inches (5.5 feet) for future SLR. Under daily flooding conditions, no flooding would be observed as the site is higher than flood elevations that would result from daily flooding, as well as future SLR conditions projected by 2050 (12 inches of SLR). With future SLR conditions projected by 2100 (36 inches of SLR), potential ponding at low spots is expected, primarily due to the inability of storm water to exit the site due to high tides in the Bay. When the 100-year storm surge is considered with present day conditions, no flooding within the development footprint is expected, as the proposed elevations are significantly higher than this elevation. However, there is potential for ponding on City streets at low spots. In addition, significant portions of the streets are lower than the flood elevation, and large-scale flooding of adjacent city streets would occur with mid-century level of the SLR scenario in addition to the 100-year storm surge, and large scale flooding would occur at all adjacent streets with end-of-century SLR in addition to a 100-year storm surge.[97] Therefore, the project would not exacerbate the frequency or severity of flooding or cause flooding in areas that otherwise would not be subject to flooding without the project because it would not change the shape or configuration of the shoreline or add in-water features that would alter circulation patterns or redirect flood flows. Further, the project site is predominantly impervious; project design would reduce the amount of impervious area, thereby reducing flood flows. Therefore, the project would not place housing within a 100-year flood zone or exacerbate the frequency or severity of flooding or cause flooding in areas with housing that otherwise would not be subject to flooding without the project and flooding impacts associated with housing would be ***less than significant***.

Impact HY-7: The proposed project would not place structures within a 100-year flood hazard area. The proposed project may place structures in areas that could be inundated by flooding due to SLR but would not exacerbate the frequency or severity of flooding or cause flooding in areas that otherwise would not be subject to flooding without the project. (Less than Significant)

The existing finished grades in Mission Bay adjacent to the project site range from elevations of 8.3 to 11.8 feet NAVD88. Grading and hydrology designs for Mission Bay were established prior to the more recent SLR investigations of the past 8 years and would not accommodate the 2100 high SLR estimates.[98] Under existing conditions, the project site (with the exception of Pier 48 and a small area along the north side of the site) could be temporarily flooded to a maximum depth of 2 feet as a result of 36 inches of SLR in combination with 100-year storm surge. This is the amount of SLR that the NRC projects will occur by 2100. The NRC Report

[97] Moffatt & Nichol. 2017. Coastal Flooding Limits for No-Project and Proposed Project Conditions Mission Rock Development Seawall Lot 337 M&N Job No: 7530-02. March 28.

[98] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

concludes that the worst-case amount of SLR would raise San Francisco Bay water levels by up to 66 inches by 2100. In combination with 100-year storm surge, this amount of SLR would flood the entire project site, with the exception of Pier 48, to a maximum depth of 6 feet with the current site grade. The flood levels associated with both scenarios are 12.8 feet NAVD88 and 15.3 feet NAVD88, respectively. Pier 48 is not within an anticipated future flood zone, even under the worst-case scenario of 66 inches of SLR in combination with a 100-year storm surge.[99]

As described above under Impact HY-6, proposed project would raise grades up to an elevation of 15.3 feet NAVD88 to finished floor elevations, which would provide a minimum of 5.5 feet (66 inches) of freeboard above present-day BFE for the development area. Further, the project would raise the center of site to approximate elevations of 14.8 to 15.8 feet NAVD88 to accommodate protection from the 2100 SLR projections.[100,101] No flooding would be observed under daily flooding conditions and mid-century SLR conditions, with the exception of potential ponding at low spots with end-of-century SLR scenarios. Although there is potential for ponding on streets at low spots when the 100-year storm surge is considered under current conditions, and large-scale flooding of adjacent city streets would occur with both the mid-century and end-of-century SLR scenarios when the 100-year storm surge is considered, no flooding within the development footprint is expected.[102] Therefore, the project would not exacerbate the frequency or severity of flooding. Raising the inland grade to this elevation would protect buildings and immovable facilities such as roadways from flooding from 66 inches of SLR in combination with a 100-year storm surge. China Basin Park would maintain shoreline elevations close to the existing grade of approximately 11.3 feet NAVD88. Grades across the park would transition between lower areas at existing grade and bio-retention areas, and raised or sloped landscape areas between the Bay Trail and the promenade. The Bay Trail would be elevated to approximately 13.3 feet NAVD88 through the center of the park to provide 6 feet of freeboard from the 2016 King Tide elevation of 7.3 feet NAVD88. The promenade, located on the south side of the park along the northernmost development blocks, would be elevated to an elevation of approximately 14.8-15.3 feet NAVD88 in relationship to the ground floors of adjacent buildings. These elevated areas in the park would preserve public access and help ensure that accessible paths of travel remain free of flood water except in extreme storm events, according to sea level rise projections for year 2100. Future adaptations would be implemented as required to maintain flood protection for existing public access features.

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99 BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

100 BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

101 Moffatt & Nichol. 2017. Coastal Flooding Limits for No-Project and Proposed Project Conditions Mission Rock Development Seawall Lot 337 M&N Job No: 7530-02. March 28.

102 Moffatt & Nichol. 2017. Coastal Flooding Limits for No-Project and Proposed Project Conditions Mission Rock Development Seawall Lot 337 M&N Job No: 7530-02. March 28.

As for existing flooding conditions, factors that could exacerbate flooding and increase the potential for coastal erosion along the waterfront portion of the project site include changes in the shape and configuration of the shoreline as well as construction of in-bay structures or enclosures such as jetties, breakwaters, or marinas that could change circulation patterns in San Francisco Bay at the project site and in the vicinity. Because the final slope and shape of the shoreline along the project waterfront portion of the project site would be substantially the same as existing conditions and the proposed project would not include the construction of any new in-water structures, the patterns of flood flows and the potential for coastal erosion at the project site and in the vicinity would not be substantially affected.

The proposed project would not include additional stormwater discharges or other discharges that would increase the frequency or severity of flooding. As discussed above in Impact HY-4, the proposed storm drain system would be designed in accordance with applicable regulations and the 2016 SMR Guidelines. All new development is required to handle stormwater that ensures that flooding will not increase and flood flows will not be redirected to other areas that are not currently prone to flooding. The overland release plan in the adjacent Mission Bay area avoids overland release around the project site. Overland release for the area is towards China Basin Channel or discharges into the Bay, along existing streets. Development within the project site will not impede flow. Rehabilitation of Pier 48 could include interior and exterior improvements and apron repair or replacement, but the overall structures and sizes would not change; therefore, there would be no changes with respect to the ability of the existing buildings to impede or redirect flood flows. The overland release plan for stormwater flow avoids overland release around the project site. The overland release for the areas west of Third Street is west, towards 4th Street and Channel Street, prior to discharge into the Bay. Development within the project site or raising the Mission Rock site will not impede stormwater flow. Further, the project site is predominantly impervious; project design would reduce the amount of impervious area, thereby reducing flood flows. The project would not exacerbate flooding due to SLR at the project site. The proposed project would not cause flooding to occur in areas that would not be subject to flooding without the proposed project for the reasons stated above. Therefore, impacts related to the placement of structures within a 100-year flood zone and the impedance or redirection of flood flows within an existing 100-year flood zone would be ***less than significant***.

Impact HY-8. The project area is subject to flooding from tsunami inundation, but the project would not exacerbate flooding or cause flooding in areas that otherwise would not be subject to flooding without the project. The project site is not subject to inundation by seiche or mudflows. (Less than Significant)

According to the State of California Tsunami Inundation Map for Emergency Planning (San Francisco North Quadrangle/San Francisco South Quadrangle), the majority of the project site is currently subject to flooding from tsunami inundation, with flooding up to an elevation of

about 12.7 feet NAVD88. However, the southwest portion of the site (Block C and the western half of Block D) is not located within a designated tsunami inundation area.[103] As explained above in Impact HY-6, the project would not exacerbate the frequency or severity of flooding or cause flooding in areas that otherwise would not be subject to flooding without the project because it would not change the shape or configuration of the shoreline or add in-water features that would alter circulation patterns or redirect flood flows. Further, the project would be designed to provide better protection for structures from flooding from tsunami inundation than current elevations provide by raising the site grade. While tsunami emergency preparedness planning focuses on the maximum credible event elevation, the design of the proposed project focuses on flood protection under most circumstances. The estimate for the 100-year tsunami event from the U.S. Army Waterways Experiment Station, which produces a minimum site grade of 8.2 feet NAVD88, without an allowance for SLR, is appropriate for purposes of establishing a minimum site grade, as it would provide for flood protection under more common extreme high tide events and most tsunami events under existing conditions.[104] In addition, the project site is predominantly impervious; project design would reduce the amount of impervious area, thereby reducing flood flows.

To protect people and structures from a significant risk of loss or injury due to tsunami hazards in the future with anticipated SLR, the project's grading elevations would consider SLR, and would exceed the minimum grade requirements. The project's minimum design criteria would provide a minimum finished floor elevation of 15.3 feet NAVD88, to accommodate for the projected 2100 SLR estimates.[105]

The project area is adjacent to Lower San Francisco Bay; therefore, the proposed project is not subject to inundation by a seiche. The project area is not within a designated landslide area. Therefore, the proposed project would not be subject to inundation by mudflows.

The project area is subject to flooding from tsunami inundation now; the project would not exacerbate flooding or cause flooding in areas that otherwise would not be subject to flooding without the project. It would raise the existing grade thereby reducing current risks that exist at the site associated with flooding from tsunami. The project site is not subject to inundation by seiche or mudflows. Therefore, impacts related to flooding from inundation by tsunami, seiche, or mudflow would be ***less than significant***.

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[103] California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS). 2009. *Tsunamic Inundation Map for Emergency Planning*. State of California, City and County of San Francisco. San Francisco North Quadrangle/San Francisco South Quadrangle. June 15.

[104] Moffat and Nichol. 2011. *Seawall Lot 337 Redevelopment – Waterside Improvements*. M&N Job No: 7530. November.

[105] BKF Engineers, Surveyors, Planners. 2016. *Mission Rock Infrastructure Plan*. September 20.

CUMULATIVE IMPACTS

The geographic context for the analysis of cumulative impacts associated with surface hydrology and water quality is the Mission Creek subwatershed. The context for groundwater hydrology is the Downtown San Francisco groundwater basin in the larger San Francisco Bay Hydrologic Region. The Mission Creek subwatershed is considered already built out. Consequently, potential growth would most likely occur as redevelopment and not extensive new development on vacant land or open space. The context for cumulative hydrology and water quality impacts is geographic and a function of whether impacts could affect surface water features/watersheds, the city's storm drainage system, or groundwater, each of which has its own physical boundary. This analysis accounts for anticipated cumulative growth within the potentially affected geographic area.

Impact C-HY-1. Cumulative Water Quality Impacts. The proposed project, in combination with other foreseeable development in the vicinity, would not contribute considerably to cumulative impacts on water quality. (Less than Significant)

Development of the proposed project, combined with other past and future development or redevelopment within the potentially affected geographic area (the Mission Creek subwatershed for surface water quality and the Downtown San Francisco groundwater basin for groundwater quality), could degrade stormwater quality through an increase in impervious surface area and an increase in contaminated runoff (see Table 4-1 in Chapter 4, *Environmental Setting and Impacts*, for projects in the area that could affect water quality). This could ultimately violate water quality standards, affect beneficial uses, and/or further impair 303(d)-listed waters within the Mission Creek subwatershed (of the larger Lower San Francisco Bay watershed) and the Downtown San Francisco groundwater basin. The quality of stormwater runoff varies with surrounding land uses, topography, and the amount of impervious cover as well as the intensity (energy) and frequency of irrigation or rainfall. During construction, runoff may contain sediments and other construction materials and wastes (e.g., concrete debris), resulting from activities such as site clearing and grubbing, demolition and the removal of existing structures and pavement, cut-and-fill activities, grading and excavation, paving, building construction, tree removal, and landscaping. During operation, runoff may contain oil, grease, and metals that accumulated in streets and driveways as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-depriving substances from landscaped areas. The highest pollutant concentrations are generally in stormwater runoff generated at the beginning of the wet season and during the "first-flush," when approximately 80 percent of total accumulated pollutants are washed off surfaces with the first 0.5 inch of rainfall. Street surfaces are the primary source of pollutants in urban areas.

Other development could affect water quality if the land use changes, the intensity changes, and/or drainage conditions are altered to facilitate the introduction of pollutants to surface or

groundwater resources. Changes in land use would alter the associated type and amount of pollutants in stormwater runoff (e.g., higher fecal coliform concentrations in runoff from residential lands compared with commercial lands). An increased intensity in land use would increase potential pollutant loads. Alterations in drainage patterns could increase pollutant loads by increasing the amount of stormwater runoff and downstream flow, thereby transporting pollutants in stormwater runoff; cause or contribute to erosion if the rate of runoff is increased; or expose vulnerable areas to infiltration or runoff. Several blocks in the area are currently under development but would be completed by the time construction of the proposed project commences. Parcels adjacent to the project site are in various stages of completion. These adjacent parcels are vacant, serving temporarily as surface parking lots, under construction, or used for construction staging and therefore potential sources of stormwater contamination.

To prevent short-term (construction) impacts on water quality, construction of nearby projects would need to comply with the requirements of the NPDES Construction General Permit and the SFPUC's Construction Site Runoff Ordinance. If the dewatering of natural groundwater would require a discharge into surface waters or nearby storm drains, future projects would be required to comply with the dewatering requirements of the San Francisco Bay Regional Water Board or the City's batch wastewater discharges permit, depending on the location of discharge, to prevent potential water quality impacts on surface waters. In addition, future projects would be required to comply with hazardous material requirements, such as the San Francisco Maher Ordinance for soil and groundwater contamination as well as SPCC requirements, as necessary. Project operations would be subject to San Francisco stormwater and the Port's Green Building Standards Code requirements as well as other stormwater requirements established by CCSF and the Port's MS4 programs. The applicable regulations, which have been developed to protect water quality, as defined in the Basin Plan, require implementation of stormwater BMPs. Because the proposed project and other foreseeable projects in the vicinity would be required to comply with these regulations, cumulative impacts would be ***less than significant***.

Impact C-HY-2. Cumulative Groundwater Impacts. The proposed project, in combination with other foreseeable development in the vicinity, would not contribute considerably to cumulative impacts on groundwater recharge and supplies. (Less than Significant)

During construction of other reasonably foreseeable development projects within the Mission Creek subwatershed and Downtown San Francisco groundwater basin, potential dewatering could be conducted on a one-time or temporary basis during the construction phase but would not result in a loss of water that would deplete groundwater supplies. During operation, new impervious areas can reduce the potential for groundwater recharge. Groundwater recharge in the Downtown San Francisco groundwater basin, an area where other projects would be located, occurs through infiltration of precipitation, landscape irrigation, and leakage from water and sewer and pipes. Most other reasonably foreseeable projects in the basin would be redevelopment or infill projects in highly urbanized areas where recharge would not occur.

Development in highly urbanized areas would not be expected to increase the amount of impervious surfaces substantially because this development would be occurring mostly in areas with a substantial amount of existing impervious surfaces. Therefore, groundwater recharge from percolating rainfall would not be adversely affected, and an indirect lowering of the local groundwater table is not likely to occur. However, development outside of areas with prior impervious surfaces could affect groundwater recharge, and the effects may be cumulatively significant. Groundwater within the Downtown San Francisco groundwater basin is not used for water supply. Therefore, the water supply necessary for construction and operation of other development projects would not reduce the volume of groundwater within the Downtown San Francisco basin.

Because of the lack of groundwater use and the presence of existing impervious surfaces on the project site, the project site would contribute only minimally to cumulative impacts on groundwater recharge, and thus, impacts related to development of the proposed project would not be cumulatively considerable and would be ***less than significant*** with respect to any potential cumulative loss of groundwater recharge and supply.

Impact C-HY-3. Cumulative Storm Drain Impacts. The proposed project, in combination with other foreseeable development in the vicinity, would not contribute considerably to cumulative impacts on storm drain capacity. (Less than Significant)

Other reasonably foreseeable development projects in the vicinity could increase the rate and volume of stormwater runoff if there were an overall increase in impervious surfaces. The existing onsite storm drain system would be replaced on the project site with new storm drain systems and would connect to the existing offsite storm drain systems that serve the site. It is likely that other projects would also be connected to the existing system, through either existing or new storm drain systems. Increases in the rate or volume of stormwater runoff can cause localized flooding if storm drain capacity is exceeded or if flows exceed channel capacities and are conveyed to overbank areas where flood storage may not be available. Generally, other projects would occur in areas that are already highly developed with impervious surfaces; therefore, changes in flows that could increase localized flood risks would not be expected to be substantial. Also, a new drainage infrastructure is expected in the project area. All projects would be required to include design features to reduce flows to pre-project conditions, consistent with San Francisco stormwater requirements and the City's Floodplain Management Ordinance. Thus, cumulative impacts on storm drainage capacity would be ***less than significant***.

Impact C-HY-4. Cumulative Flooding Impacts. The proposed project, in combination with other foreseeable development in the vicinity, would not contribute considerably to cumulative impacts on flooding. (Less than Significant)

As described above, parts of the project area are subject to flooding. Most redevelopment, including the project, would be designed to reduce the amount of impervious area, thereby reducing flood flows. All new development is required to handle stormwater in a manner that ensures that flooding will not increase and flood flows will not be redirected to other areas that are not currently prone to flooding. The overland release plan in the adjacent Mission Bay area avoids overland release around the project site. Overland release for the area is towards China Basin Channel or discharges into the Bay, along existing streets. Development within the project site will not impede flow. Development that is not located in existing or future flood-prone areas would have no effect on contributing to cumulative impacts related to flooding. The potential for increased flooding due to coastal flooding as a result of wave action is limited because of the orientation of the area in China Basin, which serves as protection from southerly wind-induced waves. In addition, new development would be designed to not exacerbate the frequency or severity of flooding or cause flooding in areas that otherwise would not be subject to flooding without the project by maintaining the shape or configuration of the shoreline or not adding in-water features that would alter circulation patterns or redirect flood flows. Existing regulations and requirements, such as the San Francisco Floodplain Management Ordinance, in general, require site-specific actions for projects within the 100-year flood zone depicted on the 2008 interim flood maps to protect against increasing flood levels and placing people or structures at risk of flood flows. Compliance by other reasonably foreseeable development projects to relevant regulations would also reduce or avoid any significant cumulative impact.

The proposed project would be required to address 100-year flood events by designing an onsite drainage system that would avoid any increase in 100-year flood levels in Mission Creek, per existing regulations, and avoid any increase in flood flows. The proposed project would also address the risk of SLR by designing proposed buildings to minimize the risk of flooding, dependent on the approach to addressing risks from rising sea levels. Examples of design features which minimize flood hazard risks include anchoring and floodproofing; using materials and utility equipment that resist flood damage; requiring electrical, heating, ventilation, plumbing, and service facilities to be designed and/or located to prevent water from entering or accumulating within the components during flood conditions. Therefore, the proposed project (with grading options and LID measures, such as bio-retention areas) would not contribute to any potential cumulative impacts related to increased flood levels, and such cumulative impacts would be ***less than significant***.

4.O HAZARDS AND HAZARDOUS MATERIALS

This section describes hazardous material and other public health and safety issues associated with construction and operation of the Seawall Lot 337 and Pier 48 Mixed-Use Project (Mission Rock Project or proposed project). Public safety concerns, discussed below, include potential exposure to hazardous materials in soil, soil gas, groundwater, and building materials, as well as emergency response and evacuation plans. The environmental impacts section defines the criteria of significance and identifies potential impacts related to hazards and hazardous materials that could result from project implementation. The analysis is based in part on the Site History Report, Seawall Lot 337/Pier 48 Mixed-Use Project, San Francisco, California (Site History Report), prepared for the proposed project by BASELINE Environmental Consulting, dated April 2014, which is included as Appendix 10 to this Draft Environmental Impact Report (Draft EIR).

No comments pertaining to hazards and hazardous materials were received in response to the notice of preparation (NOP).

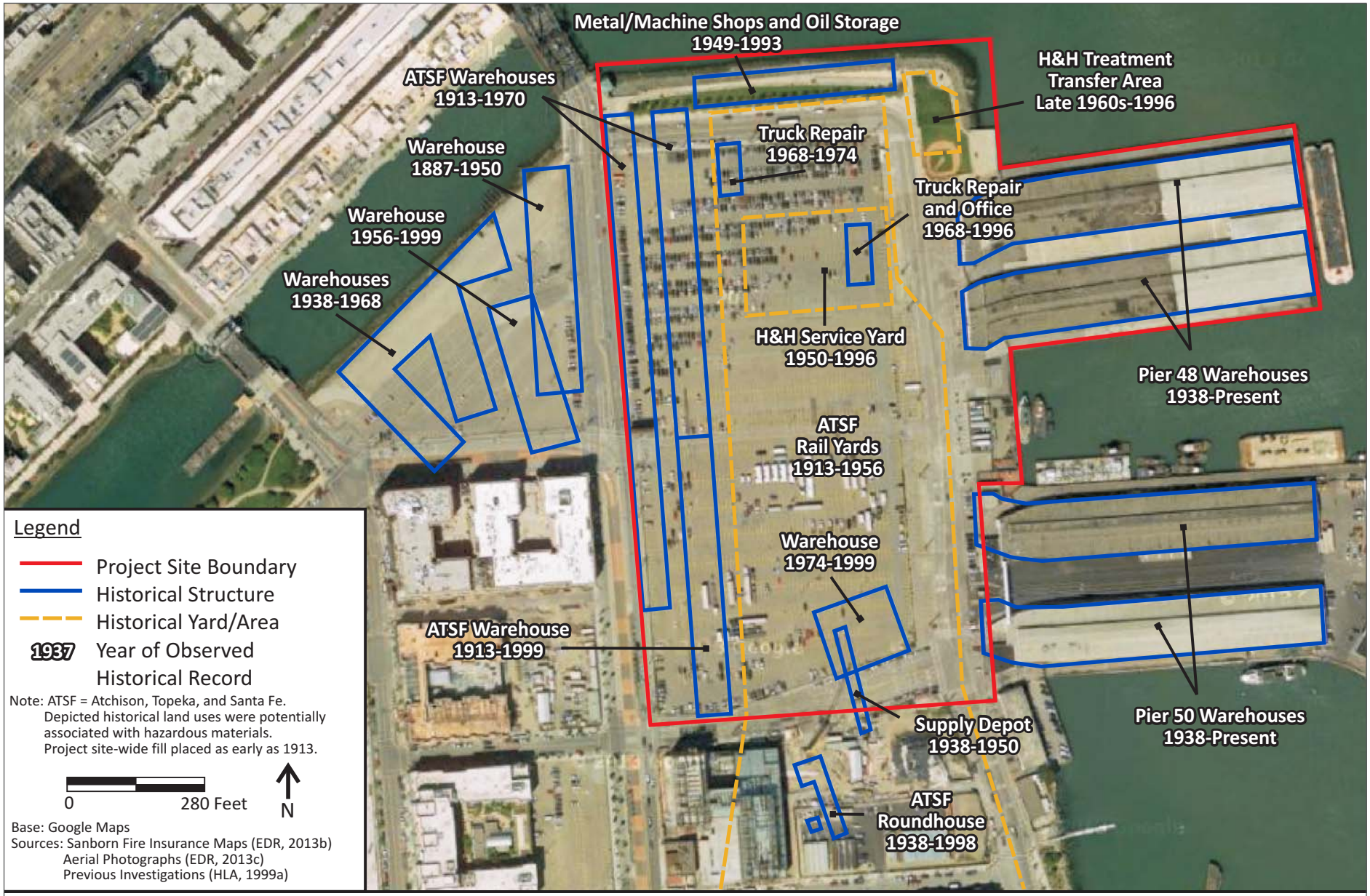
ENVIRONMENTAL SETTING

The following section summarizes existing conditions as they pertain to hazards and hazardous materials. Consideration is given to schools, airports, emergency response and evacuation plans, and wildland fire. As used in this section, the term "hazardous material" is defined as any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or the environment if released into the workplace or the environment.[1]

HISTORIC LAND USES

The project site was created, as early as 1913, by placing fill materials along the San Francisco Bay (Bay) shoreline. As shown in Figure 4.O-1 on the following page, former uses on the project site associated with the use, storage, and/or handling of hazardous materials include railway yards and associated structures, metal/machine shops, truck repair shops, and a hazardous waste treatment facility (H&H Ship Service Company). The project site was occupied predominantly by Atchison, Topeka, and Santa Fe (ATSF) railway yards from about 1913 to 1956. Storage warehouses associated with railroad operations were located on and adjacent to the western portion of the project site. A railroad supply depot was located on the southern portion of the project site, and a roundhouse with oil storage was located south of the project site.

[1] California Health and Safety Code Section 25501.



Source: Baseline Environmental Consulting, 2014.

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 4.O-1
Historical Land Uses

After the ATSF railway yards closed in the 1950s, the warehouses remained on and adjacent to the project site as late as 1999. Metal fabrication and machine shops with oil storage were located on the northern portion of the project site from about 1949 to 1993. Two truck repair shops were located on the northern portion of the project site in the 1960s and 1970s. H&H Ship Service Company operated a hazardous waste treatment facility on the northern portion of the project site from 1950 to 1996.[2]

SUBSURFACE HAZARDOUS MATERIALS

The information presented in this section is based on the following sources:

- A 2014 Site History Report prepared by BASELINE Environmental Consulting for the proposed project site.
- A December 15, 2016 memorandum prepared by Langan regarding previous environmental activities at the proposed project site.
- A December 22, 2016, letter prepared by the San Francisco Department of Public Health (SFDPH) regarding previous environmental activities at the proposed project site.

In 1987, a 1,000-gallon gasoline underground storage tank (UST) was removed from the City and County of San Francisco (City) – Port of San Francisco (Port) site, formerly located at 145 China Basin Street (now referred to as Terry A. Francois Boulevard), near China Basin Park, located generally in the northern portion of the project site. Concentrations of petroleum hydrocarbons and volatile organic compounds (VOCs) were reported in a groundwater sample collected from the excavation pit for the UST but were not above laboratory reporting limits in a groundwater sample collected from a well located about 20 feet downgradient from the pit. As a result, the SFDPH issued a Remedial Action Completion Certification in 2008. Residual soil and/or groundwater contamination (e.g., petroleum hydrocarbons and VOCs) may be present in the immediate vicinity of the former excavation pit.

In February 1999, a federal Resource Conservation and Recovery Act (RCRA) Closure Certification Report was prepared for the former H&H Ship Service Company site at 220 China Basin Street (now referred to as Terry A. Francois Boulevard), which is on the project site, to document the closure of the following four hazardous waste management units: Treatment Transfer Area, Tank Cleaning Area, Container Storage Area, and Solidification Unit. The Treatment Transfer Area was located on the east side of China Basin Park (Figure 4.O-1, on the previous page). The Tank Cleaning Area, Container Storage Area, and Solidification Unit were located within a service yard on the northeast side of Seawall Lot 337 (Figure 4.O-1).[3]

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[2] BASELINE Environmental Consulting. 2014. *Site History Report; Seawall Lot 337/Pier 48 Mixed-Use Project, San Francisco, California*. April 14.

[3] BASELINE Environmental Consulting. 2014. *Site History Report; Seawall Lot 337/Pier 48 Mixed-Use Project, San Francisco, California*. April 14.

The Treatment Transfer Area included a tank farm and pier where 11 aboveground storage tanks (ASTs) of various sizes were installed in an unpaved area in the late 1960s (Figure 4.O-1, page 4.O-2). A concrete and asphalt pad for the ASTs was constructed at a later date. Ships discharged contaminated bilge water into the ASTs. Settling and treatment tanks were used to remove petroleum products from the wastewater. The recovered petroleum products were transported to oil recycling facilities, and the treated wastewater was transported to publicly owned treatment works. The Tank Cleaning Area in the service yard (Figure 4.O-1) was a bermed concrete pad where former fuel USTs were rinsed. The rinse water was pumped into 55-gallon drums and stored in the Container Storage Area. The Container Storage Area in the service yard (Figure 4.O-1), which was a partially bermed concrete pad, was also used to store petroleum products and waste oil in 55-gallon drums. Materials stored in the Container Storage Area were shipped offsite for recycling or disposal. Sludge from USTs was solidified in the Solidification Unit in the service yard (Figure 4.O-1) using absorbent materials and mixing equipment.

In 1995, soil and groundwater samples collected from the former H&H Ship Service Company site were analyzed for metals, petroleum hydrocarbons, VOCs, semi-VOCs, polycyclic aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs). Elevated concentrations of metals, petroleum hydrocarbons, and PAHs were reported in the soil and groundwater samples.[4]

In 1999, Geomatrix Consultants completed a Site History Report, subsurface investigation, and health risk assessment (HRA) for the Imperial Weitz parking lots at the proposed project site, in accordance with the San Francisco Maher Ordinance (see *Local Regulations*). The subsurface investigation reported low levels of petroleum hydrocarbons and heavy metals, which are typical of fill materials in the area. The HRA concluded that the soil and groundwater contaminants would not pose an unacceptable carcinogenic or noncarcinogenic risk to human receptors for the proposed land use (i.e., parking lots). A Site Mitigation Report was subsequently prepared by Geomatrix Consultants for construction of the Imperial Weitz parking lots and approved by SFDPH. A "no further action" letter was issued upon completion of the project.[5]

In 2000 and 2002, two land use covenants between the City and Department of Toxic Substances Control (DTSC) were recorded for the former H&H Ship Service Company site (Appendix 10) because of residual levels of contamination in the soil and groundwater. One land use covenant limits use of the service yard at the former H&H Ship Service Company site to

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[4] BASELINE Environmental Consulting. 2014. *Site History Report; Seawall Lot 337/Pier 48 Mixed-Use Project, San Francisco, California*. April 14.

[5] San Francisco Department of Public Health, Environmental Health Branch, Site Assessment and Mitigation. December 22, 2016—letter to Seawall Lot Lot 337 Associates LLC regarding Mission Rock, Seawall Lot Lot 337 and Pier 48, San Francisco, CA.

commercial/industrial land uses (Figure 4.O-1, page 4.O-2). This land use covenant requires excavated soils to be evaluated and managed in accordance with the San Francisco Maher Ordinance (see *Local Regulations*). The covenant prohibits food production or groundwater extraction for purposes other than site remediation. Construction dewatering is also prohibited without prior approval from the DTSC. The second land use covenant limits use of the Treatment Transfer Area at the former H&H Ship Service Company site to commercial/industrial or recreational land uses. At the time the deed restriction was established, the Treatment Transfer Area was being considered for redevelopment and incorporation into the current China Basin Park. The land use covenant requires the existing asphalt/concrete pad, which covers the residual soil contamination, to remain in place and be covered by 18 inches of imported top soil and sod as long as the Treatment Transfer Area is used as a recreational park. The land use covenant requires excavated soils to be evaluated and managed in accordance with the Maher Ordinance (see *Local Regulations*), a Site Mitigation Report, and a Health and Safety Plan. It also prohibits food production or groundwater extraction for purposes other than site remediation. Construction dewatering is also prohibited, along with disturbance/alteration/degradation of the cap without prior approval from the DTSC.

In 2014, BASELINE Environmental Consulting completed a Site History Report for the Mission Rock Project, in accordance with the San Francisco Maher Ordinance (see *Local Regulations*).[6] The 2014 Site History Report summarized information from the prior subsurface site investigations, noted above. It found that low-level residual contamination from historical uses (former railway yards and structures, former metal/machine shops, former truck repair shops, the former H&H Ship Service Company treatment transfer area, and the former H&H Ship Service Company service yard) or imported fill material is present on the project site in the form of heavy metals, petroleum hydrocarbons, chlorinated solvents, PAHs, PCBs, pesticides, cyanide, acids, and asbestos.

A December 15, 2016, memorandum from Langan compared previous soil and groundwater analytical results to the current San Francisco Bay Area Regional Water Quality Control Board's (RWQCB's) Tier 1 residential environmental screening levels (ESLs). Langan identified a concentration of the PAH compound benzo(a)pyrene in one soil sample and concentrations of the heavy metals arsenic, cobalt, and lead in several soil samples that exceeded residential ESLs. No other PAHs, heavy metals, or VOCs were found in the previous samples with levels that were above established soil or groundwater residential ESLs.[7]

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[6] BASELINE Environmental Consulting. 2014. *Site History Report; Seawall Lot 337/Pier 48 Mixed-Use Project, San Francisco, California*. April 14.

[7] Langan. December 15, 2016—letter to Jon Knorpp and Fran Weld regarding environmental activities for the Mission Rock Development, Seawall Lot 337, San Francisco, CA.

In a letter dated December 22, 2016, SFDPH stated that it had reviewed all the previous site assessment and investigation reports related to the proposed project site. Because there had been no change in land use at the project site since the 1999 subsurface investigation, SFDPH determined that concentrations of residual contamination in soil and/or groundwater at the project site are limited to low levels of VOCs, PAHS, and heavy metals and no new subsurface investigations are required for the proposed project.[8]

HAZARDOUS BUILDING MATERIALS

Hazardous materials are commonly found in buildings and can be affected during demolition and renovation activities. Hazardous building material concerns at the project site include asbestos-containing materials (ACMs), lead-based paint (LBP), chemically treated wood, and other common hazardous building materials.

Exposure to asbestos, a state-recognized carcinogen, can result in lung cancer, mesothelioma (cancer of the linings of the lungs and abdomen), or asbestosis (scarring of lung tissues that results in constricted breathing). ACMs such as thermal system insulation, surfacing materials, and asphalt and vinyl flooring may be present in buildings constructed prior to 1981. Two of the sheds on Pier 48 were constructed in 1929-1930; therefore, ACMs may be present in these structures. There are no structures on Seawall Lot 337 that would contain ACMs.

Exposure to lead, a state-recognized carcinogen, can result in stomach and lung cancer and impair nervous, renal, cardiovascular, and reproductive systems. Although LBP in residential structures was banned in 1978, this restriction did not apply to commercial and industrial buildings; therefore, any commercial or industrial building, regardless of construction date, could have surfaces that have been coated with LBP.[9] Two of the sheds on Pier 48 were constructed in 1929-1930; therefore, LBP may be present in these structures. There are no structures on Seawall Lot 337 that would contain LBP.

Chemical preservatives such as creosote, arsenic, chromium, copper, and pentachlorophenol can be used to protect wood pilings from decay. However, these chemical preservatives can pose a potential risk to water quality and aquatic life. Pier 48 is supported by chemically treated wood pilings.

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[8] San Francisco Department of Public Health, Environmental Health Branch, Site Assessment and Mitigation. December 22, 2016—letter to Seawall Lot 337 Associates LLC regarding Mission Rock, Seawall Lot 337 and Pier 48, San Francisco, CA.

[9] Department for Toxic Substances Control. 2006. *Interim Guidance Evaluation of School Sites with Potential Soil Contamination as a Result of Lead from Lead-Based Paint, Organochlorine Pesticides from Termiticides, and Polychlorinated Biphenyls from Electrical Transformers*. June 9 (revised).

Other common items that may be present in the sheds on Pier 48, such as electrical transformers, fluorescent lighting, electrical switches, heating/cooling equipment, and thermostats, could contain hazardous materials (e.g., PCBs, diethylhexyl phthalate, mercury, and other metals) and pose a health risk if not handled and disposed of properly. The disposal of these materials is regulated under the California Universal Waste Rule (see discussion below, under *Regulatory Framework*).

SCHOOLS

A review of federal records for public and private schools with grades ranging from pre-kindergarten to 12 indicates that there are no schools within 0.25 mile of the project site.[10]

AVIATION HAZARDS

The nearest public-use airport to the project site is Oakland International Airport, which is located approximately 8.8 miles southeast of the site.[11] According to the Airport Land Use Compatibility Plan adopted by the Alameda County Airport Land Use Commission, the project site is not within the airport influence area associated with Oakland International Airport.[12] In addition, there are no mapped private airstrips within 2 miles of the proposed project.[13]

WILDLAND FIRE HAZARDS

The California Department of Forestry and Fire Protection (CAL FIRE) has mapped Very High Fire Hazard Severity Zones in each county to help responsible local agencies identify measures to reduce the potential for losses of life, property, and resources from wildland fire. CAL FIRE has determined that there are no Very High Fire Hazard Severity Zones in the city.[14]

REGULATORY FRAMEWORK

The proper management of hazardous materials is a common concern for all communities. Beginning in the 1970s, governments at the federal, state, and local levels became increasingly concerned about the effects of hazardous materials on human health and the environment.

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[10] National Center for Education Statistics. 2015. *School Search Tool for Public and Private Schools*. Available: http://nces.ed.gov/ccd/schoolsearch/. Accessed: October 15, 2015.

[11] San Francisco International Airport is located about 10 miles south of the project site.

[12] Environmental Science Associates. 2012. *Oakland International Airport: Airport Land Use Compatibility Plan*. December 15.

[13] Federal Aviation Administration. 2015. *Airport Data and Contact Information.* Database searched for private-use facilities in San Francisco. Available: http://www.faa.gov/airports/airport_safety/airportdata_5010. Accessed: October 15, 2015.

[14] California Department of Forestry and Fire Protection. 2007. *San Francisco County: Draft Fire Hazard Severity Zones in LRA*. October 5.

Numerous laws and regulations were developed to investigate and mitigate these effects. As a result, the storage, use, generation, transport, and disposal of hazardous materials are highly regulated by federal, state, and local agencies. Information about relevant agencies and the laws, regulations, and programs they administer are summarized below.

FEDERAL AND STATE REGULATIONS

HAZARDOUS MATERIALS MANAGEMENT

The USEPA is the lead agency with responsibility for enforcing federal laws and regulations that govern hazardous materials with the potential to affect public health or the environment. The major federal laws and regulations USEPA enforces that could relate to the management of hazardous materials on the project site are the RCRA and Toxic Substances Control Act (TSCA).

In 1976, the RCRA was enacted to provide a general framework for USEPA to regulate hazardous waste from the time it is generated until its ultimate disposal. In accordance with the RCRA, facilities that generate, treat, store, or dispose of hazardous waste are required to ensure that the wastes are properly managed from "cradle to grave" by complying with the federal waste manifest system.

In 1976, the TSCA was enacted to give USEPA the authority to regulate the production, importation, use, and disposal of chemicals, such as PCBs, ACMs, and LBP, that pose a risk of adversely affecting public health and the environment. The TSCA also gives USEPA the authority to regulate the cleanup of sites that have been contaminated with specific chemicals, such as PCBs.

HAZARDOUS MATERIALS RELEASE SITES

In California, USEPA has granted most enforcement authority of federal hazardous materials regulations to the California Environmental Protection Agency (Cal/EPA). Under the authority of Cal/EPA, the State Water Resources Control Board (SWRCB) and DTSC are responsible for overseeing the remediation of contaminated soil and groundwater sites. The provisions of Government Code 65962.5 (also known as the Cortese List) require the SWRCB, DTSC, the California Department of Health Services, and the California Department of Resources Recycling and Recovery to submit information pertaining to sites that are associated with solid waste disposal, hazardous waste disposal, and/or hazardous materials releases to Cal/EPA.

HAZARDOUS MATERIALS TRANSPORTATION

In 1990 and 1994, the federal Hazardous Material Transportation Act was amended to improve regulations for the protection of life, property, and the environment from the inherent risks of transporting hazardous materials. The U.S. Department of Transportation (USDOT) developed hazardous materials regulations that govern the classification, packaging, labeling,

transportation, and handling of hazardous materials as well as employee training and incident reporting.[15] The transportation of hazardous materials is subject to both RCRA and USDOT regulations.

In California, the California Highway Patrol (CHP), California Department of Transportation (Caltrans), and DTSC are responsible for enforcing federal and state regulations pertaining to the transportation of hazardous materials. If a discharge or spill of hazardous materials occurs during transportation, the transporter is required to take appropriate action immediately to protect human health and the environment (e.g., notify local authorities and contain the spill). The transporter is also responsible for cleanup of the discharge.

WORKER HEALTH AND SAFETY

The Occupational Health and Safety Administration (OSHA) is the federal agency with responsibility for enforcing and implementing federal laws and regulations pertaining to worker health and safety. Under OSHA jurisdiction, the Hazardous Waste Operations and Emergency Response regulations require training and medical supervision for workers at hazardous waste sites.[16] Additional regulations have been developed for construction workers regarding exposure to lead[17] and asbestos[18] during construction.

State worker health and safety regulations related to construction activities are enforced by the California Division of Occupational Safety and Health (Cal/OSHA). The regulations include requirements for protective clothing, training, and limits on exposure to hazardous materials. Cal/OSHA also enforces occupational health and safety regulations specific to lead and asbestos investigations and abatement, which equal or exceed their federal counterparts.

HAZARDOUS BUILDING MATERIALS

Hazardous materials are commonly found in building materials that may be affected during demolition and renovation activities. The proper management of hazardous building materials, in accordance with various regulations, is described below.

ASBESTOS-CONTAINING MATERIALS

Workers who conduct asbestos abatement must be trained in accordance with state and federal OSHA requirements. The Bay Area Air Quality Management District (BAAQMD) oversees the removal of regulated ACMs. All friable (i.e., crushable by hand) ACMs or nonfriable ACMs that

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[15] Code of Federal Regulation, Title 49, Transportation, Parts 171–180.

[16] Code of Federal Regulations, Title 29, Labor, Section 1910.120, Hazardous Waste Operations and Emergency Response.

[17] Code of Federal Regulations, Title 29, Labor, Section 1926.62, Lead.

[18] Code of Federal Regulations, Title 29, Labor, Section 1926.1101, Asbestos.

may be damaged must be abated prior to demolition in accordance with applicable requirements. Friable ACMs must be disposed of as asbestos waste at an approved facility. Nonfriable ACMs may be disposed of as nonhazardous waste at landfills that accept such wastes.

LEAD-BASED PAINT

Loose and peeling LBP must be disposed of as a state and/or federal hazardous waste if the concentration of lead equals or exceeds applicable hazardous waste thresholds. State and federal OSHA regulations require a supervisor who is certified with respect to identifying existing and predictable lead hazards to oversee air monitoring and other protective measures during demolition activities in areas where LBP may be present. Special protective measures and notification of Cal/OSHA are required for highly hazardous construction tasks related to lead, such as manual demolition, abrasive blasting, welding, cutting, or torch burning of structures, where LBP is present.

CHEMICALLY TREATED WOOD

Chemically treated wood could contain elevated levels of hazardous chemicals (e.g., arsenic, chromium, copper, pentachlorophenol, or creosote) that equal or exceed applicable hazardous waste thresholds. However, the DTSC has developed Alternative Management Standards that allow for disposal of treated wood as a nonhazardous waste. These standards, contained in Title 22 of the California Code of Regulations, Division 4.5, Chapter 34, simplify and facilitate the safe and economical disposal of treated-wood waste. The Alternative Management Standards provide for less stringent storage requirements, extended accumulation periods, allow shipments without a hazardous waste manifest and a hazardous waste hauler, and allow disposal at specific nonhazardous waste landfills.

UNIVERSAL WASTES

The disposal of universal waste is regulated under the California Universal Waste Rule, which is less stringent than most other federal and state hazardous waste regulations. To manage universal waste in accordance with the streamlined requirements for the state, generators must relinquish the waste to a universal waste transporter, another universal waste handler, or a universal waste destination facility.

LOCAL REGULATIONS

HAZARDOUS AND ACUTELY HAZARDOUS EMISSIONS

The BAAQMD oversees the protection of air quality in the San Francisco Bay Area Air Basin, which includes the project site. Hazardous and acutely hazardous emissions during construction (e.g., demolition of buildings containing asbestos) and facility operations (e.g., emissions from diesel generators) are subject to health risk assessment regulations and permitted conditions of operation to protect nearby sensitive receptors.

WORK PRACTICES FOR LEAD-BASED PAINT

Work that could result in disturbance of LBP must also comply with Section 3426 of the Port of San Francisco Building Code, Work Practices for Lead-Based Paint on Pre-1979 Buildings and Steel Structures. Where any work may disturb or remove lead paint on the exterior of any building built prior to 1979, Section 3426 requires specific notification and work standards, and identifies prohibited work methods and penalties.

Section 3426 applies to the exterior of all buildings or steel structures on which original construction was completed prior to 1979 (which are assumed to have LBP on their surfaces, unless demonstrated otherwise through sampling and laboratory analysis), and to the interior of residential buildings, hotels, and childcare centers. The ordinance contains performance standards, including requirements for restricting access during abatement activities; establishing containment barriers that are at least as effective at protecting human health and the environment as those in the U.S. Department of Housing and Urban Development Guidelines (the most recent Guidelines for Evaluation and Control of Lead-Based Paint Hazards); protecting the ground from contamination during exterior work; protecting floors and other horizontal surfaces from work debris during interior work; preventing migration of lead paint beyond containment barriers during the course of the work; and achieving cleanup standards. Section 3426 contains provisions regarding inspection and sampling for compliance by the Port, as well as enforcement, and describes penalties for noncompliance with the requirements of the ordinance.

WORK PRACTICES FOR ASBESTOS ABATEMENT

Section 3425 of the Port of San Francisco Building Code addresses work practices for asbestos containing materials. In accordance with this section, applicants for a building permit application are required to include an asbestos survey report with the building permit application. The submittal must also identify the scope of asbestos removal; methods and tools for disturbance and/or removal of asbestos-containing materials; the start and end dates; dates by which the responsible party will fulfill notification requirements for the occupants and adjacent properties; and information regarding the party responsible for performing the asbestos abatement work. The Port is authorized to inspect any asbestos abatement work conducted in accordance with Section 3425 of the Port of San Francisco Building Code.

HAZARDOUS MATERIALS MANAGEMENT

In California, state hazardous waste and material handling laws are enforced by Cal/EPA with the assistance of local agencies designated as Certified Unified Program Agencies (CUPAs). In San Francisco, the SFDPH is the designated CUPA. The CUPA program consolidates specified administrative requirements, permits, inspections, and enforcement activities for the following existing state programs, as established by five different state agencies, and combines them into what is known as the Unified Program:

- Hazardous Waste Generator and Tiered Permitting Program (California Health and Safety Code [H&SC] Chapter 6.5)
- Underground Storage Tank Program (H&SC Chapter 6.7)
- Aboveground Petroleum Storage Tank Program (H&SC Chapter 6.67)
- California Accidental Release Prevention Program (H&SC Chapter 6.95)
- Hazardous Materials Release Response Plan and Inventory (Business Plan) Program (H&SC Chapter 6.95)
- Hazardous Material Management Plan and Hazardous Material Inventory Statement Program (California Fire Code and H&SC Chapter 1)

The Unified Program requires facilities to properly manage and disclose which hazardous materials are used during facility operations to minimize the risk of a hazardous materials release and improve emergency response actions in the event of a release. In San Francisco, the provisions of the Hazardous Materials Release Plan and Inventory Program (e.g., requirements for preparation of a Hazardous Materials Business Plan) and California Accidental Release Prevention Program (e.g., requirements for preparation of a Risk Management Plan) have also been incorporated into the Articles 21 and 21A of the San Francisco Health Code to help enforce mandatory measures to minimize the risk of a hazardous materials release. In addition, Article 22 of the San Francisco Health Code, entitled "Hazardous Waste Management," provides measures for safe handling of hazardous wastes in the city. It authorizes SFDPH to implement the state hazardous waste regulations, including authority to conduct inspections and document compliance.

MAHER ORDINANCE AND HAZARDOUS MATERIALS IN SOIL AND GROUNDWATER

SFDPH administers Article 22A of the San Francisco Health Code (also referred to as the Maher Ordinance), which requires applicable projects to assess, sample, analyze, and remediate (if necessary) subsurface contamination prior to the issuance of building permits. The Maher Ordinance applies to any project that could encounter hazardous materials in the subsurface soil or groundwater in areas known to contain fill material or are suspected to contain hazardous materials in the subsurface, sometimes referred to as Maher zones.[19] In these areas, the requirements apply to any sites that would excavate more than

[19] Maher zones include areas with current or historical industrial use or zoning; areas within 100 feet of current or historical underground tanks; filled former Bay, marsh, or creek areas; and areas within 150 feet of a current or former elevated highway.

50 cubic yards of soil.[20] The proposed project is subject to the Maher Ordinance because proposed soil excavation would exceed 50 cubic yards, and the project site is mapped within a Maher zone.

In accordance with Health Code Section 22.A.6, the Maher Ordinance requires the project sponsor to retain the services of a qualified professional to prepare a Site History Report and assess potential and/or known sources of subsurface contamination at the project site. Based on the Site History Report, the professional recommends whether the project sponsor should conduct subsurface investigation(s) to characterize the quality of the soil and groundwater that would be disturbed during project construction. If so recommended, the professional prepares a Subsurface Analysis Report, based on the subsurface investigation(s), to evaluate hazardous materials in the soil and groundwater at the project site and determine whether they are causing or are likely to cause significant health and safety risks given the intended land use. If the Subsurface Analysis Report indicates that hazardous substances are present in soil or groundwater exceeding the DTSC or RWQCB public health risk levels, the applicant must prepare a Site Mitigation Report. The Site Mitigation Report must describe the methods (e.g., source removal, treatment, vapor barrier installation, restrictions on uses or activities at the project site) recommended to assure the intended use will not result in public health or safety hazards in excess of the DTSC and RWQCB acceptable risk levels or other applicable standards. The Site Mitigation Report must include health and safety measures to protect construction workers and the public during construction, including how to address any unknown conditions encountered. The Site Mitigation Report must also outline the soil and groundwater handling procedures that will be followed in all areas that would be disturbed during construction on the land portion of the project site (i.e., for this project, not sediments submerged in the Bay beneath Pier 48), including dust control measures that will be used. The Site Mitigation Report must also identify any remedial actions that will be taken, including removal or treatment of soil or groundwater, or placing a cover over soil to avoid future exposures, implementing a long-term operations and maintenance plan, or recording use restrictions on the property. All documents required under the Maher Ordinance must be submitted to and approved by the SFDPH prior to project construction.

SAN FRANCISCO CONSTRUCTION DUST ORDINANCE

San Francisco Health Code Article 22B[21] and San Francisco Building Code Section 106.A.3.2.3[22] collectively constitute the Construction Dust Control Ordinance, which was adopted in July 2008. The ordinance applies to all site preparation work, demolition, or other construction

[20] Projects that would excavate less than 50 cubic yards of soil where subsurface contamination is suspected are required to refer to the SFDPH to determine if enrollment in the Maher program is necessary.

[21] San Francisco Department of Public Health. 2008a. *Article 22B Construction Dust Control Requirements*. Available: http://health.sanfranciscocode.org/22B/. Accessed: August 27, 2015.

[22] Port of San Francisco. 2016. *2016 Port of San Francisco Building Code*. Accessed: March 9, 2017.

activities within San Francisco that have the potential to create dust. Projects that expose or disturb more than 10 cubic yards, or 500 square feet, of soil must comply with specified dust control measures, whether or not the activity requires a permit from the San Francisco Department of Building Inspections. For projects involving more than 0.5 acre, the Dust Control Ordinance requires that the project sponsor to submit a Dust Control Plan for approval by the SFDPH prior to issuance of a building permit by DBI or the Port of San Francisco.

Building permits will not be issued without written notification from the Director of Public Health that states that the applicant has a site-specific Dust Control Plan, if required, unless the Director waives the requirement. The Construction Dust Control Ordinance requires the project sponsors and contractors who are responsible for construction activities to minimize visible dust on the site. Minimum dust control measures that apply to all projects include watering all construction areas sufficiently to prevent dust from becoming airborne; providing as much water as necessary to control dust (without creating runoff) in any area of land clearing, earth movement, excavation, drillings, and other dust-generating activity; during excavation and dirt-moving activities, wet sweep or vacuum the streets, sidewalks, paths, and intersections where work is in progress at the end of the workday; covering any inactive stockpiles greater than 10 cubic yards or 500 square feet of excavated materials, and using dust enclosures, curtains, and dust collectors as necessary to control dust in the excavation area. Other dust control measures that may be included in a Dust Control Plan, if one is required, include but are not limited to wetting down the area around soil improvements; an analysis of wind direction; placement of dust monitors; recordkeeping for particulate monitoring results; inspections and record keeping for visible dust; and establishing a hotline for surrounding community members to call and report visible dust problems. Reclaimed water must be used if required by Article 21, Section 1100 et seq., of the San Francisco Public Works Code.

The project site is approximately 28 acres in size; as it is more than 0.5 acres, the project sponsor would be required to prepare a Dust Control Plan.

EMERGENCY RESPONSE AND EVACUATION

The CCSF Emergency Management Program is part of a jurisdiction-wide system that provides emergency management guidance related to prevention, preparedness, response, and recovery. The CCSF's Emergency Response Plan utilizes an all-hazards approach to emergency planning and, therefore, encompasses all hazards that are applicable to the city and county, both natural and man-made, ranging from planned events to large-scale disasters.[23]

[23] City and County of San Francisco. 2010. *Emergency Response Plan*. December.

Different types of emergencies, such as fires, a release of hazardous materials, or other incidents, may require evacuation actions. Because of the geography and particular vulnerabilities of the Bay Area, evacuation is considered a last resort.[24] In the event of an emergency evacuation, accessible routes would be established by the San Francisco Police Department in collaboration with the San Francisco Department of Public Works (SFDPW), San Francisco Municipal Transportation Authority (MTA), Caltrans, and CHP.[25]

SAN FRANCISCO GENERAL PLAN

The following policies from the Community and Safety Element of the San Francisco General Plan apply to the proposed project:

- Policy 1.23: 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.
- Policy 1.24: Educate public about hazardous materials procedures including transport, storage, and disposal.
- Policy 2.11: Ensure the city's designated system of emergency access routes is coordinated with regional activities for both emergency operations and evacuation.
- Policy 3.12: Address hazardous material and other spills by requiring appropriate cleanup by property owners per local, state, and federal environmental laws.

ENVIRONMENTAL IMPACTS

This section describes the impact analysis related to hazards and hazardous materials for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts (if any) accompany each impact discussion.

SIGNIFICANCE CRITERIA

The proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

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[24] Governor's Office of Emergency Services; Cities of Oakland, San Francisco, and San José; Counties of Alameda, Contra Costa, Marin, Napa, San Mateo Santa Clara, Santa Cruz, Solano, and Sonoma. 2008. *San Francisco Bay Area Regional Emergency Coordination Plan*. March.

[25] City and County of San Francisco. 2010. *Emergency Response Plan*. December.

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

METHODS FOR ANALYSIS

As described under *Regulatory Framework*, the use of hazardous materials is subject to numerous laws and regulations. In most cases, the laws and regulations pertaining to hazardous materials management are adequate for minimizing risks to human health and the environment. The impact analysis takes into account applicable laws and regulations in assessing impacts related to hazardous materials during project construction and operation.

To assess the potential of the proposed project to create a significant hazard to the public or environment related to subsurface hazardous materials, the impact analysis considers the previous site history and findings from the SFDPH's review of previous site assessments and investigations.[26]

LAND USE ASSUMPTIONS

As described in Chapter 2, *Project Description*, this environmental impact report (EIR) analyzes two land use assumptions: High Commercial and High Residential. These assumptions represent the full range of land uses and building programs that could be developed on the project site under the proposed flexible zoning for Blocks H, I, and J. Although the land use mix between High Commercial and High Residential would differ, the two assumptions would have similar total square footages, footprints, excavation depths, similar building configurations (with the exception of building heights on Blocks H, I, and J), and similar construction characteristics. Therefore, the differences between the two assumptions would not result in any

[26] Stephanie Cushing, San Francisco Department of Public Health, Environmental Health Branch, Site Assessment and Mitigation. December 22, 2016—letter to Seawall Lot Lot 337 Associates LLC regarding Mission Rock, Seawall Lot Lot 337 and Pier 48, San Francisco, CA.

meaningful difference in potential impacts on hazards and hazardous materials. As such, the following analysis applies to both the High Commercial and High Residential land use assumptions.

TOPICS NOT EVALUATED IN DETAIL

Public-Use Airports. The project site is located approximately 8.8 miles northwest of the nearest public-use airport, Oakland International Airport; it is not located within the airport influence area; therefore, project structures would not be considered a potential obstruction to aircraft that use Oakland International Airport. Therefore, the proposed project would have ***no impact*** on the navigable airspace of public-use airports, and this impact is not evaluated further.

Private Airstrips. There are no private airstrips within 2 miles of the project site. Therefore, the proposed project would have ***no impact*** on the navigable airspace of private airstrips, and this impact is not evaluated further.

Wildland Fires. The project site is surrounded by urban development. It is not mapped as being in or adjacent to a Very High Fire Hazard Severity Zone. Therefore, the proposed project would have ***no impact*** related to wildland fire hazards, and this impact is not evaluated further.

IMPACTS AND MITIGATION MEASURES

Impact HZ-1. The proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (Less than Significant)

Project construction and operational activities are expected to involve the routine transport, use and disposal of hazardous materials (e.g., motor fuels, solvents, lubricants, and other typical hazardous materials used by residential, retail, commercial, industrial, and open space and recreational uses) that could pose a significant threat to construction workers, the public, or the environment if not properly managed.

CONSTRUCTION

Small amounts of hazardous materials, particularly motor fuels, solvents and lubricants, would be transported, used, and disposed of during project construction. These materials, which are commonly used in construction projects, are not considered acutely hazardous. The project sponsors' contractors would be required to comply with OSHA and Cal/OSHA health and safety requirements, all of which would be specified in the construction contracts. These regulations are effective in reducing potential risks to workers by, for example, requiring protective clothing and worker training, requiring medical examinations and monitoring of employees who are engaged in activities that could disturb asbestos-containing building materials, specifying precautions and safe work practices that must be followed to minimize the

potential for a release of asbestos fibers, establishing a maximum safe exposure level for construction work where lead exposure may occur, and requiring protective measures, monitoring requirements, and compliance standards to ensure the safety of construction workers who may be exposed to LBP.

In addition, hazardous materials must be transported to and from the project site in accordance with the RCRA and USDOT regulations and disposed of in accordance with the RCRA and the California Code of Regulations at a facility that is permitted to accept the waste. These regulations require all hazardous waste transporters to have identification numbers and a hazardous waste manifest, which documents the legal transport and disposal of the waste and is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations require specific cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill as well as safe packing and transport of hazardous waste. Because compliance with existing regulations is mandatory, construction of the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, and this impact would be ***less than significant***.

OPERATION

During operation, it is anticipated that the proposed project would require the use of hazardous materials that are typical of residential, commercial, production, and active/retail uses as well as parking facilities and open space areas. Relatively small quantities of hazardous materials, such as cleaners, disinfectants, and chemicals for landscaping maintenance, would be used for routine purposes. These commercial products are labeled to inform users about potential risks and appropriate handling procedures. Most of these materials are consumed through use, resulting in relatively little hazardous waste. In addition, programs are in place in San Francisco to provide opportunities for residents to dispose of household hazardous waste. Under Articles 21 and 22 of the San Francisco Health Code, implemented by SFDPH, businesses are required to ensure employee safety by identifying hazardous materials in the workplace, providing safety information to workers who handle hazardous materials, and adequately training workers.

Industrial/manufacturing and maritime uses proposed at Pier 48 could involve the use of larger quantities of hazardous materials. As described in the *Regulatory Framework*, above, the management of large quantities of hazardous materials (including diesel fuel for emergency generators or chemicals used in manufacturing) is subject to laws and regulations, particularly the Unified Program administered by SFDPH as the CUPA. The Unified Program ensures that facilities properly manage and disclose the hazardous materials they use or store on site to minimize the risk of a hazardous materials release and improve emergency response actions in the event of a release. For example, the provisions of the Hazardous Materials Release Plan and Inventory Program require any facility that uses, handles, or stores aggregate quantities of any

hazardous material equal to or greater than 55 gallons of liquid, 500 pounds of solids, and/or 200 cubic feet of compressed gas to report their chemical inventories to the Hazardous Materials Unified Program Agency by preparing a Hazardous Materials Business Plan. The plan must include measures for the safe storage, transportation, use, and handling of hazardous materials as well as contingency measures that describe the facility's response procedures in the event of a hazardous materials release. Because compliance with existing regulations is mandatory, operation of the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, and this impact would be ***less than significant***.

Impact HZ-2. The proposed project would not create a significant hazard to the public or the environment through the release of hazardous materials. (Less than Significant)

Potential upset and accident conditions associated with hazardous materials that are used during construction and operation, removed during building demolition, or encountered in the subsurface during earthwork activities are discussed below.

ACCIDENTAL HAZARDOUS MATERIALS RELEASES

Project construction and operational activities are expected to involve the use of hazardous materials (e.g., motor fuels, solvents, and lubricants). These hazardous materials would remain onsite during construction activities. Accidental releases of hazardous materials into the air, soil, and/or groundwater during construction and operation could adversely affect construction workers, the public, and/or the environment. As described under Impact HZ-1, the use of hazardous materials would be subject to existing hazardous materials laws and regulations, particularly the Unified Program, as administered by the Hazardous Materials Unified Program Agency. Adherence to these standards would reduce the potential for an accidental release.

In addition, a Stormwater Pollution Prevention Plan (SWPPP) must be prepared and implemented during project construction for coverage under the Construction General Permit, in accordance with SWRCB requirements. As detailed in Section 4.N, *Hydrology and Water Quality*, the SWPPP requires implementation of best management practices (BMPs) related to hazardous materials storage and soil stockpiles, inspections, maintenance, employee training, and the containment of releases to prevent runoff into existing stormwater collection systems or waterways. Because compliance with existing regulations is mandatory, accidental hazardous materials releases during construction and operation would have a ***less-than-significant*** impact on human health and/or the environment. Hazards associated with the disturbance of existing soil and groundwater contamination are discussed further below.

HAZARDOUS BUILDING MATERIALS

Construction activities associated with the rehabilitation of sheds and removal of wood pilings at Pier 48 could release hazardous building materials into the environment. Hazardous buildings materials could include ACMs, LBP, chemically treated wood, and other common hazardous buildings materials. As discussed under *Regulatory Framework*, the removal of hazardous building materials is governed by federal and state laws and regulations. Workers who are involved with the abatement of hazardous building materials must be trained in accordance with state and federal OSHA requirements. Hazardous building materials removed during demolition must be transported in accordance with USDOT regulations and disposed of in accordance with the RCRA, the California Code of Regulations, and/or the California Universal Waste Rule at a facility that is permitted to accept the wastes. As noted above, these regulations require all hazardous waste transporters to have identification numbers and a hazardous waste manifest, which documents the legal transport and disposal of the waste and is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations require specific cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill as well as safe packing and transport of hazardous waste. Treated-wood waste, such as wood pilings, may also be disposed of in accordance with the Alternative Management Standards adopted by DTSC under California Code of Regulations Title 22, Chapter 34. Section 19827.5 of the California Health and Safety Code requires local agencies not to issue demolition or alteration permits until an applicant has demonstrated compliance with the notification requirements of applicable federal regulations regarding hazardous air pollutants. Because compliance with existing regulations is mandatory, the proposed project would have a ***less-than-significant*** impact on human health and/or the environment during building renovation activities.

HAZARDOUS SOIL AND GROUNDWATER

Sediments may be disturbed during pile replacement of Pier 48 and soils and groundwater at the rest of the property may be disturbed during project construction or project operation. If sediments that contain residual levels of contaminants are disturbed during pile replacement activities under Pier 48, the disturbance of these sediments could re-suspend contaminants in the water column, potentially affecting the environment. As discussed in Section 4.N, *Hydrology and Water Quality*, pile replacement activities would be subject to the requirements of a Section 10 permit from the U.S. Army Corps of Engineers, water quality certification from the Regional Water Quality Control Board, a Major Permit from the Bay Conservation and Development Commission, and formal consultations with the National Marine Fisheries Service and California Department of Fish and Wildlife for the protection of biological resources. The permits would specify BMPs and the preparation and implementation of plans for the protection of water quality, such as a Debris Management Plan; a Spill Resource and Countermeasure Plan; equipment fueling requirements to require proper fuel transfer

procedures; equipment maintenance requirements to minimize leaks and spills; a Materials Management Disposal Plan; barge mooring requirements to capture construction debris; measures to avoid cement, concrete, and saw water from entering the Bay; and measures to ensure proper disposal of construction material. For example, the Bay Conservation and Development Commission's typical permit conditions include requirements regarding constructing, guaranteeing, and maintaining public access to the Bay; specified construction methods to ensure safety or protect water quality; plan review requirements that must be met before construction can begin; and mitigation requirements to offset adverse environmental impacts.

To implement sea level rise adaptation measures, construction would include building elevated building pads, street, sidewalks and landscape areas via pile-supported construction. Nonstructured park areas would be raised through the placement of fill material, either over the existing grade or on top of geofoam placed on the existing grade, which would both replace and supplement existing fill to achieve no net increase in overall soil weight. The resulting new grade would slope upward from the shoreline and pier/wharf areas up to a level that allows for 66 inches of sea level rise. Although most of the project site soil, therefore, would be covered, some soil excavation would occur to install concrete basements for parking garages, utility corridors or crawl spaces. The maximum depth of expected excavation on the project site would be approximately 33 feet below ground surface to accommodate the Mission Rock Square parking garage. Soil and groundwater at the project site is known to contain residual contamination consisting of VOCs, PAHs, and heavy metals; one PAH and several metals in soil exceed the RWQCB screening level for residential use.

To comply with the requirements of Article 22A (the Maher Ordinance) during development of the existing parking lot on the project site, the parking lot operator (Imperial Weitz LLC) completed a soil and groundwater investigation and human health risk assessment, and development of a Site Mitigation Report in 1999. The risk assessment found that soil and groundwater contamination does not pose a significant risk to on-site construction workers, neighboring residents during construction, or future site users (assuming use for surface parking). A Site Mitigation Report was developed in 1999 that established procedures for soil handling and disposal, including dust and erosion control. Similarly, for proposed development at the project site, SFDPH through the Maher process would require preparation, implementation and approval of a Site Mitigation Report that includes health and safety measures to protect construction workers and the public during construction to assure no unacceptable exposure to hazardous materials during soil and groundwater disturbance activities. Further, if residual contaminants are left on the site, the Site Mitigation Report must demonstrate that it will not pose a risk to future users of the site. The Site Mitigation Report must outline the soil and groundwater handling procedures to be followed in all areas that would be disturbed during construction on the land portion of the project site (i.e., not sediments submerged in the Bay beneath Pier 48). In accordance with San Francisco Health

Code Article 22B, a Dust Control Plan must be also submitted 8 weeks prior to the start of construction.[27] The Site Mitigation Report would also need to include measures to comply with the land use covenants established for residual soil and groundwater contamination at the former H&H Ship Service Company. All required regulatory and remediation activities would be conducted in order to lift restrictions associated with residential land use on the project site.[28] Any proposed deviations from the land use covenants would need to be approved by the DTSC.

The Site Mitigation Report will present recommended measures to mitigate potential risks to the environment and protect construction workers, nearby residents, workers, and/or pedestrians from potential exposure to hazardous substances and underground structures that may be encountered during soil excavation and grading activities. The Site Mitigation Report will also include procedures for initial response to unanticipated conditions, such as underground storage tanks, sumps, or pipelines that may be identified during excavation activities. Specified procedures would typically include notification, field screening, and worker health and safety measures. Any discovered USTs would be required to be closed, pursuant to Article 21 of the San Francisco Health Code. Article 21 provides that all closures and removals of USTs shall require approval of SFDPH, compliance with Article 21 and its implementing regulations, and compliance with applicable provisions of Chapters 6.7 and 6.75 of the California Health and Safety Code (commencing with Section 25280) and its implementing regulations. The closure of any UST must also be conducted in accordance with a permit from the San Francisco Fire Department.

Based on the proposed construction activities for the development of the site, clean fill material or concrete capping would be added across the project site during construction activities. The fill material added to the site would act as a cover over the underlying soil and serve to protect future users of the site from exposure to any remaining contaminants in the soil. Piles would be driven into the soil to support foundation systems and underground utilities. Some buildings may have underground utilities and crawl spaces that may or may not encounter onsite soils because only disturbances to the imported fill or geofoam would be required rather than the soil beneath. If any soil disturbance occurs, all work would be done in accordance with the approved Site Mitigation Report. Additionally, the Site Mitigation Report will specify basic

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[27] San Francisco Department of Public Health, Environmental Health Branch, Site Assessment and Mitigation. December 22, 2016—letter to Seawall Lot Lot 337 Associates LLC regarding Mission Rock, Seawall Lot Lot 337 and Pier 48, San Francisco, CA.

[28] The Port has submitted an application for regulatory oversight by DTSC's Voluntary Cleanup Program, thereby initiating the regulatory process through which the existing deed restriction on a portion of the Site will be terminated, and a new deed restriction that uses current agency form and reflects intended construction and future use for commercial, residential, and open space will be executed by the Port and DTSC.

health and safety concerns to be addressed by the contractor or subcontractor who is responsible for worker health and safety through preparation of a detailed health and safety plan.

Further, as discussed above, existing OSHA and Cal/OSHA requirements call for protective clothing and worker training, medical examinations and monitoring of employees who are engaged in activities that could disturb asbestos-containing building materials, precautions and safe work practices that must be followed to minimize the potential for a release of asbestos fibers, a maximum safe exposure level for construction work where lead exposure may occur, and protective measures, monitoring requirements, and compliance standards to ensure the safety of construction workers who may be exposed to LBP.

In addition, hazardous materials must be transported to and from the project site in accordance with RCRA and USDOT regulations and disposed of in accordance with the RCRA and California Code of Regulations at a facility that is permitted to accept the waste. These regulations require all hazardous waste transporters to have identification numbers and a hazardous waste manifest, which documents the legal transport and disposal of the waste and is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations require specific cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill as well as safe packing and transport of hazardous waste.

Finally, the Site Mitigation Report will include an Operations and Maintenance (O&M) Plan to provide for long-term management of the site. Future site users, utility maintenance workers, or other workers who may handle contaminated soils during project operations would need to comply with the site's O&M Plan. In accordance with any land use restrictions recorded on the project site, the site's O&M Plan would include measures that would need to be followed during any work that may disturb underlying soils. The O&M Plan would include maintenance logs, cap inspection reports, and annual inspection reports.

Because the project sponsor would be required to comply with existing regulations; prepare and implement a site-specific Site Mitigation Report, which would be approved by SFDPH prior to the commencement of construction and earthwork activities; and obtain approval from DTSC for any deviation from the land use covenants, the proposed project would not create a significant hazard for construction workers, future site users, and/or the environment from the disturbance of contaminated soil and/or groundwater, and the project would result in a ***less-than-significant*** impact.

Impact HZ-3. The proposed project would not create a potentially significant hazard for children at nearby schools from the emission or handling of hazardous or acutely hazardous materials. (Less than Significant)

The handling or emission of hazardous or acutely hazardous materials near schools must consider potential health effects on children, who are considered sensitive receptors. There are no existing public or private schools within a 0.25-mile radius of the project site. However, a 500-student public school has been proposed for the Mission Bay neighborhood that could be located within a 0.35-mile radius of the project site in the future. Although the school is outside the 0.25-mile radius, potential impacts are conservatively discussed below. For purposes of this analysis, it is assumed that such a school could be in operation during the project construction period as well as during project operation.

The only plausible exposure pathway of concern for children at nearby schools is through the inhalation of air contaminants, such as particulate matter. As discussed in Section 4.G, *Air Quality*, sources of hazardous emissions during project construction and operation include diesel particulate matter from vehicle exhaust and emergency generators. With mitigation, these emission sources would have a less-than-significant impact on nearby sensitive receptors (which include schools).

As discussed under Impact HZ-1, above, hazardous materials used during construction and operation would be managed in accordance with applicable laws and regulations, and potential impacts on nearby receptors were found to be less than significant. This determination would also apply to future school children. As discussed under Impact HAZ-2, a Site Mitigation Report and dust control measures must be implemented to ensure that residual soil contamination is properly managed. The site's O&M Plan would include measures that would need to be followed during any work that may disturb underlying soils. The O&M Plan would include maintenance logs, cap inspection reports, and annual inspection reports. Therefore, the handling or emission from contaminated soil or groundwater of hazardous or acutely hazardous materials during project construction and operation would have a ***less-than-significant impact*** on nearby schools.

Impact HZ-4. The proposed project would not create a potentially significant hazard for the public or environment related to development of a hazardous materials site included in a list compiled pursuant to Government Code Section 65962.5. (Less than Significant)

One hazardous materials release site on the SWRCB's list of leaking UST cleanup sites, compiled pursuant to Section 65962.5 of the Government Code, was formerly located on the project site, the CCSF – Port of San Francisco site (formerly located at 145 China Basin).[29] A

[29] http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0607500273

release of petroleum from a leaking 1,000-gallon gasoline UST was reported at the former 145 China Basin site during the excavation and removal of the tank in 1987. Because petroleum hydrocarbons were not reported above laboratory reporting limits in a groundwater sample collected from a well located about 20 feet downgradient from the tank excavation pit, the SFDPH issued a Remedial Action Completion Certification for this release site in 2008. Hazardous materials releases were also reported at the H&H Ship Service Company[30], which was formerly located on the project site; however, this site is not included on a list compiled pursuant to Section 65962.5 of the Government Code. Based on review of previous site assessment and investigation reports conducted at the project site, the SFDPH has determined that low levels of residual soil and/or groundwater contamination could remain at the site.[31]

As discussed in Impact HZ-2, the project sponsor would be required to prepare and implement a site-specific Site Mitigation Report, which would be subject to review and approval by SFDPH prior to commencement of construction and earthwork activities. Such work would be subject to OSHA and Cal/OSHA requirements and Construction Dust Control Ordinance requirements, which would protect construction workers and members of the public. Hazardous materials would be transported to and from the project site in accordance with RCRA and USDOT regulations and disposed of in accordance with the RCRA and California Code of Regulations at a facility that is permitted to accept the waste. Therefore, the proposed project would not create a significant hazard for construction workers, future site users, and/or the environment from the disturbance of contaminated soil and/or groundwater, and the project would result in a ***less-than-significant impact.***

Impact HZ-5. The proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (Less than Significant)

The proposed project would not be expected to interfere with the CCSF's Emergency Response Plan, which would be coordinated and implemented through a series of Community Disaster Response Hubs throughout the city (but not on the project site). The city does not have designated emergency evacuation routes. In the event of an emergency, evacuation routes would be established by the San Francisco Police Department in collaboration with the SFDPW, MTA, Caltrans, and CHP. Because the proposed project would not alter adjacent roadways, the project would not be expected to physically interfere with emergency evacuation plans. Therefore, the proposed project would have a ***less-than-significant impact*** on existing emergency response and evacuation plans for the city.

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30 http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=80001528

31 San Francisco Department of Public Health, Environmental Health Branch, Site Assessment and Mitigation. December 22, 2016—letter to Seawall Lot Lot 337 Associates LLC regarding Mission Rock, Seawall Lot Lot 337 and Pier 48, San Francisco, CA.

CUMULATIVE IMPACTS

The geographic context for the analysis of cumulative impacts associated with hazards and hazardous materials resources considers the projects listed in Table 4-1 of Chapter 4, *Environmental Setting and Impacts*.

Impact C-HZ-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not create a significant hazard to human health and/or the environment involving the management or release of hazardous materials. (Less than Significant)

Project impacts identified above related to the management and potential release of hazardous materials during construction, operation, and building demolition are site specific. These hazardous materials would be managed in accordance with existing regulatory requirements, which would reduce the risk of hazardous materials emissions and/or accidental releases that could affect receptors outside the project work areas. Therefore, the proposed project would not be expected to contribute to any potential hazardous materials impacts at other nearby project sites. Similarly, hazardous materials impacts from other nearby projects would not be expected to intensify potential impacts on the project site because they, too, would be site specific. This would be a ***less-than-significant*** cumulative impact.

Impact C-HZ-2: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not create a significant hazard to human health and/or the environment involving the disturbance of subsurface hazardous materials. (Less than Significant)

Project impacts identified above related to the disturbance of hazardous materials encountered in the subsurface during construction and operation are site specific. These hazardous materials would be managed in accordance with the Site Mitigation Report and existing regulatory requirements, which would reduce the risk of hazardous materials dust emissions and/or accidental releases that could affect offsite receptors; therefore, the proposed project would not be expected to contribute to any potential hazardous materials impacts at other nearby projects. Similarly, hazardous materials impacts from other nearby projects would not be expected to intensify potential impacts on the project site because they, too, would be site specific. There would be a ***less-than-significant*** cumulative impact.

Impact C-HZ-3: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not create a potentially significant hazard for children at nearby schools from the emission or handling of hazardous or acutely hazardous materials. (Less than Significant)

As discussed under Impacts C-HZ-1 and C-HZ-2, above, hazardous materials used and/or encountered in the subsurface during construction and operation would be managed in accordance with the Site Mitigation Report and applicable laws and regulations, which would reduce the risk of hazardous materials dust emissions and/or accidental releases that could affect offsite receptors such as school children. As discussed in Section 4.G, *Air Quality*, with mitigation, the project's cumulative contribution to existing and reasonably foreseeable future sources of toxic air contaminant emissions (e.g., diesel particulate matter) during construction and operation would be considered less than cumulatively considerable. Therefore, the project would have a ***less-than-significant cumulative impact*** on nearby schools.

Impact C-HZ-4: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not create a potentially significant hazard for the public or environment related to development of a hazardous materials site included in a list compiled pursuant to Government Code Section 65962.5. (Less than Significant)

As discussed under Impact C-HZ-2, project impacts related to construction and operational activities that could disturb potential subsurface contamination from a hazardous materials release site, regardless of whether the site is identified on a list compiled pursuant to Government Code Section 65962.5, would be site specific. These hazardous materials would be managed in accordance with the Site Mitigation Report and existing regulatory requirements, which would reduce the risk of hazardous materials dust emissions and/or accidental releases that could affect offsite receptors; therefore, the proposed project would not be expected to contribute to any potential hazardous materials impacts at other nearby projects. Similarly, hazardous materials impacts from other nearby projects would not be expected to intensify potential impacts on the project site because they, too, would be site specific. Therefore, there would be a ***less-than-significant cumulative impact***.

Impact C-HZ-5: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not impair implementation of or physically interfere with an adopted emergency response or evacuation plan. (Less than Significant)

The proposed project would not alter local roadways or result in permanent road closures. All development in the city is required to adhere to applicable safety standards regarding emergency response. Because of the project's compliance with applicable standards, and because it would not alter adjacent roadways, it would not be expected to contribute to cumulative impacts related to the impairment of emergency response or evacuation plans. A detailed discussion of emergency access is provided in Section 4.E, *Transportation*. This is considered a ***less-than-significant cumulative impact.***

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5. OTHER CEQA CONSIDERATIONS

This chapter discusses the following topics in relation to the Seawall Lot 337 and Pier 48 Mixed-Use Project (Mission Rock Project or proposed project): growth inducement; significant environmental effects that cannot be avoided if the proposed project is implemented; significant irreversible environmental changes that would result if the proposed project is implemented; and areas of controversy and issues to be resolved.

A. GROWTH-INDUCING IMPACTS

Section 15126.2(d) of the California Environmental Quality Act (CEQA) Guidelines states that an environmental impact report (EIR) should discuss "…the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth can be induced in a number of ways, including through the elimination of obstacles to growth, through the stimulation of economic activity within the region, or through precedent-setting action. CEQA requires a discussion of how a project could increase population, employment, or housing in the areas surrounding a project as well as an analysis of the infrastructure and planning changes that would be necessary to implement the project.

The proposed project would induce growth by constructing a place of employment as well as new housing units where none exist at present. As discussed in Section 4.C, *Population and Housing*, under the High Commercial Assumption, the project site would house approximately 2,350 residents and directly employ 6,050 workers. Given that just over half of employees in San Francisco are also residents and that those employee/residents are included in households, the High Commercial Assumption could result in a total population increase of up to 7,660. Under the High Residential Assumption, the project site would house approximately 3,760 residents and directly employ 4,510 workers. Considering the employee/residents and their households, the estimated total increase in the city's population could be as high as 7,720. This addition to the city's population under the more intensive High Residential Assumption represents 8.8 percent of the city's projected population growth from 2015 to 2025, for a total of 942,520 people living in San Francisco in 2025.

Impacts typically related to growth-inducing projects include impacts on infrastructure (i.e., transportation, water supply, electricity, and wastewater conveyance infrastructure) and public services (i.e., emergency services, schools, parks, and libraries). The project site would be located in an area with connectivity to existing local and regional transit services. The proposed project would be designed to maximize transit, bicycle, and pedestrian modes of travel, as discussed in Section 4.E, *Transportation and Circulation*. Furthermore, Section 4.J, *Public Services*

and Recreation, and Section 4.K, *Utilities and Service Systems*, did not identify significant impacts that would result from project implementation. Given the small proportion of the city's population that the proposed project would represent (approximately 1 percent by 2025), its location within a transit-accessible area, and that no significant impacts related to infrastructure and public services have been identified, growth-inducing impacts are not anticipated to be adverse. Furthermore, it is unlikely that the proposed project could create precedent for other increases in heights along the waterfront because any such increases would require voter approval, pursuant to Proposition B.

B. SIGNIFICANT UNAVOIDABLE IMPACTS

In accordance with Sections 21100 (b)(2)(A) and 21100.1(a) of the CEQA Statute and Section 15126.2(b) of the State CEQA Guidelines, an EIR is required to identify any significant environmental effects that cannot be avoided if a project is implemented. Many impacts identified for the proposed project would either be less than significant or could be mitigated to a less-than-significant level. However, the proposed project would also result in significant impacts that cannot be mitigated to less-than-significant levels, as listed below.

TRANSPORTATION IMPACTS

- The proposed project would result in an adverse impact by increasing ridership by more than 5 percent on two individual Muni routes that exceed 85 percent capacity utilization under baseline conditions. (Impact TR-4)
- The proposed project would result in an adverse impact related to a substantial increase in transit delays on Third Street between Channel Street and Mission Rock Street. (Impact TR-6)
- The proposed project would have significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. (Impact TR-9)
- The proposed project would contribute considerably to a significant cumulative transit impact because it would increase ridership by more than 5 percent on one individual Muni route that would exceed 85 percent capacity utilization. (Impact C-TR-4)
- The proposed project would contribute considerably to significant cumulative impacts related to transit delay. (Impact C-TR-6)
- The proposed project would contribute considerably to significant cumulative pedestrian impacts. (Impact C-TR-7)

NOISE IMPACTS

- Construction of the proposed project would generate noise levels in excess of standards or result in substantial temporary increases in ambient noise levels. (Impact NOI-1)
- Operation of the proposed project could result in the exposure of persons to or generation of noise levels in excess of the San Francisco Noise Ordinance or a substantial permanent, temporary, or periodic increase in ambient noise levels in the project vicinity, above levels existing without the project. (Impact NOI-2.)
- Construction of the proposed project would expose persons to or generate excessive ground-borne vibration or ground-borne noise levels. (Impact NOI-3)
- Construction activities for the proposed project, in combination with other past, present, and reasonable future projects in the city, would result in a substantial temporary increase in noise or noise levels in excess of the applicable local standards. (Impact C-NOI-1)
- Construction activities associated with project-related development, in combination with other past, present, and reasonable future projects in the city, would expose sensitive receptors to excessive ground-borne vibration related to annoyance. (Impact C-NOI-2)
- Operation of the proposed project, in combination with other past, present, and reasonable future projects in the city, could result in the exposure of persons to noise in excess of the applicable local standards or a substantial permanent ambient noise level increase in the project vicinity. (Impact C-NOI-3)

AIR QUALITY IMPACTS

- Construction of the proposed project would generate fugitive dust and criteria air pollutants, which for criteria air pollutants but not fugitive dust, would violate an air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. (Impact AQ-1)
- During project operations, the proposed project would result in emissions of criteria air pollutants at levels that would violate an air quality standard, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. (Impact AQ-2)
- During combined project construction and operations, the proposed project would result in emissions of criteria air pollutants at levels that would violate an air quality standard, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. (Impact AQ-3)
- The proposed project's construction and operation, in combination with other past, present, and reasonable future projects, would contribute to cumulative regional air quality impacts. (Impact C-AQ-1)

WIND IMPACTS

- The proposed project would alter wind in a manner that would substantially affect public areas. (Impact WS-1)
- The proposed project, in combination with past, present, and reasonably foreseeable future projects, would alter wind in a manner that would substantially affect public areas. (Impact C-WS-1)

C. SIGNIFICANT IRREVERSIBLE CHANGES

In accordance with Section 21100(b)(2)(B) of the CEQA Statute and Section 15126.2(c) of the CEQA Guidelines, an EIR must identify any significant irreversible environmental changes that could result from implementation of a project. This may include current or future uses of nonrenewable resources and secondary or growth-inducing impacts that commit future uses of nonrenewable resources. Also included are secondary or growth-inducing impacts that commit future generations to similar uses. According to the CEQA Guidelines, irretrievable commitments of resources should be evaluated to ensure that current consumption is justified. In general, such irreversible commitments include the use of resources, such the materials to construct a project, as well as the energy and natural resources (including water) that would be required to sustain a project and its inhabitants or occupants over the usable life of the project.

The consumption of nonrenewable resources includes conversion of agricultural lands and lost access to mining reserves. As discussed in Chapter 4, *Environmental Setting and Impacts*, the California Department of Conservation designates the site as "Urban and Built-Up Land," and the project site is located in an urbanized area of San Francisco. Therefore, no existing agricultural lands would be converted to non-agricultural uses. In addition, the project site does not contain known mineral resources and does not serve as a mining reserve; therefore, development of the proposed project would not result in the loss of access to mining reserves.

No significant environmental damage, such as accidental spills or explosions of hazardous materials, is anticipated with implementation of the proposed project. Compliance with federal, state, and local regulations would ensure that this potential impact would be reduced to a less-than-significant level.

The project sponsor would be required to demonstrate compliance with the performance standards outlined in the Maher Ordinance, including the preparation of a site-specific site mitigation plan, subject to review and approval by the San Francisco Department of Public Health. As such, no irreversible changes, such as those that might result from construction of an industrial project, would result from development of the proposed project.

Construction of the proposed project would require the use of energy, including energy produced from nonrenewable resources. Energy consumption would also occur during the operational period of the proposed project. The proposed project would be required to incorporate green building features, consistent with the City and County of San Francisco's (City's) Green Building Ordinance, to reduce greenhouse gas (GHG) emissions. As discussed in Section 4.H, *Greenhouse Gas Emissions*, the proposed project would not result in any significant impacts associated with an increase in GHG emissions or conflict with measures adopted for the purpose of reducing such emissions because the proposed project would be compliant with the City's Greenhouse Gas Reduction Strategy. Additionally, the proposed project would not require the construction of major utility lines to deliver energy or natural gas because these services are already provided in the area.

The consumption of other nonrenewable or slowly renewable resources would occur during construction and operation. These resources include, but are not limited to, lumber, concrete, sand and gravel, asphalt, masonry, metals, and water. The Project would irreversibly use water and solid waste landfill resources. However, the Project would not involve a large commitment of those resources relative to supply, nor would it consume these resources in a wasteful manner, because all resources would be used to achieve the project objectives. Therefore, the proposed project would not result in a significant impact associated with the consumption of nonrenewable resources.

D. Areas of Known Controversy and Issues to Be Resolved

This EIR analyzes the potential environmental effects of the proposed project, as identified in the notice of preparation (NOP), which was issued on December 11, 2013 (Appendix 1 of this EIR). On the basis of public comments submitted following publication of the NOP, it was determined that the potential areas of controversy and unresolved issues for the proposed project include:

- **Project Description**: Comments raised concerns about the provision of transportation infrastructure; height, scale, and design of the proposed project; uses that would be present on the project site; and provision of affordable housing. These topics are discussed in detail in Chapter 2, *Project Description*.
- **Aesthetics**: Comments raised concerns about the potential impacts on views. This is discussed in Section 4.B, *Aesthetics*.
- **Cultural Resources**: Comments raised concerns about the potential impacts on submerged cultural resources, which is discussed in Section 4.D, *Cultural Resources*.

- **Transportation and Circulation**: Comments raised concerns about the potential increases in traffic congestion and changes to circulation patterns and parking; public transportation availability; pedestrian safety; and potential impacts on game days. These topics are discussed in Section 4.E, *Transportation and Circulation*.
- **Noise:** Comments raised concerns about the potential noise impacts, which is discussed in Section 4.F, *Noise*.
- **Air Quality**: Comments raised concerns about the potential impacts on operational air quality, discussed in Section 4.G, *Air Quality*.
- **Greenhouse Gas Emissions**: Comments raised concerns about GHG emissions, discussed in Section 4.H, *Greenhouse Gas Emissions*.
- **Wind and Shadow**: Comments raised concerns about the potential impacts on shade/shadow, discussed in Section 4.I, *Wind and Shadow*.
- **Public Services and Recreation**: Comments raised concerns about the potential impacts on emergency service providers; potential loss of green space/recreational areas; and potential impacts on schools. These topics are discussed in Section 4.J, *Public Services and Recreation*.
- **Utilities and Service Systems**: Comments raised concerns about the potential impacts on water supply and wastewater services, discussed in Section 4.K, *Utilities and Services Systems*.
- **Biological Resources**: Comments raised concerns about the potential impacts on the marine environment and listed species, discussed in Section 4.L, *Biological Resources*.
- **Hydrology and Water Quality**: Comments raised concerns about the effects of sea-level rise on the proposed project; and potential impacts on water quality. These topics are discussed in Section 4.N, *Hydrology and Water Quality*.
- **Alternatives**: Comments raised concerns about the consideration of alternatives, discussed in Chapter 7, *Alternatives*.

6. VARIANTS

A. INTRODUCTION

The project sponsor (Seawall Lot 337 Associates, LLC) has requested that this draft environmental impact report (EIR) include an environmental analysis of variants to the proposed project. Variants are variations of the proposed project at the same project site, with the same objectives, background, and development controls, but with a specific variation that may or may not reduce environmental impacts. Therefore, this chapter describes and analyzes the associated environmental impacts for the following four variants to the proposed project:

- **Variant 1 – District Energy/Bay-Source Energy Capture**, which would provide a district-wide heating and cooling system, with hot and cold water piped underground to individual buildings, in lieu of having chillers and boilers in each building as proposed in the project (both land use assumptions).
- **Variant 2 – Entertainment Venue**, which would accommodate up to 4,000 patrons and up to 50 events per year.
- **Variant 3 – Reconfigured Parking**, which would relocate the 700 proposed parking spaces from the subterranean garage at Mission Rock Square to the Block D2 garage.
- **Variant 4 – Hotel Use**, which would provide a hotel of approximately 200,000 gross square feet (gsf) in a building that otherwise would have been residential under the proposed project (both land use assumptions).

These variants modify limited features or aspects of the project, unlike the alternatives to the project (described and analyzed in Chapter 7, *Alternatives*), which analyze different approaches to developing the project site in order to address significant impacts that may result from the project. Each variant is analyzed at the same level of detail as the proposed project and would be available for selection by the project sponsor and decision makers as part of an approval action.

For some environmental topics, the impacts under a variant would be the same as those of the proposed project. However, in some cases, the impacts of the proposed project under a particular variant would differ from the impacts identified for the proposed project in Chapter 4, *Environmental Setting and Impacts*. Unless otherwise stated, all mitigation and improvement measures described in Chapter 4 that would be required to reduce impacts associated with the proposed project would also be applicable to each of the variants.

B. VARIANT 1: DISTRICT ENERGY/BAY-SOURCE ENERGY CAPTURE

DESCRIPTION

Variant 1 consists of a District Energy System (DES) combined with use of an alternative energy source for heating and cooling, with a preference for use of bay water if feasible. The DES entails a district-wide heating and cooling system, with hot and cold water piped underground to individual buildings, in lieu of having chillers and boilers in each building as proposed for the project (both land use assumptions). This district-wide approach allows for improved energy efficiency, sustainability, and fuel flexibility as compared to conventional heating and cooling technologies. When coupled with bay-source energy capture (as described further below), the water and energy efficiency of the proposed project, with Variant 1, would be greater than if conventional approaches were used.

In general, the proposed DES for Mission Rock comprises a centralized thermal generation plant which could be coupled with a bay-water heat-rejection and heat-source energy capture system (described below as a sub-variant). Additional energy capture sub-variants beyond the bay-source option are also discussed below.

This plant would supply hot and cold water to the development through a network of buried pipes. The main equipment in the plant would be chillers, heat pumps, boilers, bay-water heat exchangers (if applicable), and cooling towers. Boilers and cooling towers would be used mainly when the bay-water heat-rejection and heat-source system is unavailable. If the bay-water heat-rejection and heat-source energy capture sub-variant is not implemented with Variant 1, the plant would still include chillers, heat pumps, boilers, and cooling towers but not the bay-water heat exchangers.

DISTRICT ENERGY SYSTEM PLANT

A DES plant contains standard equipment, such as chillers and boilers, which any building would typically have in a mechanical room in either a basement or a penthouse. With a DES, the equipment in the individual buildings would be removed and then aggregated at one location under Variant 1. It is anticipated that the approximately 25,000-gsf DES plant could be located either on Block A, within the parking structure planned for Block D2, or on Pier 48, although other blocks may be considered if found to be beneficial. The DES would be integrated into an already-planned building or, in the case of Pier 48, existing building. The building footprints and massing (with the exception of the cooling towers described below) proposed under the project would not need to be expanded under Variant 1 to accommodate the DES. Slightly different construction activity (number and types of equipment pieces) compared to the proposed project would be required for Variant 1.

The major components within the DES plant under Variant 1 would include chillers, heat pumps, heat exchangers, boilers, pumps, pressure vessels and tanks, control and alarm systems, and cooling towers. The DES system under Variant 1 has not been designed at this stage, but it is anticipated that cooling towers would reach a height of between approximately 20 and 25 feet. The DES would also entail use of a closed-loop distribution system, using heated or cooled water to provide thermal energy through a network of buried pipes to the individual buildings. Should cooling towers be added to Pier 48 under Variant 1, they would be developed in a manner consistent with the Secretary of the Interior Standards for Rehabilitation.

BAY-SOURCE ENERGY CAPTURE

BAY-SOURCE ENERGY CAPTURE SYSTEM DESCRIPTION

As noted above, the water and energy efficiency of the proposed project would be greatest when the DES under Variant 1 is coupled with the bay-source energy capture system. The bay-source energy capture system would use bay water for heat rejection in the warmer months and a heat source in the colder months. The bay-source energy capture system would be combined with chillers, heat pumps, and boilers at the DES plant to heat or cool the closed-loop distribution system. The bay-source energy capture system would include the following process:

- Water would be pumped from the San Francisco Bay (Bay) at a low intake screen approach velocity below 0.2 feet per second per California Department of Fish and Wildlife[1] (CDFW) requirements and an intake screen slot velocity below 0.5 feet per second per Clean Water Act (CWA) 316(b), to minimize fish impingement and entrainment.[2] It is anticipated that the mesh size for the intake screen would be approximately 1.75 millimeters or smaller.
- Incoming bay water would then be passed through a micro-screen drum filter to further minimize particulate entry.
- The bay water would then be passed through an ultra-violet sterilization system. No chemical treatment of the bay water would occur.
- From the sterilization system, the bay water would be pumped to titanium heat exchangers to reject heat during the summer and provide a heat source during the winter.
- During warmer months, the temperature of bay water would increase as it goes through the heat exchanger, and during the colder months it would be cooled down. Because the distribution system would run off of the domestic (SFPUC) potable water system and would use only bay water as a source of thermal energy, the heat exchanger would ensure that bay water never comes in contact with water in the DES distribution system.

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1 California Department of Fish and Game. Fish Screening Criteria. June 19, 2000.

2 California Department of Fish and Game. Fish Screening Criteria. June 19, 2000.

- After passing through the heat exchanger, the bay water would be returned to the Bay through a diffuser. Per San Francisco Regional Water Quality Control Board Basin Plan requirements the water returned to the Bay would be no more than 4 degrees Fahrenheit different than the receiving Bay water.
- The estimated peak flow of the system is 18.2 million gallons per day (mgd) in the summer and 11.5 mgd during the winter.

Maintenance would involve cleaning the DES system approximately a half-day per month. The cleaning activities would largely be automatic, but occasional support from a small number of divers may be needed, depending on the final location chosen for the intake. It is also possible, depending on the location of the intake, that back-flushing activities may be required for cleaning.

BAY-SOURCE ENERGY CAPTURE SYSTEM CONSTRUCTION

Three high-density polyethylene (HDPE) pipes, approximately 30 inches in diameter, two for intake and one for outfall, would be used. The pipes would be placed on the existing seabed ("bottom-mounted solution") or just below the seabed and would each extend a maximum of between approximately 600 and 1,400 feet into the Bay. Pipes installed on the seabed would include concrete anchors. Pipes installed below the seabed could be horizontally directionally drilled (HDD). HDD involves drilling a pilot hole, which is subsequently enlarged with a reaming tool to the desired size. Drilling mud, usually bentonite or polymer, is used to flush the cuttings and stabilize the hole. When the hole has reached the required size, the HDPE pipe is pulled back into the hole in one single operation. The drill rig would be placed on-shore in China Basin Park and a barge would be used for the over water pipeline pullback. No existing riprap would be disturbed or excavated to accommodate this system, and no dewatering or cofferdams would be required for construction activities.

The outfall and intake pipelines and structures under this variant would be installed adjacent to Pier 48. If it is determined to be necessary to extend the pipeline offshore beyond the pier, the extension would entail either the bottom-mounted solution or an extension of the HDD. The bay-water pump station would be placed onshore and integrated into the DES plant described above.

Pile-driving activities would be required to install the two intake screen structures under this variant. Specifically, it is assumed that approximately eight 14-inch square concrete piles would be required to support and secure the intake screen structures. These would be installed at a rate of eight piles per day, unless permits dictate otherwise, and are therefore assumed to all be installed within one day. Each pile is conservatively assumed to require up to 100 blows with an impact hammer. It is not anticipated that pile driving for this system would overlap with other pile-driving activities elsewhere on the project site. It is anticipated an area within the Bay of approximately 6,000 square feet would be needed to accommodate the pipes, piles, and any other related infrastructure.

SUB-VARIANTS: OTHER ENERGY SOURCE OPTIONS

In lieu of the bay-source energy capture preferred option under this variant, other technologies also being considered for heat-rejection and heat-source system for the DES, including geothermal exchange and wastewater energy capture systems, are described below. If the bay source energy capture variant is not implemented, then one of these other technologies would be constructed instead in combination with the DES under Variant 1.

Geothermal Energy Capture Sub-variant. Instead of the bay-source energy capture system, several wells could be installed where energy exchange between the groundwater and soil and a closed-loop heat-rejection and heat-source system would occur. The closed-loop system would entail the use of pipes installed in the wells, circulation pumps, and heat exchangers. The heat exchangers would transfer the energy from the well water system to the district energy system. The wells could be placed anywhere on Seawall Lot 337 and the depth of the wells could exceed the depth of the piles used to support buildings and infrastructure at the site and would comply with all relevant geotechnical requirements. No piles would need to be driven to implement this sub-variant as the material used for the pipes would be high-density polyethylene pile (HDPE). Construction of the geothermal energy capture option under this sub-variant would require placement of wells, but the wells would not require construction activities beyond what is assumed for the project and for the DES and bay-source energy capture sub-variant.

Wastewater Energy Capture Sub-variant. Under this scenario, the bay-source energy capture portion (or sub-variant) of this variant would not be constructed. Instead, the sanitary sewer system would provide a heat sink for energy capture purposes, similar to the bay-source and geothermal exchange system. An existing sanitary sewer trunk line runs through the area. The flow rate and temperature in the sanitary sewer are unknown at this time. However, if the flow is adequate, this system could be used as an energy exchange source for the DES. Under this sub-variant, additional pipes would be required in the streets, but the footprint of construction or the anticipated schedule would not increase beyond what is anticipated with development of the proposed project. This variant would utilize the same sanitary sewer pump stations as anticipated under the proposed project. Construction of the wastewater capture option would not require additional construction beyond what is assumed for the project and for the DES and bay-source energy capture sub-variant.

The *Regulatory Framework* discussions throughout Chapter 4 also apply to Variant 1. However, Variant 1 would also be required to comply with these additional regulations:

Fish Impingement and Entrainment. The CDFW has adopted fish screening criteria that regulate intake screen slot velocity to minimize impingement and entrainment of fish. Also, U.S. Environmental Protection Agency (EPA) standards for the release of heated water established pursuant to the federal CWA Section 316(b) would apply. CWA Section 316(b) requires that the EPA establish standards requiring that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts.

Release of Heated Water into Enclosed Bays. The California SWRCB under its authority delegated by the EPA to enforce the CWA has adopted a Thermal Plan that regulates the release of thermal waste (i.e., cooling water and industrial process water used for the purpose of transporting waste heat). In addition, the U.S. EPA, under CWA Section 316(b), has adopted standards for release of heated water to enclosed bays that limits the temperature of the return water to between 4 and 20 degrees Fahrenheit.

IMPACT ANALYSIS

ENVIRONMENTAL TOPICS NOT REQUIRING FURTHER ANALYSIS UNDER VARIANT 1

Unless specifically stated otherwise, the following discussion applies to Variant 1 including DES combined with any of the heat generation technologies being considered (i.e., the bay-source energy capture, geothermal exchange, or wastewater energy capture sub-variants).

Variant 1 and the proposed project would have the same (or fewer) environmental effects as the proposed project for the following topics explained below: land use and land use planning, aesthetics population and housing, cultural resources, transportation and circulation, wind/shadow, public services and recreation, utilities and service systems, geology and soils, and hazardous materials.

Variant 1 would aggregate standard heating and cooling equipment, which would otherwise be contained in each building's mechanical room, in an approximately 25,000 gsf DES plant located in an existing or planned building. However, the overall site plan, building footprints and heights, mix of land uses, and intensity of development would be the same under Variant 1 and the proposed project. As a result, Variant 1 would have less than significant land use and land use planning impacts because the site plan under Variant 1 would be the same as under the proposed project. No changes to site configuration or the physical characteristics of the buildings (e.g., height, mass, bulk, orientation, setbacks, architectural treatments) would occur compared to the proposed project that would change the analysis or conclusions regarding aesthetics or wind and shadow under Variant 1.

Variant 1 and the proposed project would have the same mix of land use types (i.e., residential, commercial, active/retail, production) with the square footage and require similar construction activities and durations. As a result, the number of onsite residents, employees, employee-induced residents, and construction-related employees would be the same for Variant 1 and the proposed project, as would the conclusions regarding less-than-significant impacts associated with population and housing. Impacts on public services and recreation as well as utilities and service systems (with the exception of energy demand, in which case Variant 1 would have a positive effect compared to the proposed project), which are based largely on the increased demand associated with population and housing growth, would be the same under Variant 1 and the proposed project. No additional traffic trips would be generated by this variant; as

such, transportation-related impacts would be the same as under the proposed project. There would be no meaningful difference in potential physical environmental impacts on cultural resources, geology and soils, or hazardous materials between Variant 1 and the proposed project because Variant 1 and the proposed project would have the same total square footage, building configurations and footprints, and construction characteristics.

All recommended mitigation measures for the environmental topics mentioned above under the proposed project would be applicable to this variant. Therefore, these environmental topics require no further analysis under Variant 1. Environmental topics discussed below for Variant 1 include the following: Noise, Air Quality, Biological Resources, and Hydrology and Water Quality.

NOISE

The following discussion assumes implementation of the DES with the bay-source energy capture sub-variant. As noted above, the other sub-variants under Variant 1would have similar or less construction activity than the bay-source energy capture sub-variant, making this sub-variant the most intensive scenario for the purposes of this EIR.

Variant 1 and the proposed project would require the same types of construction activities and durations, equipment, and staging locations as the project except for the additional pile driving that would be required under Variant 1. The additional pile driving associated with this variant would include an additional eight 14-inch concrete piles installed, which is anticipated to take one additional day, compared to the proposed project. The total number of piles driven or number of pile blows on a worst-case day (when the most piles are driven) would not increase due to the addition of these eight piles, but the number of days of pile driving would increase by one day. Accordingly, potential construction noise impacts of Variant 1 to noise-sensitive receptors would be the same on a daily basis as those described for the proposed project but would last one day longer than the proposed project. Similar to the proposed project, impacts would be ***significant and unavoidable***.

With regard to operational noise, Variant 1 would include noise-generating motors, chillers, heat pumps, boilers, bay-water heat exchangers, and cooling towers, which would result in additional operational noise compared to the proposed project. The noise generated by individual pieces of mechanical equipment associated with this variant would be similar to the noise generated by stationary noise sources (HVAC, generators, and other mechanical equipment) associated with the proposed project. However, the thermal generation plant and associated equipment would be located in a centralized location so noise sources may combine to result in slightly increased noise in the immediate vicinity of the DES plant under this variant, compared to the proposed project. However, noise levels would not increase to the extent that nearby receptors would be affected beyond what is anticipated under the proposed project.

The centralization of the DES equipment associated with this system into a single location could result in greater noise levels in the immediate vicinity of the equipment under this variant, compared to the proposed project. The closest existing and future noise-sensitive receptors to Block A (where the system is anticipated to be installed) and Block D (the alternative location option for the system) are residential land uses located just west of Third Street (which are as close as 100 feet from the project site, and could be similarly close to the DES system under this variant, depending on the final installation location). Both Block A and Block D1 would also contain future onsite sensitive receptors which would be exposed to noise from the DES system under this variant. The closest future onsite noise-sensitive receptors from the other possible location at Pier 48 would be directly across Terry A. Francois Boulevard at Block K or J (under the High Residential Assumption). Due to the proximity between existing and future onsite receptors and the DES system under this variant, it is still possible that exterior noise levels at adjacent uses could be such that the interior 45 dBA noise level standard between 10:00 p.m. and 7:00 a.m. and/or the 55 dBA standard between 7:00 a.m. and 10:00 p.m. may be exceeded.

Compliance with Police Code Section 2909, which requires that the project sponsor provide acoustical treatments for stationary equipment under this variant that reduces ambient noise levels to below the 55 dBA daytime and 45 dBA nighttime interior thresholds (generally exterior noise levels of 20 dB above the interior threshold result in compliance with interior noise levels) would ensure the operational ambient noise impacts remains at ***less than significant*** levels, similar to the proposed project.

Variant 1 would not change the outdoor event uses under the proposed project so to the extent proposed project uses are subject to Mitigation Measure M-NOI-2.1, Noise Control Plan for Outdoor Amplified Sound), this mitigation would equally apply under Variant 1 and noise from outdoor events would remain ***less than significant with mitigation***.

AIR QUALITY

Criteria pollutant and toxic air contaminant emissions under Variant 1 were analyzed using the same methodologies and assumptions as those used for the proposed project. The emissions modeling details for the Reduced Intensity Alternative are provided in Appendix 6-2. The modeling uses the same methodology contained Air Quality Technical Report.

CONSTRUCTION IMPACTS

The following discussion assumes implementation of the DES with the bay-source energy capture sub-variant. As noted above, the other sub-variants under Variant 1 would have similar or less construction activity than the bay-source energy capture sub-variant.

Similar to the proposed project, construction-related air quality impacts of Variant 1 would be significant and unavoidable with mitigation. For the proposed project, as described in Section 4.G, *Air Quality*, estimated construction-related emissions of reactive organic gas (ROG) would

exceed the Bay Area Air Quality Management District's (BAAQMD's) significance thresholds for the year 2019 at 66 pounds per day, and estimated construction-related emissions of nitrogen oxides (NO_x) would exceed the BAAQMD's significance thresholds from 2018 through 2021 at between approximately 69 and 156 pounds per day. Even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, for the proposed project, NOx levels would exceed the significance threshold from 2018 through 2020, at between approximately 63 and 91 pounds per day. Similarly, as shown in Table 6-1 on the following page (and in Tables 2 and 3 in Appendix 6-2), the construction-related criteria air pollutant emissions for Variant 1 would exceed the thresholds for emissions of NOx for the years between 2018 and 2021 and as shown in Table 6-2, page 6-11, (and in Tables 4 and 5 in Appendix 6-2), emissions of NOx under Variant 1 would still be significant even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4 for the years between 2018 and 2020, similar to the proposed project. ROG emissions would also exceed BAAQMD's significance threshold in 2019 at 65 pounds per day, but would be below the threshold after implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, as shown in Tables 6-1 and 6-2 (also see Tables 4 and 5 in Appendix 6-2). Thus, similar to the proposed project, an offset emissions mitigation measure would be required for Variant 1 to provide for reduction of levels of NO_x exceeding the significance thresholds through implementation of pollution reduction programs elsewhere in the air basin. Accordingly, additional mitigation beyond Mitigation Measures M-AQ-1.1 through M-AQ-1.4 would be required for Variant 1 to reduce the residual NOx emissions. Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor shall pay an offset mitigation fee for all remaining unmitigated NO_x emissions in excess of BAAQMD thresholds for Variant 1. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of construction emissions of NOx are conservatively considered ***significant and unavoidable with mitigation*** for Variant 1, same as for the proposed project.

OPERATIONAL IMPACTS

There would be no difference in operational activities which generate criteria pollutant emissions between Variant 1 and the proposed project. Similar to the proposed project, operational impacts of Variant 1 would be significant and unavoidable with mitigation. As described in Chapter 4, Section 4.G, *Air Quality*, estimated operational emissions of ROG under the proposed project for the High Commercial land use assumption (the most impactful scenario) would exceed the BAAQMD's significance thresholds for the years 2021 through 2024 and all following operational years at between approximately 66 and 123 pounds per day and

TABLE 6-1. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR VARIANT 1 (INCLUDING SUB-VARIANTS)

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	2.0	22.7	0.8	0.7
2018	36.8	**118.5**	5.1	4.9
2019	**65.1**	**150.9**	6.4	6.1
2020	50.1	**125.8**	4.9	4.7
2021	34.2	**69.1**	2.5	2.4
2022	17.8	23.5	0.9	0.9
2023	4.4	5.8	0.2	0.2
2024	0.0	0.0	0.0	0.0
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.3	2.9	<0.1	<0.1
2018	4.8	**15.4**	0.7	0.6
2019	8.5	**19.6**	0.8	0.8
2020	6.4	**14.8**	0.5	0.5
2021	4.5	9.0	0.3	0.3
2022	2.3	3.1	0.1	0.1
2023	0.6	0.8	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**10**	**10**	**15**	**10**

Source:

ENVIRON International Corporation and the California Air Districts. 2013. CalEEMod User's Guide. Version 2013.2. Appendix A: Calculation Details for CalEEMod. Prepared for the California Air Pollution Control Officers Association. July. Available: http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixa.pdf?sfvrsn=2. Accessed: October 12, 2015.

Notes:

Emissions over threshold levels are in **bold**

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 6-2. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR VARIANT 1 (INCLUDING SUB-VARIANTS)

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.7	8.4	<0.1	<0.1
2018	10.6	**58.6**	0.9	0.9
2019	18.3	**85.9**	1.3	1.3
2020	14.7	**79.3**	1.2	1.2
2021	9.4	51.7	0.7	0.6
2022	4.6	19.4	0.3	0.2
2023	1.2	5.1	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	<0.1	1.1	<0.1	<0.1
2018	1.4	7.6	0.1	0.1
2019	2.4	**11.2**	0.2	0.2
2020	1.9	9.6	0.1	0.1
2021	1.2	6.7	<0.1	<0.1
2022	0.6	2.5	<0.1	<0.1
2023	0.2	0.7	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**10**	**10**	**15**	**10**

Source:

Refer to Table 6-1.

Notes:

a. Emissions over threshold levels are in **bold**

b. Mitigated emissions assume all off-road equipment and diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Does not include effect of Mitigation Measure M-AQ-1.5, which requires NOx offsets.

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

emissions of NOx would exceed the threshold for the years 2023 through 2024 and all following operational years at between approximately 57 and 60 pounds per day. The same mitigation measures identified for the proposed project would apply to Variant 1. Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG and NOx emissions in excess of BAAQMD thresholds for Variant 1. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of operational emissions of ROG and NOx are conservatively considered ***significant and unavoidable with mitigation*** for Variant 1, same as for the proposed project.

COMBINED CONSTRUCTION AND OPERATIONAL IMPACTS

As noted above, this construction analysis assumes Variant 1 coupled with the bay-source energy capture sub-variant. As noted above, the other sub-variants under Variant 1 would have similar or less construction activity than the bay-source energy capture sub-variant making this analysis the most intensive option in terms of construction emissions and impacts.

Similar to the proposed project, combined construction and operational impacts of Variant 1 would be significant and unavoidable with mitigation since they would both have similar operational activities. As described in Section 4.G, *Air Quality*, estimated combined construction and operational emissions of ROG and NOx under the proposed project for the High Commercial land use assumption would be between approximately 66 and 123 pounds per day of ROG for the years 2019 through 2024 and between approximately 57 and 156 pounds per day of NOx for the years 2018 through 2024 and beyond, and for the High Residential land use assumption would be between approximately 66 and 124 pounds per day between 2019 through 2024 and beyond and between approximately 62 and 156 pounds per day of NOx for the years 2018 through 2023, exceeding significance thresholds for both ROG and NOx. As shown in Table 6-3 on the following page (and in Table 6 in Appendix 6-2), Variant 1 would result in combined construction and operational criteria air pollutant emissions of ROG and NOx slightly lower than those for the proposed project, but still at levels that would exceed the applicable significance thresholds, as shown in Table 6-3. The same mitigation measures identified for the proposed project would apply to Variant 1, although the amount of emissions offset would need to be adjusted to the emissions calculated for this variant. Even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4 and M-AQ-2.1 through M-AQ-2.3, ROG levels would exceed the significance threshold from 2020 through 2024 and beyond at between 61 and 107 pounds per day, and NOx levels would exceed the significance threshold from 2018 through 2023 at between 59 and 103 pounds per day, as shown in Table 6-4, page 6-14, (also see Table 7 in Appendix 6-2). Pursuant to Mitigation Measure M-AQ-1.5,

TABLE 6-3. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR VARIANT 1 (INCLUDING SUB-VARIANTS)

	Average Daily Emissions (lbs/day)							
Year	ROG	NO_x	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	2.0	22.7	0.8	0.0	0.8	0.7	0.0	0.7
2018	36.8	**118.5**	5.1	0.0	5.1	4.9	0.0	4.9
2019	**65.1**	**150.9**	6.4	0.0	6.4	6.1	0.0	6.1
2020	**100.7**	**150.8**	5.7	8.6	14.3	5.5	2.5	7.9
2021	**122.4**	**109.5**	3.8	20.9	24.6	3.6	6.0	9.6
2022	**122.1**	**71.7**	2.5	25.0	27.5	2.5	7.2	9.6
2023	**122.7**	**65.7**	2.2	33.3	35.5	2.2	9.5	11.7
2024	**118.1**	**57.4**	2.0	33.3	35.3	1.9	9.5	11.5
Significance Threshold	**54**	**54**	**82**	**82**	**82**	**54**	**54**	**54**
	Annual Emissions (tons/year)							
Year	ROG	NO_x	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.3	2.9	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	4.8	**15.4**	0.7	0.0	0.7	0.6	0.0	0.6
2019	8.5	**19.6**	0.8	0.0	0.8	0.8	0.0	0.8
2020	**15.6**	**19.1**	0.7	1.6	2.3	0.7	0.4	1.1
2021	**20.6**	**16.4**	0.6	3.8	4.4	0.5	1.1	1.6
2022	**21.4**	**11.9**	0.4	4.6	5.0	0.4	1.3	1.7
2023	**22.2**	**11.7**	0.4	6.1	6.5	0.4	1.7	2.1
2024	**21.6**	**10.5**	0.4	6.1	6.4	0.4	1.7	2.1
Significance Threshold	**10**	**10**	**15**	**-**	**15**	**10**	**-**	**10**

Source:

Refer to Table 6-1 above and Table 10 of the ADEIR.

Notes:

a. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

b. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

c. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 6-4. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR VARIANT 1 (INCLUDING SUB-VARIANTS)

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.7	8.4	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	10.6	**58.6**	0.9	0.0	0.9	0.9	0.0	0.9
2019	18.3	**85.9**	1.3	0.0	1.3	1.3	0.0	1.3
2020	**60.8**	**102.9**	1.8	7.2	9.0	1.8	2.1	3.8
2021	**89.2**	**88.9**	1.6	17.3	18.9	1.6	4.9	6.5
2022	**98.6**	**63.8**	1.4	20.7	22.1	1.4	5.9	7.3
2023	**107.0**	**60.0**	1.5	27.6	29.1	1.5	7.9	9.4
2024	**105.6**	52.5	1.4	27.6	29.0	1.4	7.9	9.3
Significance Threshold	**54**	**54**	**82**	**82**	**82**	**54**	**54**	**54**
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	<0.1	1.1	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	1.4	7.6	0.1	0.0	0.1	0.1	0.0	0.1
2019	2.4	**11.2**	0.2	0.0	0.2	0.2	0.0	0.2
2020	**10.3**	**13.6**	0.2	1.3	1.5	0.2	0.4	0.6
2021	**15.8**	**13.5**	0.3	3.1	3.4	0.3	0.9	1.2
2022	**17.8**	**10.6**	0.2	3.8	4.0	0.2	1.1	1.3
2023	**19.5**	**10.7**	0.3	5.0	5.3	0.3	1.4	1.7
2024	**19.3**	9.6	0.3	5.0	5.3	0.2	1.4	1.7
Significance Threshold	**10**	**10**	**15**	**-**	**15**	**10**	**-**	**10**

Source:

Refer to Table 6-3 above and Table 12 of the ADEIR.

Notes:

a. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-2.2), and auto vehicle trips are reduced by 20% through the TDM plan (Mitigation Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG and NOx offsets.

b. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

c. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]

d. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG:	reactive organic gases
NOx.:	nitrogen oxides
PM10:	particulate matter less than or equal to 10 microns in diameter
PM2.5:	particulate matter less than or equal to 2.5 microns in diameter
lbs:	pounds
VDECS:	Verified Diesel Emissions Control Strategies

the project sponsor shall be required to pay an offset mitigation fee for all remaining unmitigated ROG and NOx emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee would be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of ROG and NOx emissions is conservatively considered significant and unavoidable with mitigation for Variant 1, same as for the proposed project.

TOXIC AIR CONTAMINANTS

Similar to the proposed project, construction and operation of Variant 1 (assuming the bay-source energy capture sub-variant, which is the most conservative assumption for analysis purposes) would generate toxic air contaminants, including PM2.5, diesel particulate matter (DPM), and total organic gases (TOG). The sources of emissions for Variant 1 would be exactly the same as for the proposed project. The quantity of emissions would vary slightly for construction under Variant 1 (compared to the proposed project) due to slightly different construction activity for pile driving, but would be exactly the same for operations. This is because operational activities that generate TACs under Variant 1 are identical to those of the proposed project.

PM2.5 ANALYSIS

Similar to the proposed project, the PM2.5 contribution at receptors under Variant 1 (assuming the bay-source energy capture sub-variant, which is the most conservative assumption for analysis purposes) would be less than significant with mitigation, and the same mitigation measure would apply to this variant. For the proposed project (see Table 4.G-16 in Section 4.G, *Air Quality*), the PM2.5 contribution would exceed the significance threshold, but implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the PM2.5 concentration below the thresholds of significance at the onsite maximally impacted

receptor (MIR) in the study area that is not in the air pollutant exposure zone (APEZ) under existing/future conditions but would be placed in the APEZ under existing/future plus proposed project conditions.

For Variant 1, as shown in Table 6-5 on the following page (also see Table 8 in Appendix 6-2), the maximum annual average PM2.5 concentration would not exceed the significance threshold of 0.2 μg/m^3 for the MIR that is currently located in the APEZ. However, it would exceed the significance threshold of 0.3 μg/m^3 for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 1.

More specifically, the onsite MIR currently outside the APEZ but that would be located in the APEZ with the contribution from Variant 1 could be exposed to a maximum annual average PM2.5 concentration from Variant 1 of up to 2.2 μg/m^3. This exceeds the project contribution threshold of 0.3 μg/m^3. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this impact. There are no offsite MIRs currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 1. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce PM2.5 exhaust emissions from off-road construction equipment, on-road haul trucks, construction generators, in-water construction equipment, emergency generators, and mobile sources, and would reduce the maximum annual average PM2.5 concentration from Variant 1 for the onsite MIR to 0.3 μg/m^3, which does not exceed the threshold of 0.3 μg/m^3. Mitigation Measure M-AQ-1.1 would reduce off-road and generator PM2.5 exhaust emissions by 73–91 percent under Variant 1, M-AQ-1.2 would reduce on-road PM2.5 exhaust emissions by 22–88 percent, M-AQ-1.4 would reduce barge PM2.5 exhaust emissions by 58 percent, and M-AQ-2.1 would reduce emergency generator PM2.5 exhaust emissions by 85 percent. Therefore, with mitigation, the maximum annual average PM2.5 concentration for receptors currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 1, would be ***less than significant with mitigation***. This is the same as under the proposed project.

CANCER RISK ANALYSIS (DPM/TOG)

The lifetime cancer risk at receptors under Variant 1 (assuming the bay-source energy capture sub-variant, which is the most conservative assumption for analysis purposes) would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this variant. For the proposed project (see Tables 4.G-23 and 4.G-24 in Section 4.G, *Air Quality*), the risk would exceed the significance threshold and implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the risk below the thresholds of significance for the onsite MIR in the study area that is not located in the APEZ under existing/future conditions, but would be placed in the APEZ under existing/future plus proposed project conditions.

TABLE 6-5. MAXIMUM ANNUAL AVERAGE PM2.5 EXHAUST EXPOSURE WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS NOT LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS BUT WOULD BE LOCATED IN THE APEZ DURING EXISTING/FUTURE PLUS PROPOSED PROJECT CONDITIONS FOR VARIANT 1 (INCLUDING SUB-VARIANTS)

	Annual Average PM2.5 Concentration (μg/m³) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	**Variant 1**	**Mitigated [c]**	**Variant 1**	**Mitigated [c]**
Construction				
Total (Background + Project)	10.6	8.6	-	-
Background	8.4	8.4	-	-
Construction Contribution	**2.2**	0.3	-	-
Significance Threshold for Project Contribution	0.3	N/A[d]	-	-
Above Threshold?	**Yes**	N/A[d]	-	-

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1) and auto vehicle trips are reduced by 20% through the TDM plan (Mitigation Measure M-AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

c. The mitigated values may represent different receptor locations than the Variant 1 values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e. the total background plus project annual average PM2.5 concentration is less than the APEZ threshold of 10.0 μg/m³), the project-level threshold does not apply.

Abbreviations:

μg/m³: micrograms per cubic meter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

APEZ: Air Pollutant Exposure Zone

VDECS: Verified Diesel Emissions Control Strategies

Emissions over threshold levels are in **bold**

For Variant 1, as shown in Table 6-6 on the following page (also see Tables 9 and 10 in Appendix 6-2), the lifetime excess cancer risk would exceed the significance threshold of 7.0 in one million persons exposed for the MIR currently located in the APEZ. It would also exceed the significance threshold of 10.0 in one million persons exposed for the MIR that is currently not located in the APEZ but that would be placed in the APEZ with the contribution from Variant 1.

More specifically, the offsite MIR currently located in the APEZ could be exposed to a lifetime excess cancer risk of up to 23.9 in one million under Variant 1 conditions (for construction plus operation). This exceeds the project contribution threshold of 7.0 in one million. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this impact under Variant 1, similar to the proposed project. The lifetime excess cancer rick at the onsite MIR currently located in the APEZ would be below the project contribution threshold of 10.0 in one million, a less than significant impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 under Variant 1 would reduce the lifetime excess cancer risk from Variant 1 to 4.0 in one million for the offsite MIR currently located in the APEZ. This is less than the project contribution threshold of 7.0 in one million, a less than significant impact. The onsite and offsite MIRs not located in the APEZ but would be located in the APEZ with the contribution from Variant 1 could be exposed to a lifetime excess cancer risk of up to 140.5 and 105.1 per one million, respectively, under Variant 1 conditions (for construction plus operation). This exceeds the project contribution threshold of 7.0 in one million. This is considered a significant impact, similar to the proposed project. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the lifetime excess cancer risk from Variant 1 for the onsite and offsite MIRs to 25.9 and 8.6 in one million, respectively (for construction plus operation). For the onsite MIR, the mitigated lifetime excess cancer risk for Variant 1 of 25.9 combined with background cancer risk of 53.0 would equal 78.8, which would not exceed the APEZ threshold of 100.0 per million. Therefore, under mitigated conditions with Variant 1 (similar to the proposed project), neither the onsite MIR nor the offsite MIR would be placed into the APEZ. Consequently, with mitigation, lifetime excess cancer risk impacts for those receptors that are not located in the APEZ but that would be located in the APEZ with the contribution from Variant 1 would be ***less than significant with mitigation,*** same as for the proposed project.

Consistency with Clean Air Plan. Similar to the proposed project, impacts related to consistency with the 2010 Clean Air Plan (CAP) for Variant 1 (applies to all sub-variants) would be less than significant with mitigation. Variant 1 would be consistent with the 2010 CAP because it would incorporate mitigation measures that include offsetting residual ROG and NOx emissions above significance thresholds. Additionally, Variant 1 would be consistent with the 2010 CAP through the incorporation of control measures of the CAP, including land use/local impact measures (such as TCM C-1 – Voluntary Employer-Based Trip Reduction

TABLE 6-6. MAXIMUM LIFETIME EXCESS CANCER RISK WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS FOR CONSTRUCTION PLUS OPERATION FOR VARIANT 1 (INCLUDING SUB-VARIANTS)

	Lifetime Excess Cancer Risk (per million) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	Variant 1	Mitigated [c]	Variant 1	Mitigated [c]
RECEPTORS CURRENTLY LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS				
Total (Background + Project)	-	-	131.1	111.2
Background	-	-	107.2	107.2
Construction Plus Operation Contribution	-	-	**23.9**	4.0
Significance Threshold for Project Contribution	-	-	7.0	7.0
Above Threshold?	-	-	**Yes**	No
RECEPTORS NOT LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS BUT WOULD BE LOCATED IN THE APEZ DURING EXISTING/FUTURE PLUS VARIANT 1 CONDITIONS				
Total (Background + Project)	193.4	78.8	175.3	100.3
Background	53.0	53.0	70.3	91.7
Construction Plus Operation Contribution	**140.5**	25.9	**105.1**	8.6
Significance Threshold for Project Contribution	10.0	N/A[d]	10.0	10.0
Above Threshold?	**Yes**	N/A[d]	**Yes**	No

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1) and auto vehicle trips are reduced by 20% through the TDM plan (Mitigation Measure M-AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from Variant 1.

c. The mitigated values may represent different receptor locations than the Variant 1 values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e. the total background plus project lifetime excess cancer risk is less than the APEZ threshold of 100), the project-level threshold does not apply.

Abbreviations:

APEZ: Air Pollutant Exposure Zone

VDECS: Verified Diesel Emissions Control Strategies

Emissions over threshold levels are in **bold**

Programs and TCM D-2 – Pedestrian Access and Facilities Improvements) and energy/climate measures (such as ECM 1 – Energy Efficiency and ECM 2 – Renewable Energy) now required through the various components of the City's Greenhouse Gas Reduction Strategy as well as the transportation demand management measures that would be implemented through Mitigation Measure M-AQ-2.3, similar to those for the proposed project. Variant 1 would also not hinder implementation of the 2010 CAP because Variant 1 would place a dense, walkable urban area near a concentration of regional and local transit service and would not preclude the extension of a transit line or a bike path or any other transit improvement. Therefore, similar to the proposed project, Variant 1 would not conflict with, or obstruct implementation of the 2010 CAP, and this impact would be ***less than significant***.

BIOLOGICAL RESOURCES

The following discussion assumes implementation of the DES with the bay-source energy capture sub-variant. The other sub-variants would have similar or less construction activity than the bay-source energy capture sub-variant, and would not affect biological resources in the Bay in any manner different from the proposed project. Thus, Variant 1 with the bay-source energy capture sub-variant is the most intensive option with respect to biological resources.

Variant 1, with the bay-source energy capture sub-variant, would include the same types of construction activities and durations, equipment, and staging locations as the proposed project, but would result in greater impacts on biological resources. Potential impacts to special-status fish species and marine mammals include disturbance of bay sediments from the placement of the pipes or HDD, noise from pile driving, entrainment of fish larvae and eggs and food supply for fish into the intake system of the bay source heating/cooling system, and discharge of return water to the Bay which may affect water quality.

WATER TEMPERATURE

The Bay water return, after it goes through the bay source heating/cooling system, would be limited to a 4-degree Fahrenheit difference than the surrounding Bay in compliance with the State Water Resource Control Board for temperature discharges in enclosed bays, which would limit thermal effects to marine biota.[3] The State Water Resources Control Board and U.S. EPA standards for release of heated water into enclosed bays puts limits on the temperature of the return water of between 4 and 20 degrees Fahrenheit. For discharges classified as "thermal

[3] State Water Resources Control Board. No date. Water Quality control plan for control of temperature in coastal and interstate waters and enclosed bays and estuaries in California. Available: http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/wqplans/thermpln.pdf. Accessed: October 14, 2016.

waste discharges," as described in the SWRCB "Thermal Plan,"[4] return water is not permitted to exceed a temperature of 4 degrees Fahrenheit higher than the ambient water temperature. The Thermal Plan is applied by the RWQCB for San Francisco Bay for thermal discharges. NPDES permits require that intake and discharge water temperatures be monitored and reported to the RWQCB annually as a standard requirement of any NPDES permit for a point source discharge.

Complying with the state and federal guidelines would ensure that project impacts associated with acceptable temperature level would remain less than significant. Similar to the proposed project, Variant 1 with the bay-source energy capture variant, would be required to comply with the NPDES permit conditions to operate, and this permit must be renewed every 5 years. Therefore if there are any changes to the discharge standard, the project would need to comply or receive a specific exemption from the SWRCB to continue to discharge. Regarding the temperature impact, 4 degrees of temperature fluctuation is well within seasonal temperature fluctuations observed under ambient conditions in the San Francisco Bay and species in the Bay have evolved to be accustomed to those temperature fluctuations. Additionally, there is a very large tidal prism (tidal/water exchange) in the San Francisco Bay, and the project area has been shown to have a high amount of temperature mixing (no thermal lenses or stratification, instead a largely uniformed temperature). The amount of water discharged from the facility would be minuscule compared to daily tidal exchange and volume of the San Francisco Bay. Therefore, if the discharge is complying with state and federal temperature requirements, the temperature impact of Variant 1 on the San Francisco Bay is anticipated to be negligible, and would be a ***less-than-significant*** impact.

Potential impacts of Variant 1 on special-status fish species, marine mammals, and their habitat would be greater than those described for the proposed project as a result of inclusion of the bay-source energy capture system, as discussed below.

NOISE AND DISTURBANCE

Fish. Construction of the bay source heating/cooling system under Variant 1 may entail additional pile driving of approximately eight, 14-inch square concrete piles. All eight piles are expected to be driven in one day. As discussed in Section 4.L, *Biological Resources*, impact pile driving poses a risk to fish because the levels of underwater noise produced by piles driven with an impact hammer in or near open water can reach levels of sufficient intensity to injure or kill fish within a certain radius of the source piles. The criteria for assessing injury to fish from underwater sound pressure caused by in-water pile driving noise using an impact hammer are peak sound pressure

[4] State Water Resources Control Board. No date. Water Quality control plan for control of temperature in coastal and interstate waters and enclosed bays and estuaries in California. Available: http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/wqplans/thermpln.pdf. Accessed: October 14, 2016.

levels of 206 decibels (dB) (largest absolute value of instantaneous sound pressure) and 187 dB cumulative sound exposure levels (SELs) (sum of acoustical energy over all pile strike events) for fish greater than or equal to 2 grams. For fish less than 2 grams, the peak sound pressure level is 206 dB and cumulative SEL is 183 dB. Physical injury to fish is expected if either of these thresholds is exceeded and fish are present within the threshold contours. Additionally, fish behavioral effects are expected to occur at the 150 dB root mean square (RMS) contour.[5]

The peak sound level (without attenuation) for using an impact hammer to drive 14-inch square concrete pile under Variant 1 would be 184 dB at 10 meters. The peak sound pressure level using an attenuation method (such as a bubble curtain, which has been shown to typically decrease sound levels by at least 5 dB[6]) would be 179 dB at 10 meters. Both levels would be below the peak level injury threshold of 206 dB for all fish sizes and therefore unlikely to cause direct injury to fish due to peak levels under Variant 1.

Based on an assumed reference cumulative SEL of 188 dB (measured at 10 meters from the pile), cumulative SELs exceeding the interim threshold for fish less than 2 grams (183 dB) would extend up to 22 meters away from the source pile (refer to Table 6-7 on the following page). That is, fish weighing less than 2 grams remaining within a 10-meter radius of a pile for an entire day of pile driving could be injured. Based on a 5 dB reduction in sound levels with attenuation (183 dB cumulative SEL), the estimated distance could be reduced to 10 meters. For fish weighing 2 grams or more, these distances are estimated to be 12 meters (no attenuation) and <10 meters (with attenuation) as shown in Table 6-7.

Based on a threshold of 150 dB RMS, the potential for behavioral effects is calculated to extend up to 341 meters away from the source piles assuming no attenuation, and 158 meters from the source piles with attenuation. Although specific effects cannot be assessed with available information, the potential exists for fish within this distance of active pile driving to respond in ways that temporarily disrupts or alters their behavior under Variant 1.

Peak sound levels generated by impact pile driving would not exceed thresholds for the protection of fish within less than 10 meters of pile driving and are less likely to result in fish injury. However, accumulated sound levels[7] from impact pile driving could cause injury to fish of all sizes within 12 to 22 meters of the source piles (excluding consideration of the use of a bubble curtain or other attenuation device), based on the conservative assumption that fish remain in the potential zone of injury for an entire day of pile-driving operations.

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[5] Caltrans 2015. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Sacramento, CA.

[6] Bubble curtains reduce the radiation of sound from the pile into the water by making the sound pass through a "curtain" of low-density air bubbles. Hydroacoustic monitoring has shown that air bubble curtains can decrease the overall level of sound-pressure levels in the adjacent water column and decrease the extent to which the adverse sound-related impacts occur.

[7] The underwater sound pressure level that a fish may experience during pile driving over a day.

TABLE 6-7. SUMMARY OF EFFECTS OF IMPACT PILE DRIVING IMPACTS ON FISH FROM BAY COOLING SYSTEM

Number and size of piles	8 14-inch concrete
Type of equipment	Impact hammer
Number of blows/day	800
Peak Noise Levels	
Threshold	*206 dB*
Without attenuation	206 dB (<10 meters)/184 dB (10 meters)
With attenuation	206 dB (<10 meters)/179 dB (10 meters)
Accumulated Sound Levels	
Thresholds (Cumulative SEL)	*Fish ≥ 2 g (187 dB); Fish < 2 g (183 dB)*
Without attenuation	187 dB (12 meters) 183 dB (22 meters)
With attenuation	187 dB (<10 meters) 183 dB (10 meters)
Distance to Behavioral Threshold for Fish	
Threshold (RMS)	*150 dB*
Without attenuation	341 meters
With attenuation	158 meters

It should be noted that special-status fish species (Section 4.L, *Biological Resources,* Table 4.L-1) in the study area during the time of pile driving (June 1 through November 30) would most likely be large juveniles and adults and, therefore, capable of moving out of this zone before harmful sound levels are reached. Once pile driving begins, individual fish that approach the construction area are likely to detect the sounds and avoid or bypass the potential injury impact zone, which would extend 10 to 22 meters from the pile driving location into the Bay. Opportunities for fish to avoid pile-driving sounds would also occur during periods when pile driving ceases (e.g., while repositioning of equipment) and at night when pile driving would be suspended. Nonetheless, given the estimated accumulated sound levels and uncertainty regarding the behavioral responses of the species of concern, impacts on special-status fish species from pile driving would be significant. Under Variant 1, there would be one additional day of pile driving if the bay source heating/cooling variant is selected and which would result in a slightly higher impact on fish but would not change the significance conclusion reached in Section 4.7, *Biological Resources*.

Mitigation Measure M-BI-3.1 restricts in-water pile driving to June 1 to November 30, which would avoid impacts on most special-status fish species. Mitigation Measure M-BI-3.2 would decrease noise impacts from impact pile driving on special-status species in the project area by using noise attenuation measures, having an approved biologist on site during pile driving, and monitoring noise levels. If the cumulative SEL at the predicted distances from the source pile is

reached during the day, pile driving activities will cease until the next day in order to avoid accumulated impacts to fish that may be present. These measures will reduce the impact of Variant 1 to a ***less-than-significant*** level, similar to the proposed project.

Marine Mammals. As discussed above, an impact hammer would be used to install approximately eight 14-inch square concrete piles under Variant 1. As distance from pile driving increases, sound attenuation from transmission loss reduces sound-pressure levels. The potential harmful effects also decrease.

Injury. NMFS recommends specific thresholds for different marine mammal species to evaluate when auditory effects (TTS or PTS) are likely to occur, including different thresholds for peak noise, accumulated sound, airborne noise (e.g. noise at haul-out areas), and behavioral effects.[8] A temporary threshold shift (TTS) results in a temporary hearing loss. A permanent threshold shift (PTS) results in a permanent hearing loss. As dual metrics, NMFS considers onset of PTS to have occurred when either one of the two metrics is exceeded. Since the cumulative SEL thresholds are lower than the peak thresholds, the impact analysis focused on the cumulative SEL thresholds.

The distances to the cumulative SEL threshold contours for PTS/TTS for the 14-inch square pile to be driven under Variant 1 were calculated. These sound levels correspond to the following thresholds:

- 155 dB – High frequency cetacean (harbor porpoise) auditory impacts under impact pile driving
- 183 dB – Low frequency cetacean (gray whale) auditory impacts under impact pile driving
- 185 dB – Phocid pinnipeds (harbor seal) auditory impacts under impact pile driving
- 203 dB – Otariid pinnipeds (sea lion) auditory impacts under impact pile driving

As indicated in Table 6-8, on the following page, based on the cumulative SEL contours, TTS and/or PTS could occur to certain marine mammals from impact driving within 12 to 26 meters without attenuation (harbor porpoise, grey whale, and harbor seal) and up to 12 meters with attenuation (harbor seal only) if marine mammals are present during a full day of impact driving within the effect zone.

[8] National Oceanic and Atmospheric Administration and National Marine Fisheries Service. 2016. Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing. Underwater acoustic thresholds for onset of permanent and temporary threshold shifts. NOAA Technical memorandum NMFS-OPR-55. July.

TABLE 6-8. SUMMARY OF PILE-RELATED IMPACTS ON MARINE MAMMALS FROM BAY COOLING SYSTEM

Species	Gray Whale	Harbor Porpoise	Harbor Seal	Sea Lion
Auditory Impact Threshold	**183dB SEL**	**155dB SEL**	**185dB SEL**	**203dB SEL**
Number of 14-inch concrete piles	8			
Type of equipment	Impact hammer			
Number of blows/day	800			
Noise level without attenuation (cumulative SEL)	188 dB at 10 meters			
Noise level with attenuation (i.e. with bubble curtain) (cumulative SEL)	183 dB at 10 meters			
Exceeds threshold without attenuation?	Yes, up to 22 meters	Yes, up to 26 meters	Yes, up to 12 meters	No
Exceeds threshold with attenuation?	No	Yes, up to 12 meters	No	No

The noise levels are greatest at the source of the impact driving and attenuate as the distance from the impact-driving increases. Based on the analysis conducted, the distance within which the noise levels under Variant 1 would be at or above the PTS/TTS threshold of 155 dB SEL for harbor porpoise (which is the lowest decibels of the marine mammals) would be 26 meters and the distance to the 203 dB SEL threshold for sea lions (which is the highest of the marine mammals) would be within 10 meters of the source of the impact-driving. The distances and criteria for each marine mammal are shown in Table 6-8, above. The distance for harbor porpoise is reduced to 12 meters with the use of an attenuation system such as a bubble curtain, which decreases the noise by 5 dB and prevents it from traveling as far at the higher dB level.

Airborne Noise. NMFS also considers in-air noise levels below 90 dB to be safe for harbor seals and below 100 dB to be safe for sea lions and other pinnipeds. Marine mammals who have their heads above water at locations close to the pile driving activities may be affected by elevated noise levels.[9] Potential impacts would be similar to those for high underwater sound pressure levels (temporary hearing loss and changes to behavioral patterns). The distance to the 90 dB airborne noise contour would be 95 meters and the distance to the 100 dB airborne

[9] Caltrans. 2011. Final Environmental Impact Statement. Statutory exemption Volume I. San Francisco-Oakland Bay Bridge east spans seismic safety project. Chapter 3.

contour would be 30 meters, both measured from the impact hammer location. Although there would be an additional day of pile driving under this variant as compared to the proposed project, impacts could increase slightly but the significance conclusion would not change as a result.

Behavioral Effects. Disturbance and noise associated with construction at the pile-driving site may also startle marine mammals and result in dispersion from the study area. Behavioral responses of harbor seals and sea lions to noise can range from something as innocuous as a seal raising or turning its head, to permanent abandonment of an area. Noise may elicit short-term disruptions of normal activities, startle responses, agitation, and stress. Existing evidence shows that most marine mammals tend to avoid loud noises.[10] Marine mammals in the water in the project vicinity would be temporarily displaced if they choose to avoid the area in response to high sound pressure levels. NMFS recommends a threshold of 160 dB RMS for behavioral effects to marine mammals from impact hammer. The calculated distance to the 160 dB RMS contour for impact hammer driving of the 14-inch concrete piles under Variant 1 would be 74 meters (unattenuated) and 34 meters (attenuated). Background noise levels in central San Francisco Bay range from 120 to 152 dB due to ongoing and persistent vessel activity in the Port of San Francisco and the Port of Oakland and thus, the project and Variant 1 would only result in behavioral disturbance when underwater sound levels reached above background levels and above the 160 dB contour (which would be within 34 to 74 meters of the proposed pile driving).

Implementation of Mitigation Measures M-BI-3.2 and M-BI-3.3 with Variant 1 would reduce noise impacts on marine mammals from project pile-driving activities by employing a "soft start" technique that allows marine mammals the opportunity to leave the impact area, implementing noise attenuation measures (such as bubble curtains), monitoring marine mammal activity, and shutting down pile-driving activity when marine mammals enter a zone in which injury thresholds would be exceeded. With implementation of Mitigation Measure M-BI-3.3, impact hammer driving would only occur when marine mammals would be outside of the safety zone. This impact of Variant 1 would be ***less than significant with mitigation,*** similar to the proposed project.

ENTRAINMENT

Under Variant 1, operation, the bay-source energy capture system would pull water from the Bay into the intake. The estimated peak flow of the system would be 18.2 Mgal/day in the summer and 11.5 Mgal/day during the winter. The intake screen approach velocity would be below 0.2 feet per second, which complies with CDFW and NMFS guidance, and the intake screen slot velocity below 0.5 feet per second per CWA Section 316(b) to minimize impingement

[10] Caltrans. 2011. Final Environmental Impact Statement. Statutory exemption Volume I. San Francisco-Oakland Bay Bridge east spans seismic safety project. Chapter 3.

and entrainment of special-status fish species. The intake screen mesh size is anticipated to be approximately 1.75 millimeters or smaller. Thereafter, the incoming bay water would be passed through a micro-screen drum filter to further minimize particulate entry. Nevertheless, fish eggs and larvae, and their food sources (e.g., zooplankton), could become entrained into the bay source heating/cooling system under Variant 1.

As shown in Table 4.L-1 in Section 4.L, *Biological Resources,* special-status fish species and essential fish habitat (EFH) fish species could occur in the project area. In order to identify EFH fish species that could occur in the project area, the 2007 San Francisco Bay Fish Index was reviewed[11] and compared to EFH fish species list for San Francisco Bay. Special-status fish species, including Chinook salmon, steelhead, green sturgeon, and longfin smelt, that may be present in the project area are not at risk of impingement or entrainment because of the large sizes and swimming abilities of the life stages of these species within this part of their range (juveniles, subadults, and adults). However, EFH species such as Pacific herring, Northern anchovy, and brown rockfish produce drifting eggs and/or larvae that are potentially susceptible to impingement or entrainment at the intake. The life history of these species is discussed in Section 4.L, *Biological Resources*.

Pacific herring larvae could become impinged on the pump screen or entrained into the bay source heating/cooling pump system (October to March) since spawning occurs in intertidal and nearshore zones along the San Francisco waterfront under Variant 1 [12] and larvae move passively with currents. Pacific herring eggs and adults are harvested commercially and are abundant throughout the San Francisco Bay.[13] Northern anchovy eggs and larvae may also become impinged or entrained since eggs are pelagic and larvae move into shallow water habitat. Northern anchovy comprise more than 80 percent of all fish captured in the Bay.[14] Brown rockfish give live birth to larvae between 5 and 6 mm long. The larvae are pelagic and often occur near piers and shallow nearshore waters.[15] Larvae of these species can become entrained into the pump system or impinged on the screen due to the nearshore rearing habitat

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[11] Swanson, C. 2007. 2007 San Francisco Bay fish index. A multi-metric index to evaluate the health of San Francisco Bay's fish community in four sub-regions of the estuary. Prepared for the San Francisco Estuary Project Indicators Consortium. November 30, 2007.

[12] California Department of Fish and Wildlife. 2015. Draft supplemental environmental document. Pacific herring commercial fishing regulations.

[13] California Department of Fish and Wildlife. 2015. Draft supplemental environmental document. Pacific herring commercial fishing regulations.

[14] Swanson, C. 2015. State of the estuary report 2015. Technical appendix. WILDLIFE-Bay fish indicators and index technical appendix. June 2015. Available: http://www.sfestuary.org/wp-content/uploads/2015/09/Summary_TA_TA_Wildlife_Fish_Swanson_Rosenfield_WebberStover_SOTER_2015.pdf. Accessed: October 13, 2016.

[15] Stein, D., and T. J. Hassler. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest) – brown rockfish, copper rockfish, and black rockfish. U.S. Fish and Wildlife Service. Biological Report 82(11.113). U.S. Army Corps of Engineers, TR EL-82-4. 15 pp.

available near the project site. The intake screen slot velocity would be below 0.5 feet per second so the velocities surrounding the screen would decrease with distance. Screen approach velocities would also have a small sphere of influence on the surrounding bay waters, since the existing tidal action and currents would be stronger than the screen approach velocity. Only those eggs and larvae that pass in the immediate vicinity of the intake would be affected by the velocity surrounding the pump under Variant 1.

The volume of water pumped and the numbers of eggs and larvae that may be affected represents a very small fraction of the total pelagic habitat and spawning distribution of these species, which includes the coast of California, not just the San Francisco Bay. In addition, these species have high fecundity and support major commercial fisheries because of their abundance. With the limitations on screen velocity and mesh size, entrainment and impingement of eggs and/or juveniles from the pump would not have a population effect on these species. This impact is considered ***less than significant*** under Variant 1. Since it would not include Bay water intakes under Variant 1, this impact would not occur under the proposed project.

Macroinvertebrates and zooplankton could also become entrained into the pumps, which could have an effect on prey items for special-status fish species. Due to the water pumping rate, a small amount of water in relation to the entire San Francisco Bay would be pumped and sterilized and prey items would continue to be readily available in the water surrounding the project site. Thus, this impact on special-status fish species (through the removal of their prey items) is considered ***less than significant*** under Variant 1. Since it would not include Bay water intakes, this impact would not occur under the proposed project.

PERMANENT FILL DUE TO PLACEMENT OF PILES

Construction of the bay source heating/cooling system under Variant 1 would result in a change to habitat for Green sturgeon and EFH for Pacific salmonids, coastal pelagic species, and groundfish. The system would include installation of intake and outfall pipelines placed on the seabed or under the seabed. It is anticipated an area of approximately 6,000 square feet would be needed to accommodate the pipes, piles, and any other related infrastructure. This would result in replacement of approximately 6,000 square feet of Bay substrate with the pipes, piles and related infrastructure. The replacement of this small area of the Bay floor under Variant 1 would result in the loss of invertebrates that utilize soft Bay bottom sediments, but would introduce areas of hard substrate that would be colonized by invertebrate species that prefer hard substrates. This change may be affect some fish species negatively and others positively, with a neutral effect overall to special status species and EFH. The placement of piles would be adjacent to Pier 48 under Variant 1, which is considered a relatively disturbed environment in comparison to other open water portions of the Bay. As described above under *Entrainment*, all of the EFH species spawn in around San Francisco Bay and coastal ocean waters. Habitat loss would be minimal because other areas in the Bay would be available and the project area serves

as a transient migration and rearing area. Because the effect of the replacement of soft bottom substrate with hard substrate would be neutral overall to special status and non-special status fish species, this is impact is considered ***less than significant*** under Variant 1. The change in substrate would not have adverse population effects for Pacific salmonids, coastal pelagic species or groundfish. This impact would not occur under the proposed project.

SHADING

There would be no permanent overwater structures as part of Variant 1; thus, there would be no permanent increase in shading and the impacts associated with a change in permanent shading from the variant, similar to the project, would be ***less than significant***.

HYDROLOGY AND WATER QUALITY

Variant 1 and the proposed project would generally require the same types of construction activities and durations, equipment, and staging locations and result in the same amount of impervious surface areas as the proposed project. Accordingly, potential impacts of Variant 1 on the surface water hydrology, groundwater hydrology, and flooding subtopics of hydrology and water quality would be the same as those described for the proposed project. These environmental subtopics require no further analysis under Variant 1. Variant 1 would differ from the proposed project with respect to the potential water quality impacts of the bay-source energy capture sub-variant, as discussed below. Hydrology and water quality impacts associated with the geothermal and wastewater energy capture options under consideration in Variant 1 would not vary substantially from those of the proposed project.

WATER QUALITY

The potential water quality impacts, including degradation of both stormwater quality and Bay water quality due to resuspension of sediment, associated with the construction activities described for the proposed project in Section 4.N, *Hydrology and Water Quality*, would also apply to Variant 1. In addition, construction of a bay-source energy capture system as part of Variant 1 would require additional off-shore pile driving and in-water construction, including drilling the HDPE. These additional in-water construction activities under Variant 1 would result in short-term disturbance of localized Bay sediments and temporary impacts on water quality, which would not occur with the proposed project.

Construction activities associated with Variant 1 would comply with the water quality control measures described in Section 4.N, *Hydrology and Water Quality*. Because of the limited extent and temporary nature of construction activities in the Bay, as well as implementation of water quality control measures as part of compliance with permit requirements under Variant 1, water quality impacts related to construction activities in the Bay associated with the bay-source energy capture system under Variant 1 would be ***less than significant***, similar to the proposed project.

The operational and maintenance activities as well as the potential associated impacts on water quality described for the proposed project in Section 4.N, *Hydrology and Water Quality*, would also apply to Variant 1.[16] In addition, Variant 1 could couple a DES with bay-source energy capture, which would use heated or cooled water to provide thermal energy to individual buildings through a network of buried pipes. The bay-source energy capture system would pump water from the Bay, send it through a heat exchanger, and then return it to the Bay. A series of filters and an ultraviolet sterilization system would treat the water before it would enter the system. No chemical treatment of the water would occur so as to protect the Bay environment.

As discussed above, compliance with the NPDES permit and RWQCB requirements would place limits on the screen size, include provisions to ensure that the discharged water would not substantially raise water temperatures and provide criteria for minimizing the impingement and entrainment of locally present fish under Variant 1. Through this compliance, the bay-water pumping system under Variant 1 is not expected to pose a significant impact on water quality, nor is it expected to violate any water quality standards. Similar to the proposed project, water quality impacts associated with operation of the DES with the bay-source energy capture system under Variant 1 would be ***less than significant***.

C. VARIANT 2: ENTERTAINMENT VENUE

DESCRIPTION

Under Variant 2, Entertainment Venue, an entertainment venue would be provided on the project site. The venue would be indoors. The venue is anticipated to be approximately 100,000 gsf in size and located either at Pier 48 (Option A) or Block E (Option B). The inclusion of the entertainment venue would not increase the overall size of the project, the building footprints, or building heights. Rather, this variant would replace 100,000 gsf of the industrial/manufacturing uses on or in Pier 48 or what would otherwise be 100,000 gsf commercial/retail uses at Block E. Whether constructed on Pier 48 or Block E, the Entertainment Venue would be constructed in Phase 1 (Area A), similar to when those areas would be built out under the proposed project. The entertainment venue would accommodate up to 50 events per year, with up to 4,000 patrons at each event. Events at the entertainment venue could occur anytime of the day and/or week. However, events would be scheduled so that peak arrival and departure times would not be concurrent with peak arrival and departure times for ballgames and other similarly large ballpark events and venue operations would comply with relevant noise regulations. Specifically, an event at the entertainment venue could occur during a ballgame or during an event at Warriors Event Center. However, no event of more than approximately 50 percent capacity would occur at the

[16] Analysis assumes maintenance and cleaning would not require the use of chemicals and that there is no potential for accidental spills.

entertainment venue while both a large event at AT&T Park and a large event at the Warriors Event Center were occurring, unless the entertainment venue event is related to a concurrent event and is drawing from people already planning to visit AT&T Park or Warriors Event Center. Each entertainment venue event could employ up to approximately 300 people. During events, the event sponsor would also provide increased private security to help with onsite crowd management and public safety during events. Additional parking control officers (PCOs) would not be needed for entertainment venue events under Variant 2.

No additional subsurface disturbance or construction would be required under either option (Pier 48 or Block E) because the proposed entertainment venue under Variant 2 would not result in any changes to the proposed building footprints compared to the proposed project. Vehicle trips associated with the entertainment venue would use either the parking garage at Block D2 or the Mission Rock Square Garage. No additional parking would be proposed to accommodate this variant. Variant 2 would result in a 100,000 gsf reduction in commercial/retail at Block E or in industrial/manufacturing uses on or in Pier 48 (depending on which option is chosen), thereby reducing the number of employees onsite (described in Chapter 2, *Project Description*). Events at the entertainment venue could require police presence for security. Events located in Pier 48 (under Option A) would be served by portable toilets and sinks, whereas if located on Block E (under Option B), the event facility would have permanent restrooms.

The *Regulatory Framework* discussions throughout Chapter 4 for the proposed project also apply to Variant 2.

IMPACT ANALYSIS

ENVIRONMENTAL TOPICS NOT REQUIRING FURTHER ANALYSIS UNDER VARIANT 2

Both Option A and Option B of Variant 2 and the proposed project would have the same environmental effects related to land use and land use planning, aesthetics, population and housing, cultural resources, greenhouse gas emissions, wind/shadow, biological resources, geology and soils, hydrology and water quality, and hazardous materials.[17]

Variant 2 would replace the approximately 100,000 gsf of commercial and retail uses that are planned under the proposed project with an entertainment venue. The site plan, building footprints, building heights, and intensity of development would be the same under Variant 2 and the proposed project, and overall land uses would be similar. As a result, Variant 2 would have less than significant land use and land use planning impacts. There would be no changes to the site plan, physical characteristics of the proposed buildings (e.g., height, massing, bulk, orientation, setbacks, architectural treatments), or construction activities that would change the analysis or conclusions regarding impacts related to aesthetics, wind, or shadow (that were concluded for the proposed project) under Variant 2.

[17] Throughout this analysis, unless otherwise specified, the text applies to both Option A and Option B.

Variant 2 and the proposed project would have a similar mix of land use types. Although the same number of temporary construction-related employees and onsite residences would occur under Variant 2 as the proposed project, it is expected that the entertainment venue would employ fewer people than the proposed project. Variant 2 would have the same square footage for residential and production uses as the proposed project but would have 6 to 8 percent less square footage for commercial/retail/industrial uses, depending on where on the site Variant 2 is located and depending on which land use assumption the Variant is compared to. If commercial uses are displaced, Variant 2 would result in a net decrease of approximately 63 employees[18] and if retail uses are displaced, Variant 2 would result in a net decrease of approximately six employees compared to the project.[19] It is assumed that the entertainment venue would replace all proposed uses at Pier 48, resulting in a net increase of 100 employees under Variant 2 compared to the proposed project (Pier 48 is anticipated to employ 200 people at buildout). However, employees working at the entertainment venue under Variant 2 would not serve as permanent employees since they would work only during the 50 anticipated annual events. As a result, in general, Variant 2 would generate less onsite employment and employee-related induced growth than the proposed project. Conclusions regarding population and housing would thus remain similar.

Variant 2 and the proposed project would have the same site plan, building characteristics, and construction characteristics and require similar operational and maintenance activities. If sited at Pier 48, Variant 2 would be consistent with Secretary of the Interior Standards and would not affect any character-defining features. As a result, there would be no meaningful difference in potential physical environmental impacts related to cultural resources, geology and soils, and hazardous materials under Variant 2. There would be no change in the amount of impervious surface as a result of Variant 2 compared to the proposed project; therefore, there would be no additional impacts related to hydrology and water quality. Similarly, there would be no change in the potential for impacts on biological resources, including candidate, sensitive, or special-status species, or wildlife movement because the footprint of the project would not change and no areas not already analyzed elsewhere in this EIR would be affected by implementation of this variant (compared to the proposed project).

Greenhouse gas emissions are correlated with population growth and the resulting increase in the number of vehicle trips and demand for utilities. Although employee-related induced growth may be slightly less under Variant 2 relative to the proposed project, there would be no meaningful difference in population-driven greenhouse gas emissions under Variant 2. However, due to the projected intensity of energy use at Pier 48 under the project, it is anticipated that energy use and, in turn, GHG emissions would be reduced with the elimination of 100,000 gsf the industrial/manufacturing land uses on or in Pier 48 under Option A of this

[18] As discussed in Section 4.C, *Population and Housing*, 276 gsf/employee. 100,000 gsf / 276 gsf = 363 employees.

[19] As discussed in Section 4.C, *Population and Housing*, 327 gsf/employee. 100,000 gsf / 276 gsf = 306 employees.

variant. All mitigation measures described for these impacts under the proposed project would be applicable to this variant, compared to the proposed project. Therefore, these environmental topics require no further analysis under Variant 2.

TRANSPORTATION

Travel demand for Variant 2 was analyzed using methodologies and assumptions similar to those used for the proposed project. The travel demand forecasts for Variant 2 are provided in Table 6-9 on the following page and in Appendix 6-1. The forecasts are based on methodology contained in the *San Francisco Transportation Impact Analysis Guidelines for Environmental Review* (SF Guidelines) and supplemented with information to account for the large-scale and mixed-use qualities of the proposed project.

As shown in Table 6-9 on the following page, typical weekday trip generation for Variant 2 would vary slightly from that of the proposed project because of changes in land uses. This table conservatively compares trips generated by Variant 2 to the High Commercial Assumption because that land use assumption generates more person and vehicle trips than the High Residential Assumption. Therefore, this table shows only a comparison to the High Commercial Assumption. Variant 2 at Pier 48 (Option A) would generate slightly higher travel demand than Variant 2 at Block E (Option B), and would thus have slightly greater impacts. As such, comparisons of quantitative transportation data in the following discussion of transportation impacts focus on Variant 2 at Pier 48 (Option A) and a comparison to the High Commercial Assumption version of the proposed project. Variant 2 at Pier 48 (Option A) would result in fewer external person trips during the a.m. peak hour and more during the p.m. peak hour than the High Commercial Assumption version of the proposed project. Detailed calculations regarding trip generation for Variant 2 are included Appendix 6-1.

CONSTRUCTION IMPACTS

Variant 2 (Option A and B) would have similar construction impacts as the Proposed Project because it would involve construction of the same number of buildings and parking structures. Construction of Variant 2 would not result in significant impacts on the transportation and circulation network because any effects would be of limited duration and temporary.

Construction-related work for Variant 2 (Option A and B) would have a ***less-than-significant impact*** on transportation and no mitigation measures would be required. Improvement Measure I-TR-1 requires the applicant to prepare a Construction Traffic Control Plan for the proposed project. Improvement Measure I-TR-1 would also apply to Variant 2 (Option A and B) to further reduce less-than-significant impacts related to potential conflicts between construction activities and pedestrians, bicyclists, transit and vehicles, and between construction activities and nearby businesses and residents.

TABLE 6-9. PROPOSED PROJECT AND VARIANT 2 TRIP GENERATION

Land Use	Proposed Project High Commercial Assumption	Option A (Event at Pier 48)	Option B (Event at Block E)	Option A Change from High Commercial Assumption	
Weekday A.M. Peak Hour					
Total Person Trips	6,864	6,755	6,373	-109	-2%
Auto	*2,524*	*2,480*	*2,348*	*-44*	*-2%*
Transit	*2,635*	*2,581*	*2,465*	*-54*	*-2%*
Other[a]	*1,705*	*1,694*	*1,560*	*-11*	*-1%*
Total Vehicle Trips	1,449	1,420	1,378	-29	-2%
Weekday P.M. Peak Hour					
Total Person Trips	9,145	9,233	8,942	88	1%
Auto	*3,488*	*3,615*	*3,534*	127	4%
Transit	*2,841*	*3,003*	*2,892*	162	6%
Other[a]	*2,816*	*2,615*	*2,516*	-201	-7%
Total Vehicle Trips	1,755	1,819	1,781	64	4%

Source: Fehr & Peers, 2016; Adavant, 2016.

Note:

a. "Other" includes bicycles, walking, motorcycles, taxis, and additional modes.

VMT IMPACTS

Variant 2 would generate slightly more daily VMT than the proposed project on the 50 days each year when events would be scheduled at the entertainment venue, as it would generate 15,988 daily vehicle trips or five percent more daily vehicle trips on event days than the High Commercial Assumption under the proposed project. Because the proposed project is located within a Traffic Analysis Zone that has existing average daily VMT per capita for residential, office, and retail uses that is more than 15 percent below the existing regional average daily VMT per capita, the proposed project and therefore Variant 2 would not cause significant additional VMT. As with the proposed project, Variant 2 would also not substantially induce automobile travel. As such, Variant 2 would have a ***less-than-significant*** impact on VMT.

TRAFFIC HAZARD IMPACTS

Variant 2 (Options A and B) would result in similar queues at the Block D2 parking garage as the High Commercial Assumption version of the proposed project, as it would generate slightly fewer a.m. peak hour vehicle trips and slightly more p.m. peak hour vehicle trips during entertainment venue event times. Westbound vehicles on Long Bridge Street waiting to turn left into the easternmost garage driveway would queue into the Long Bridge Street/Bridgeview Street

intersection and impede the flow of pedestrian, bicycle and vehicle traffic. This would be a *significant* impact. The same mitigation measures identified for the proposed project would apply to Variant 2. With implementation of Mitigation Measure M-TR-3, the traffic hazard impact of Variant 2 would be reduced to ***less-than-significant*** levels.

TRANSIT IMPACTS

As shown in Table 6-9, on the previous page, the number of transit trips generated by Variant 2 on Pier 48 (Option A) would be 2 percent lower during the a.m. peak hour and 6 percent higher during the p.m. peak hour compared to the proposed project's High Commercial Assumption. Impacts on transit capacity utilization associated with Variant 2 would be similar to those of the proposed project. Impact TR-4 and Impact TR-6 indicate that the proposed project would have a significant impact on two transit lines (10 Townsend and 30 Stockton) due to a substantial increase in transit demand that would not be accommodated by local transit capacity and an increase in transit delays due to queues at the proposed project's Block D2 parking garage. Variant 2 would have the same significant transit impacts as the proposed project and Mitigation Measures M-TR-4.1, M-TR-4.2 and M-TR-6 would apply to Variant 2.

Implementing Mitigation Measures M-TR-4.1 and M-TR-4.2 would allow Muni to maintain transit headways, and would reduce the Variant 2 impact to less-than-significant levels. However, because the method and total cost of providing additional service and the SFMTA's ability to implement improvements is uncertain, the Variant 2 transit impacts would be ***significant and unavoidable with mitigation***, similar to under the proposed project.

Implementation of Mitigation Measure M-TR-6 would resolve transit delay impacts to being less than significant. However, at this time they may not be considered to fully resolve transit delay impacts because, and to the extent that, implementation of some of components of the mitigation (i.e., approval of restriping on Third Street and entering into an Event Management Agreement with the project sponsor to allocate PCOs on site), require SFMTA Board approval, and such approval is currently considered uncertain. Thus, based upon such current uncertainty of full implementation of Mitigation Measure M-TR-6, the transit delay impacts of Variant 2 would remain ***significant and unavoidable with mitigation***, similar to under the proposed project.

The proposed project would have less-than-significant impacts on regional transit routes. Since the number of peak hour transit trips are similar between Variant 2 and the High Commercial Assumption version of the proposed project, like the proposed project, Variant 2 would have a ***less-than-significant*** impact on regional transit routes.

BICYCLE AND PEDESTRIAN IMPACTS

The bicycle and pedestrian network and facilities for Variant 2 (Option A and B) would be identical to those for the proposed project. Variant 2 would produce similar levels of total person-trips but slightly fewer bicycle and pedestrian trips compared to the proposed project's

High Commercial Assumption, as shown in Table 6-9, page 6-34, because the entertainment venue is projected to generated fewer bicycle and pedestrian trips during the a.m. and p.m. peak hour than the employment uses it would replace.

As with the proposed project, Variant 2 would cause pedestrian and bicycle hazards due to queues at the proposed project garages as documented in Impact TR-3 and TR-6. Mitigation Measures M-TR-3 and M-TR-6 would also apply to Variant 2. With implementation of these measures, vehicle impacts on pedestrian and bicycles generated by trips to the projects' parking garage under Variant 2 would be reduced to a less-than-significant level.

As documented in Impact TR-9, the proposed project would cause significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. Variant 2 would have the same significant pedestrian impacts as the proposed project and Mitigation Measure M-TR-9 would also apply to Variant 2. Implementation of Mitigation Measure M-TR-9 would resolve pedestrian safety impacts and reduce them to less than significant. However, at this time, the approval of the signalization improvements is considered somewhat uncertain, because they will require SFMTA Board approval. Thus, because implementation of Mitigation Measure M-TR-9. is uncertain to such extent, Variant 2 pedestrian safety impacts would continue to be considered ***significant and unavoidable with mitigation***, similar to the proposed project.

As documented in Impact TR-10, the proposed project would cause a significant impact at the bicycle-truck interface at Pier 48. Variant 2 would have the same significant bicycle impact as the proposed project and Mitigation Measure M-TR-10 would apply to Variant 2. Implementation of Mitigation Measure M-TR-10 would resolve bicycle safety impacts and reduce the impact to ***less-than-significant with mitigation*** under Variant 2. Improvement Measure I-TR-10 would also apply to Variant 2 and would further enhance vehicle/bicycle safety.

LOADING IMPACTS

Variant 2 would have similar peak loading demands to the proposed project, which would not be accommodated by the proposed loading supply and therefore result in a significant impact. Mitigation Measures M-TR-11.1 and M-TR-11.2 would apply to Variant 2. Implementation of Mitigation Measures M-TR-11.1 and M-TR-11.2 would resolve the loading shortfall and the loading impacts would be ***less than significant with mitigation***.

EMERGENCY ACCESS IMPACTS

Emergency access to the project site for Variant 2 would be similar to that of the proposed project, whether the entertainment venue is located at Pier 48 or Block E. The proposed internal roadway network would accommodate emergency vehicles including fire trucks. Emergency vehicle access to Pier 48 would be provided via Terry A. Francois Boulevard. The proposed

cross-section for this roadway includes a 26-foot-wide shared zone for vehicular access, including emergency vehicles. The aforementioned fire access evaluation indicates that emergency vehicles can access Pier 48 via any of the three east-west project streets that connect to Terry A. Francois Boulevard. Variant 2 includes implementation of a "Keep Clear" zone on Mission Rock Street in front of the police and fire truck access to ensure that police vehicles and fire trucks are provided with clear access to and egress to the Public Safety Building, which is the same as the proposed project.

During events at AT&T Park, pre-event and post-event vehicular traffic destined for the proposed onsite garages would be managed as it is currently to minimize impacts on emergency-vehicle circulation and access as well as private vehicles destined for the UCSF emergency room and urgent care center. Before events at AT&T Park, up to 21 parking control officers (PCOs) are stationed at 17 locations. Post-events at AT&T Park, up to 19 PCOs are stationed at 14 locations. These locations include intersections along Third Street, Mission Rock Street, and Terry A. Francois Boulevard along the project boundaries. During major events at AT&T Park, the north–south Shared Public Way within the project site would be closed to vehicles, with the exception of emergency vehicles. If necessary, emergency vehicles would be able to travel on Muni's light rail right-of-way in the median of Third Street.

To address the circumstance of simultaneous events at AT&T Park and the Mission Rock site, the Proposed Project has prepared detailed event management plans that include combinations of strategies as described in Chapter 5 of the Mission Rock Transportation Plan.[20] These would apply to this variant as well. The Event Management measures identified in the Mission Rock Transportation Plan describe strategies for a primary event at AT&T Park (40,000+ attendees) or a secondary event at AT&T Park (15,000 to 25,000 attendees) and on-site events (2,000 to 5,000 attendees). Additionally, event traffic management systems at AT&T Park are reviewed and refined continuously to plan for such simultaneous events. Therefore, both AT&T Park and on-site events would develop refinements to their plans as needed to ensure emergency vehicle circulation is accommodated, both under the proposed project and under Variant 2.

Roadway improvements adjacent to the UCSF facilities would facilitate emergency vehicle access. Before and after events, emergency vehicle access to the project site and UCSF Medical Center uses would be maintained under the proposed project and under Variant 2, as would emergency access for persons traveling to the emergency room and urgent care center in their personal vehicles. For these reasons, Variant 2 would not inhibit emergency vehicle access to the project site and nearby vicinity under the event scenario. Similar to the proposed project, the Variant 2 would be designed to provide access for Police and Fire department vehicles into the Public Safety Building across Mission Rock Street. However, until final street design is coordinated with the Police and Fire Department, this would conservatively be a significant

[20] Nelson Nygaard. 2017. Draft Mission Rock Transportation Plan. April 20.

impact. Mitigation Measure M-TR-12 would reduce this significant impact to a less-than-significant level. Improvement Measure I-TR-12 would also apply to Variant 2 and would enhance emergency vehicle access.

PARKING IMPACTS

The midday peak parking demand would be 3,541 spaces for Variant 2 at Pier 48 and 3,474 spaces for Variant 2 on Block E[21]. These levels are less than the midday parking demand of 3,655 spaces for High Commercial Assumption. As with the proposed project, Variant 2 would have a ***less-than-significant*** parking impact.

NOISE

Variant 2 and the proposed project would generally require the same types of construction activities and durations, equipment, and staging locations. Therefore, Variant 2 would result in the same amount of construction noise as the proposed project on any given day. Accordingly, potential construction noise impacts of Variant 2 to noise-sensitive receptors would be ***significant and unavoidable,*** the same as those described for the proposed project.

With regard to operational (non-traffic-related) noise effects, noise generated by the venue under Variant 2 would be contained within the building, and all events would be held completely indoors. Further, the building would be designed such that noise from venue would comply with interior noise standards for uses in the same building. People gathering outside the venue could potentially be source of noise. However, it would primarily be from people conversing and would not typically involve loud crowd noise from people cheering or clapping. Overall this noise is not expected to be substantially greater than the background noise associated with the traffic urban environment. Variant 2 would not change the outdoor event uses under the Project (it would only change indoor activities associated with Variant 2) so to the extent Project uses are subject to Mitigation Measure M-NOI-2.1, Noise Control Plan for Outdoor Amplified Sound), this mitigation would equally apply under Variant 2 and noise from outdoor events would remain ***less than significant with mitigation*** under Variant 2.

Inclusion of the entertainment venue with this Variant in place of other uses under the proposed project would result in a slight (1 to 4 percent) increase in p.m. peak-hour project trips under both Option A (venue at Pier 48) and Option B (Block E). A 1 percent increase in vehicle traffic would result in a less than 0.1-decible increase in traffic noise and a 4 percent increase in vehicle traffic would result in an approximate 0.3-decible increase in traffic noise on a given roadway segment. As such, project-generated noise impacts would be essentially the same under Variant 2 as they would be under the proposed project. As with the proposed project, traffic noise impacts to future onsite and offsite land uses would be ***significant and unavoidable*** under Variant 2.

[21] The peak parking demand is based on SF Guidelines Appendix 4.E-4 and analysis conducted by Adavant Consulting, 2016.

AIR QUALITY

Criteria pollutant and toxic air contaminant emissions under Variant 2 were analyzed using same methodologies and assumptions as those used for the proposed project. The emissions modeling details for the Reduced Intensity Alternative are provided in Appendix 6-2. The modeling uses the same methodology contained Air Quality Technical Report.

CONSTRUCTION IMPACTS

Similar to the proposed project, construction air quality impacts of Variant 2 would be significant and unavoidable with mitigation. For the proposed project, as described in Section 4.G, *Air Quality*, estimated Variant 2 construction-related emissions of ROG would exceed the BAAQMD's significance thresholds for the year 2019 at 66 pounds per day, and estimated construction-related emissions of NOx would exceed the BAAQMD's significance thresholds for the years between 2018 and 2021 at between 69 and 156 pounds per day. Even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4 under Variant 2, NOx levels would exceed the significance threshold from 2018 through 2020, at between approximately 63 and 91 pounds per day, similar to the proposed project. Similarly, as shown in Table 6-10 on the following page (also see Tables 17 and 18 in Appendix 6-2), the construction-related criteria air pollutant emissions for Variant 2 would exceed the thresholds for emissions of ROG for the year 2019 and NOx for the years 2018 through 2021 similar to the proposed project. As shown in Table 6-11, page 6-41 (and Tables 19 and 20 in Appendix 6-2), emissions of NOx under Variant 2 would still be significant even with implementation of Mitigation Measures M-AQ-1.1 through AQ-1.4 for the years 2018 through 2020, similar to the proposed project. Thus, similar to the proposed project, an offset emissions mitigation measure would be required under Variant 2 to provide for reduction of levels NOx exceeding the significance thresholds through implementation of pollution reduction programs elsewhere in the air basin. Accordingly, additional mitigation is required to reduce the residual NOx emissions under both Variant 2 and the proposed project. Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated NOx emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of construction emissions of NOx are conservatively considered ***significant and unavoidable with mitigation*** for Variant 2, same as for the proposed project.

TABLE 6-10. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR VARIANT 2

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	2.0	22.7	0.8	0.7
2018	37.3	**123.9**	5.3	5.1
2019	**65.6**	**155.8**	6.6	6.3
2020	48.2	**126.9**	4.9	4.7
2021	26.5	**69.1**	2.5	2.4
2022	11.9	23.5	0.9	0.9
2023	2.9	5.8	0.2	0.2
2024	0.0	0.0	0.0	0.0
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.3	2.9	<0.1	<0.1
2018	4.8	**16.1**	0.7	0.7
2019	8.6	**20.3**	0.9	0.8
2020	6.1	**14.9**	0.6	0.5
2021	3.5	9.0	0.3	0.3
2022	1.6	3.1	0.1	0.1
2023	0.4	0.8	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**10**	**10**	**15**	**10**

Source:

ENVIRON International Corporation and the California Air Districts. 2013. CalEEMod User's Guide. Version 2013.2. Appendix A: Calculation Details for CalEEMod. Prepared for the California Air Pollution Control Officers Association. July. Available: <http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixa.pdf?sfvrsn=2>. Accessed: October 12, 2015.

Notes:

Emissions over threshold levels are in **bold**

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 6-11. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR VARIANT 2

	Average Daily Emissions (lbs/day)			
Year	**ROG**	NOx	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.7	8.4	<0.1	<0.1
2018	10.9	**63.0**	1.0	1.0
2019	18.5	**90.5**	1.3	1.3
2020	14.4	**80.4**	1.2	1.2
2021	8.0	51.7	0.7	0.6
2022	3.5	19.4	0.3	0.2
2023	0.9	5.1	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	<0.1	1.1	<0.1	<0.1
2018	1.4	8.2	0.1	0.1
2019	2.4	**11.8**	0.2	0.2
2020	1.8	9.8	0.1	0.1
2021	1.1	6.7	<0.1	<0.1
2022	0.5	2.5	<0.1	<0.1
2023	0.1	0.7	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**10**	**10**	**15**	**10**

Source:

Refer to Table 6-10.

Notes:

a. Emissions over threshold levels are in **bold**

b. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Does not include effect of Mitigation Measure M-AQ-1.5, which requires NOx offsets.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

OPERATIONAL IMPACTS

Similar to the proposed project, operational impacts of Variant 2 would be less than significant with mitigation. As described in Section 4.G, *Air Quality*, estimated proposed project operational emissions of ROG under the proposed project for the High Commercial land use assumption (the most impactful scenario) would exceed the BAAQMD's significance threshold for the years 2020 through 2024 and all following operational years at between approximately 66 and 123 pounds per day and emissions of NOx would exceed the threshold for the years 2023 through 2024 and all following operational years at between approximately 57 and 60 pounds per day. As shown in Table 6-12 on the following page (also see Tables 21 and 22 in Appendix 6-2), Variant 2 would result in operational criteria air pollutant emissions of ROG and NOx slightly lower than those for the proposed project, and still at levels that would exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to Variant 2, although the amount of emissions offset through Mitigation Measure M-AQ-1.5 would be adjusted to the emissions calculated for this variant. Even with implementation of Mitigation Measures M-AQ-2.1 through M-AQ-2.3, ROG levels would exceed the significance threshold from 2021 through 2024 and beyond at between 79 and 106 pounds per day, as shown in Table 6-13, page 6-44 (also see Tables 23 and 24 in Appendix 6-2) for Variant 2 and the proposed project. However, these mitigation measures would reduce NOx emissions to below the significance threshold. Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee would be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of operational emissions of ROG are conservatively considered ***significant and unavoidable with mitigation*** for Variant 2, same as for the proposed project.

TABLE 6-12. SUMMARIZED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR VARIANT 2

	Average Daily Emissions (lbs/day)			
Year	**ROG**	NOx	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	50.2	24.4	8.5	3.0
2021	**87.3**	38.2	18.2	6.1
2022	**104.2**	44.8	21.0	7.1
2023	**117.9**	**55.5**	27.9	9.4
2024 (full buildout)	**117.7**	53.2	27.9	9.3
BAAQMD Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	NOx	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	9.1	4.2	1.5	0.5
2021	**15.9**	7.0	3.3	1.1
2022	**19.0**	8.2	3.8	1.3
2023	**21.5**	**10.1**	5.1	1.7
2024 (full buildout)	**21.5**	9.7	5.1	1.7
BAAQMD Significance Threshold	**10**	**10**	**15**	**10**

Source:

1. California Air Resources Board. 2012. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California. Available: <http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf>.
2. Fehr & Peers. 2016. Screencheck Draft - Transportation Impact Study: Mission Rock (Seawall Lot 337/Pier 48). Prepared for the San Francisco Planning Department. July. San Francisco, CA.
3. United States Environmental Protection Agency. 1996. Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors. 9.12.1 Malt Beverages. Available: <https://www3.epa.gov/ttnchie1/ap42/>. Accessed: February 29, 2016.

Notes:

a. Emissions over threshold levels are in **bold**.

b. PM10 and PM2.5 include both exhaust and dust emissions.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 6-13. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR VARIANT 2

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	45.8	23.1	7.0	2.4
2021	**79.1**	35.3	15.0	4.9
2022	**94.0**	41.5	17.3	5.7
2023	**105.6**	51.3	23.0	7.6
2024 (full buildout)	**105.4**	49.0	23.0	7.5
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	8.3	3.9	1.3	0.4
2021	**14.4**	6.4	2.7	0.9
2022	**17.2**	7.6	3.2	1.0
2023	**19.3**	9.4	4.2	1.4
2024 (full buildout)	**19.2**	8.9	4.2	1.4
Significance Threshold	**10**	**10**	**15**	**10**

Source:

Refer to Table 6-12.

Notes:

a. Mitigated emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-2.2), and auto vehicle trips are reduced by 20% (Mitigation Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG offsets.

b. PM10 and PM2.5 include both exhaust and dust emissions.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

VDECS: Verified Diesel Emissions Control Strategies

COMBINED CONSTRUCTION AND OPERATIONAL IMPACTS

Similar to the proposed project, combined construction and operational impacts of Variant 2 would be significant and unavoidable with mitigation. As described in Section 4.G, *Air Quality*, estimated combined construction and operational emissions of ROG and NOx under the proposed project for the High Commercial land use assumption would be between approximately 66 and 123 pounds per day of ROG for the years 2019 through 2024 and beyond and between approximately 57 and 156 pounds per day of NOx for the years 2018 through 2024 and beyond, and for the High Residential land use assumption would be between approximately 66 and 124 pounds per day of ROG for the years 2019 through 2024 and beyond and between approximately 62 and 156 pounds per day of NOx between 2018 and 2023, exceeding significance thresholds. As shown in Table 6-14 on the following page (also see Table 25 in Appendix 6-2), Variant 2 would result in combined construction and operational criteria air pollutant emissions of ROG and NOx slightly higher than those for the proposed project, and still at levels that would exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to Variant 2, although the amount of emissions offset would be adjusted to the emissions calculated for this variant. Even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3, ROG levels would exceed the significance threshold from 2020 through 2024 and beyond at between 60 and 107 pounds per day, and NOx levels would exceed the significance threshold from 2018 through 2023 at between 56 and 104 pounds per day, as shown in Table 6-15 on page 6-47 (also see Table 26 in Appendix 6-2). Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG and NOx emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee would be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of ROG and NOx emissions is conservatively considered ***significant and unavoidable with mitigation*** for Variant 2, same as for the proposed project.

TABLE 6-14. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR VARIANT 2

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	2.0	22.7	0.8	0.0	0.8	0.7	0.0	0.7
2018	37.3	**123.9**	5.3	0.0	5.3	5.1	0.0	5.1
2019	**65.6**	**155.8**	6.6	0.0	6.6	6.3	0.0	6.3
2020	**98.4**	**151.3**	5.7	7.8	13.5	5.5	2.2	7.7
2021	**113.8**	**107.3**	3.7	16.9	20.6	3.6	4.8	8.4
2022	**116.1**	**68.3**	2.5	19.4	21.9	2.4	5.6	8.0
2023	**120.8**	**61.3**	2.2	26.0	28.1	2.1	7.4	9.6
2024	**117.7**	53.2	1.9	26.0	27.9	1.9	7.5	9.3
Significance Threshold	**54**	**54**	**82**	**82**	**82**	**54**	**54**	**54**
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.3	2.9	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	4.8	**16.1**	0.7	0.0	0.7	0.7	0.0	0.7
2019	8.6	**20.3**	0.9	0.0	0.9	0.8	0.0	0.8
2020	**15.3**	**19.1**	0.7	1.4	2.1	0.7	0.4	1.1
2021	**19.4**	**15.9**	0.5	3.1	3.6	0.5	0.9	1.4
2022	**20.6**	**11.2**	0.4	3.5	3.9	0.4	1.0	1.4
2023	**21.9**	**10.9**	0.4	4.7	5.1	0.4	1.4	1.7
2024	**21.5**	9.7	0.3	4.7	5.1	0.3	1.4	1.7
Significance Threshold	**10**	**10**	**15**	**-**	**15**	**10**	**-**	**10**

Source:

Refer to Tables 6-10 and 6-12.

Notes:

All table references below refer to tables in the Activity Data section above

a. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

b. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

c. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 6-15. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR VARIANT 2

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.7	8.4	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	10.9	**63.0**	1.0	0.0	1.0	1.0	0.0	1.0
2019	18.5	**90.5**	1.3	0.0	1.3	1.3	0.0	1.3
2020	**60.1**	**103.5**	1.8	6.5	8.3	1.8	1.9	3.6
2021	**87.0**	**87.0**	1.6	14.1	15.6	1.5	4.0	5.6
2022	**97.5**	**60.9**	1.4	16.2	17.5	1.4	4.6	6.0
2023	**106.5**	**56.4**	1.4	21.6	23.1	1.4	6.2	7.6
2024	**105.4**	49.0	1.3	21.6	23.0	1.3	6.2	7.5
Significance Threshold	**54**	**54**	**82**	**82**	**82**	**54**	**54**	**54**
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	<0.1	1.1	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	1.4	8.2	0.1	0.0	0.1	0.1	0.0	0.1
2019	2.4	**11.8**	0.2	0.0	0.2	0.2	0.0	0.2
2020	**10.2**	**13.7**	0.2	1.2	1.4	0.2	0.3	0.6
2021	**15.5**	**13.2**	0.2	2.6	2.8	0.2	0.7	1.0
2022	**17.6**	**10.1**	0.2	2.9	3.2	0.2	0.8	1.1
2023	**19.4**	**10.0**	0.3	3.9	4.2	0.3	1.1	1.4
2024	**19.2**	8.9	0.2	3.9	4.2	0.2	1.1	1.4
Significance Threshold	**10**	**10**	**15**	**-**	**15**	**10**	**-**	**10**

Source:

Refer to Tables 6-13 and 6-15.

Notes:

a. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-2.2), and auto vehicle trips are reduced by 20%. Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG and NOx offsets.

b. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

c. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

	Average Daily Emissions (lbs/day)							
Year	ROG	NO_x	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]

d. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

VDECS: Verified Diesel Emissions Control Strategies

TOXIC AIR CONTAMINANTS

Similar to the proposed project, construction and operation of Variant 2 would generate toxic air contaminants, including PM2.5 and diesel particulate matter (DPM). The sources of emissions would be exactly the same as for the proposed project. The quantity of emissions would be exactly the same for construction as the proposed project because there is no change in construction activity for Variant 2, but would be slightly different for operations because of operation of the entertainment venue and the associated vehicle trips.

PM2.5 ANALYSIS

Similar to the proposed project, the PM2.5 contribution at receptors under Variant 2 would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this alternative. For the proposed project (see Tables 4.G-22 and 4.G-23 in Section 4.G, *Air Quality*), the PM2.5 contribution would exceed the significance threshold and although implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the PM2.5 concentration, it would not be reduced below the thresholds of significance at the onsite MIR in the study area that is not located in the APEZ under existing/future conditions, but that would be placed in the APEZ under existing/future plus proposed project conditions.

For Variant 2, as shown in Table 6-16 on the following page (also see Table 27 in Appendix 6-2), the maximum annual average PM2.5 concentration would not exceed the significance threshold of 0.2 $\mu g/m^3$ for the MIR that is currently located in the APEZ. However, it would exceed the significance threshold of 0.3 $\mu g/m^3$ for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 2.

More specifically, the onsite MIR currently outside the APEZ but that would be located in the APEZ with the contribution from Variant 2 could be exposed to a maximum annual average PM2.5 concentration from Variant 2 of up to 2.3 $\mu g/m^3$. This exceeds the project contribution threshold of 0.3 $\mu g/m^3$. This is considered a significant impact, similar to the proposed project.

TABLE 6-16. MAXIMUM ANNUAL AVERAGE PM2.5 EXHAUST EXPOSURE WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS NOT LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS BUT WOULD BE LOCATED IN THE APEZ DURING EXISTING/FUTURE PLUS PROPOSED PROJECT CONDITIONS FOR VARIANT 2

	Annual Average PM2.5 Concentration (μg/m³) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	Variant 2	Mitigated [c]	Variant 2	Mitigated [c]
Construction				
Total (Background + Project)	10.7	8.7	-	-
Background	8.4	8.4	-	-
Construction Contribution	**2.3**	0.3	-	-
Significance Threshold for Project Contribution	0.3	N/A[d]	-	-
Above Threshold?	**Yes**	N/A[d]	-	-

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1) and auto vehicle trips are reduced by 20% through the TDM plan (Mitigation Measure M-Measure AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

c. The mitigated values may represent different receptor locations than the Variant 2 values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e. the total background plus project annual average PM2.5 concentration is less than the APEZ threshold of 10.0 μg/m³), the project-level threshold does not apply.

Emissions over threshold levels are in **bold**

Therefore, mitigation is required to reduce this impact. There are currently no offsite MIRs outside the APEZ but that would be placed in the APEZ with the contribution from Variant 2. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce PM2.5 exhaust emissions from off-road construction equipment, on-road haul trucks, construction generators, in-water construction equipment, emergency generators, and mobile sources, and would reduce the maximum annual average PM2.5 concentration from Variant 2 for the onsite MIR to 0.3 μg/m³, which would not exceed the threshold of significance. Consequently, with mitigation, the maximum annual average PM2.5 concentration for receptors currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 2 would be ***less than significant***, same as for the proposed project.

CANCER RISK ANALYSIS (DPM/TOG)

The lifetime cancer risk at receptors under Variant 2 would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this variant. For the proposed project (see Tables 4.G-23 and 4.G-24 in Section 4.G, *Air Quality*), the risk would exceed the significance threshold and although implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 under Variant 2 and the proposed project would reduce the risk below the thresholds of significance for the onsite MIR in the study area that is not located in the APEZ under existing/future conditions, but that would be placed in the APEZ under existing/future plus proposed project conditions.

For Variant 2, as shown in Table 6-17 on the following page (also see Tables 28 and 29 in Appendix 6-2), the lifetime excess cancer risk would exceed the significance threshold of 7.0 per one million persons exposed for the MIR currently located in the APEZ. It would also exceed the significance threshold of 10.0 per one million persons exposed for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 2.

More specifically, the offsite MIR currently located in the APEZ could be exposed to a lifetime excess cancer risk from Variant 2 of up to 24.4 per one million. This exceeds the project contribution threshold of 7.0 in one million. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this impact under Variant 2. The lifetime excess cancer risk at the onsite MIR currently located in the APEZ would be less than the project contribution threshold of 7.0 in one million, a less than significant impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the lifetime excess cancer risk from Variant 2 to 4.1 in one million for the offsite MIR currently located in the APEZ. This is less than the project contribution threshold of 7.0 in one million, a less than significant impact, similar to the proposed project. The onsite and offsite MIRs currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 2 could be exposed to a lifetime excess cancer risk from Variant 2 of up to 140.3 and 108.4 per one million, respectively (for construction plus operation). This exceeds the project contribution threshold of 10.0 in one million. This is considered a significant impact. Therefore, mitigation is required to reduce this impact under Variant 2. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the lifetime excess cancer risk from Variant 2 for the onsite and offsite MIRs to 25.7 and 8.8 in one million, respectively. For the onsite MIR, the mitigated lifetime excess cancer risk for Variant 2 of 25.7 combined with background cancer risk of 53.0 would equal 78.6, which would not exceed the APEZ threshold of 100.0 per million. Therefore, under mitigated conditions, neither the onsite MIR nor the offsite MIR would be placed into the APEZ. Therefore, with mitigation, lifetime excess cancer risk impacts for receptors currently outside the APEZ but that would be located in the APEZ with the contribution from Variant 2 would be ***less than significant with mitigation,*** same as for the proposed project.

TABLE 6-17. MAXIMUM LIFETIME EXCESS CANCER RISK WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS FOR CONSTRUCTION PLUS OPERATION FOR VARIANT 2

	Lifetime Excess Cancer Risk (per million) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	Variant 2	Mitigated [c]	Variant 2	Mitigated [c]
RECEPTORS CURRENTLY LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS				
Total (Background + Project)	-	-	131.7	111.3
Background	-	-	107.2	107.2
Construction Plus Operation Contribution	-	-	**24.4**	4.0
Significance Threshold for Project Contribution	-	-	7.0	7.0
Above Threshold?	-	-	**Yes**	No
RECEPTORS NOT LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS BUT WOULD BE LOCATED IN THE APEZ DURING EXISTING/FUTURE PLUS PROPOSED PROJECT CONDITIONS				
Total (Background + Project)	193.2	78.6	178.6	100.5
Background	53.0	53.0	70.3	91.7
Construction Plus Operation Contribution	**140.3**	25.7	**108.4**	8.8
Significance Threshold for Project Contribution	10.0	N/A[d]	10.0	10.0
Above Threshold?	**Yes**	N/A[d]	**Yes**	No

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1) and auto vehicle trips are reduced by 20% through the TDM plan (Mitigation Measure M-AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

c. The mitigated values may represent different receptor locations than the Variant 2 values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e. the total background plus project lifetime excess cancer risk is less than the APEZ threshold of 100), the project-level threshold does not apply.

Abbreviations:

APEZ: Air Pollutant Exposure Zone

VDECS: Verified Diesel Emissions Control Strategies

Emissions over threshold levels are in **bold**

Consistency with Clean Air Plan. Similar to the proposed project, impacts related to consistency with the 2010 Clean Air Plan (CAP) for Variant 2 would be less than significant with mitigation. Variant 2 would be consistent with the 2010 CAP because it would incorporate mitigation measures that include offsetting residual ROG and NOx emissions above significance thresholds. Additionally, Variant 2 would be consistent with the 2010 CAP through the incorporation of control measures of the CAP, including land use/local impact measures (such as TCM C-1 – Voluntary Employer-Based Trip Reduction Programs and TCM D-2 – Pedestrian Access and Facilities Improvements) and energy/climate measures (such as ECM 1 – Energy Efficiency and ECM 2 – Renewable Energy) now required through the various components of the City's Greenhouse Gas Reduction Strategy as well as the transportation demand management measures that would be implemented through Mitigation Measure M-AQ-2.3, similar to those for the proposed project. Variant 2 would also not hinder implementation of the 2010 CAP because Variant 2 would place a dense, walkable urban area near a concentration of regional and local transit service and would not preclude the extension of a transit line or a bike path or any other transit improvement. Therefore, similar to the proposed project, Variant 2 would not conflict with, or obstruct implementation of the 2010 CAP, and this impact would be ***less than significant***.

PUBLIC SERVICES AND RECREATION

Impacts on public services and recreation occur because of increased demand from the increased population in the service area. As discussed above, Variant 2 would introduce fewer onsite employees and, as a result, would induce less residential population growth citywide relative to the proposed project. Therefore, on average, the demand for fire protection, police protection, schools, parks, or other public services would be slightly less than that of the proposed project.

Police Services. When large events occur at the entertainment venue, an increased level of law enforcement services would be required for onsite and offsite patrolling and responding to potential incidences associated with the temporary increase in the number of visitors. The San Francisco Police Department (SFPD) routinely provides increased protection for large-capacity events and assigns and dedicates additional SFPD personnel specifically for these events. Accordingly, the SFPD would increase local staffing for events at the venue, as needed. The level of SFPD personnel required for events would be determined in advance by SFPD's Event Commander, in coordination with the event sponsor, and specified in event security/operations plans. During events, the event sponsor would also provide increased private security to help with onsite crowd management and public safety during events. Consequently, adequate police protection services would be available and provided for the venue.

The periodic increase in demand for law enforcement services for the approximately 50 events that would take place annually would not require the construction of new or physically altered police facilities. Existing police facilities in the project vicinity, the City's Public Safety Building, and SFPD headquarters, as well as the Southern District, located immediately south of the project site, in combination with proposed event security/operations plans and the provision of onsite security personnel during events, would be able to meet the increase in demand for service without constructing new or physically altered police facilities. Adverse physical impacts associated with the provision of or the need for new or physically altered government facilities under Variant 2 would be ***less than significant***, same as under the proposed project.

UTILITIES AND SERVICE SYSTEMS

Construction Impacts. Similar to the proposed project, Variant 2 would not result in significant impacts related to utilities and service systems. Construction activities associated with Variant 2 and the proposed project would be similar. Both would result in temporary minimal increases in water demand and wastewater generation; the temporary generation of solid waste, associated with construction and demolition; and a temporary nominal increase in electricity demand. These construction impacts would be the same under Variant 2 and the proposed project and would not be anticipated to have a substantial adverse impact on water supplies/infrastructure, wastewater treatment or conveyance capacity, solid waste disposal, or electrical facilities. Similar to the proposed project, construction impacts would be ***less than significant***.

Water Demand and Wastewater Generation. Operation of Variant 2 would be expected to result in less water demand and wastewater generation than the proposed project overall since, in general, this variant would employ fewer people and, while approximately 50 events would take place annually, the water demand is assumed to be less than the demands of continual year-around use of typical commercial and office space uses. Under Option A, temporary facilities, such as portable wash stations, toilets, and solid waste receptacles, would be installed, as needed, to accommodate the large numbers of event attendees. The wastewater generated from portable wash stations and toilets under Option A would bypass the local wastewater collection system and be delivered by truck directly to Bay Area wastewater treatment plants. Wastewater disposal would be done in accordance with the provisions of existing contracts between portable facility providers and wastewater treatment plant operators, in compliance with applicable federal, state, and local regulations. Under Option B, wash stations and toilets for large event patrons would be provided in permanent restrooms. Therefore, the additional wastewater from large events would not exceed the capacities of the water treatment plants or conflict with San Francisco Bay RWQCB requirements. Impacts would be ***less than significant***, same as under the proposed project.

Solid Waste Generation. Relative to the proposed project, operation of Variant 2 could result in an incremental increase in solid waste due to events held at the entertainment venue. Temporary solid waste receptacles would be provided at events that would allow compostable materials, recyclables, and trash to be separated, in accordance with the City's Mandatory Recycling and Composting Ordinance. Solid waste from events would be collected by Recology and recycled, as feasible, with non-recyclables being disposed of at the Recology Hay Road Landfill in Solano County. As discussed under Impact UT-3, in Section 4.K, *Utilities and Service Systems*, this landfill has adequate capacity for solid waste that would be generated by Variant 2; therefore, impacts would be ***less than significant***.

Similar to the proposed project, overall operation of Variant 2 would not result in an inefficient, wasteful, or unnecessary consumption of energy. Although events at the entertainment venue could consume greater amounts of energy than typical project operations on a given day, events would occur approximately 50 days throughout the year (rather than on a daily basis) and the variant would be subject to all of the sustainability features of the project. Development of the variant would result in ***less-than-significant*** environmental impacts related to energy demand, similar to the project.

D. VARIANT 3: RECONFIGURED PARKING

DESCRIPTION

Under Variant 3, the subterranean 700-space garage under Mission Rock Square would not be developed unlike under the proposed project; in addition, several modifications, as described below, would be implemented at the parking structure at Block D2 to accommodate an additional 700 spaces under Variant 3.

The project proposes 3,100 parking spaces total on the project site, including 2,300 in the Block D2 parking garage, 700 in the subterranean Mission Rock Square Garage, and 100 spread throughout the site. Under this variant, 3,100 parking spaces would continue to be provided site wide similar to the proposed project, but the subterranean Mission Rock Square Garage would not be constructed and instead 700 spaces would be added to the parking garage on Block D2. The 3,100 parking spaces in Variant 3 therefore would include 3,000 in the Block D2 parking garage instead of 2,300 parking spaces. However, like the project, 100 parking spaces would be located below grade, at grade, or above grade within the proposed buildings (approximately 10 spaces per block) under Variant 3.

To accommodate the increase in the number of parking spaces, this variant would add two levels of below-grade parking within the Block D2 garage. This would result in 75,450 cubic yards (cy) of excavation. Under the proposed project, excavation assumed for development of the subterranean Mission Rock Square Garage is 76,221 cy, which would not occur under this

variant. Therefore, Variant 3 would reduce the overall excavation onsite by approximately 771 cubic feet (76,221 – 75,450 = 771). In addition to the two below-grade parking levels with this variant, the Block D2 garage would include stackers on the top three floors and parking on the roof. The below-grade parking levels and stackers would not occur under the proposed project, but rooftop parking could occur.

Under this variant, vehicle access on Channel Street would be prohibited from Third Street because this access point would be closed off. Under the proposed project, the purpose of providing Channel Street vehicular access from Third Street is to access the Mission Rock Square garage. With the elimination of the underground garage under this variant, vehicular access would no longer be required to and from Third Street at this location. All vehicles accessing the project site from Third Street would do so from either Exposition Street, Long Bridge Street, or Mission Rock Boulevard. Under Variant 3 the driveway to the Block D2 parking garage on the east end of Long Bridge Street, immediately west of Bridgeview Street, would not be developed.

The height and massing of the parking structure at Block D2 would not change, although the internal heights of the top three floors would be adjusted to accommodate the stackers. As with the proposed project, parking for residential and commercial uses would be separated from AT&T Park event parking. All other development at Seawall Lot 337 and Pier 48 would be the same as the proposed project.

The *Regulatory Framework* discussions for the proposed project throughout Chapter 4 also apply to Variant 3.

IMPACT ANALYSIS

ENVIRONMENTAL TOPICS NOT REQUIRING FURTHER ANALYSIS UNDER VARIANT 3

Variant 3 and the proposed project would have the same environmental effects related to land use and land use planning, aesthetics, operational air quality, population and housing, cultural resources, greenhouse gas emissions, wind/shadow, public services and recreation, utilities and service systems, biological resources, geology and soils, hydrology and water quality, and hazardous materials for the reasons discussed below.

The overall site plan, building footprints and heights, mix of land uses, and intensity of development would be the same under Variant 3 and the proposed project. As a result, Variant 3 would have less than significant land use and land use planning impacts. There would be no changes to site configuration or the physical characteristics of the buildings (e.g., height, mass, bulk, orientation, setbacks, architectural treatment) under Variant 3 that would change the analysis or conclusions provided for the proposed project regarding aesthetics, wind, or shadow under Variant 3.

Variant 3 and the proposed project would have the same mix of land use types (i.e., residential, commercial, active/retail, production) and square footage and require similar construction activities and durations. As a result, the number of onsite residents, employees, employee-induced residents, and construction-related employees would be the same, as would the conclusions regarding population and housing. Impacts on public services and recreation as well as utilities and services (e.g., wastewater, stormwater, solid waste), which are based largely on the increased demand associated with population and housing growth, would be the same under Variant 3 and the proposed project.

Variant 3 and the proposed project would have a similar site plan and building characteristics and require similar construction, operational, and maintenance activities. Similar to the proposed project, this variant would require excavation for and development of a subterranean parking garage, although the location of this excavation within the project site would differ. There would be no meaningful difference in potential physical environmental impacts related to cultural resources, geology and soils, or hazardous materials because the impact analysis is Chapter 4, *Environmental Setting and Impacts*, considers subsurface impacts across the entire project site and the analysis and conclusions apply to all areas of the project site. There would be no change in the amount of impervious surface as a result of Variant 3; therefore, there would be no additional impacts related to hydrology and water quality. Similarly, there would be no change in the potential for impacts on biological resources, including candidate, sensitive, or special-status species, or wildlife movement.

Variant 3 would require the same types of construction activities and durations, equipment, and staging locations as the proposed project as well as a substantially similar amount of excavation activities. As a result, construction-related noise and vibration would the same as that described for the proposed project.

TRANSPORTATION

The reconfiguration of parking facilities under Variant 3 would result in changes to the distribution of auto trips to and from the project site. All vehicles that would use the Mission Rock Square Garage under the proposed project would use the Block D2 parking garage under this variant. Detailed calculations regarding trip redistribution for Variant 3 are included in Appendix 6-1. However, the trip-generating land uses would be the same as those of the proposed project.

CONSTRUCTION IMPACTS

Variant 3 would have similar construction impacts as the proposed project because it would involve construction of the same number of buildings, but only one parking structure as opposed to two parking structures with the proposed project. Construction of the Variant 3 would not result in significant impacts on the transportation and circulation network because any effects would be of limited duration and temporary.

Construction-related work for Variant 3 would have a ***less-than-significant impact*** on transportation and no mitigation measures would be required. Improvement Measure (I-TR-1) requires the applicant to prepare a Construction Traffic Control Plan for the proposed project. Improvement Measure I-TR-1 would also apply to Variant 3 to further reduce less-than-significant impacts related to potential conflicts between construction activities and pedestrians, bicyclists, transit and vehicles, and between construction activities and nearby businesses and residents.

VMT IMPACTS

Variant 3 would generate the same number of vehicle trips and the same VMT as the proposed project. Because the proposed project is located within a Traffic Analysis Zone that has existing average daily VMT per capita for residential, office, and retail uses that is more than 15 percent below the existing regional average daily VMT per capita, the proposed project and therefore Variant 3 would not cause significant additional VMT. Similar to the proposed project, Variant 3 would include features that would slightly alter the transportation network. These transportation improvements would not result in a substantial increase in roadway capacity, and would therefore not substantially induce automobile travel. As such, Variant 3 would have a ***less-than-significant*** impact on VMT.

TRAFFIC HAZARD IMPACTS

Variant 3 has a single parking garage on Block D2 with 3,000 parking spaces and 100 parking spaces would be located below grade, at grade, or above grade within the proposed buildings (approximately 10 spaces per block). This larger parking structure combines the 2,300 spaces proposed in the Block D2 garage with 700 spaces proposed in the Mission Rock underground garage for the proposed project. The 3,000 stall Block D2 garage proposed under Variant 3 would have three driveways: one on the north side of Mission Rock Street just west of Bridgeview Street, one on the west side of Bridgeview Street approximately midway between Mission Rock Street and Long Bridge Street, one on the south side of Long Bridge Street between Third Street and the Shared Public Way. Since Variant 3 does not have a driveway to the Block D2 parking garage on the east end of Long Bridge Street, immediately west of Bridgeview Street, as the proposed project does, Variant 3 would result in a *less-than-significant* impact to traffic due to queues from the garage driveway on Long Bridge Street during the a.m. and p.m. peak hours. Queues from the parking garage driveways on Long Bridge Street and Bridgeview Street are projected to extend in the adjacent intersections of Third Street/Long Bridge Street and Bridgeview Street/Long Bridge Street, respectively, due to pre-event traffic for Giants games. Because the Mission Rock Transportation Plan calls for the provision of Parking Control Officers at these two locations during Giants games to manage queues and traffic at the affected intersections, these Variant 3 queue impacts would be ***less-than-significant***. No mitigations are required.

TRANSIT IMPACTS

The number of transit trips generated by Variant 3 would be identical to those generated by the proposed project. Impacts on transit capacity utilization associated with Variant 3 would be identical to those of the proposed project. Impact TR-4 and Impact TR-6 indicates that the proposed project would have a significant impact on two transit lines (10 Townsend and 30 Stockton) due to a substantial increase in transit demand that would not be accommodated by local transit capacity and an increase in transit delays due to queues at the southbound left turn movement at the Third Street/Mission Rock Street intersection associated with project trips destined to the proposed project's Block D2 parking garage. Variant 3 would have the same significant transit impacts as the proposed project and Mitigation Measures M-TR-4.1, M-TR-4.2 and M-TR-6 would apply to Variant 3.

Implementing Mitigation Measures M-TR-4.1 and M-TR-4.2 would allow Muni to maintain transit headways, and would reduce the Variant 3 impact to less-than-significant levels. However, because the method and total cost of providing additional service and the SFMTA's ability to implement improvements is uncertain, the Variant 3 impacts would be ***significant and unavoidable with mitigation***.

Implementation of Mitigation Measure M-TR-6 would resolve transit delay impacts to being less than significant. However, at this time they may not be considered to fully resolve transit delay impacts because, and to the extent that, implementation of some of components of the mitigation (i.e., approval of restriping on Third Street for an extended southbound left turn pocket at the Third Street/Mission Rock Street intersection and entering into an Event Management Agreement with the project sponsor to allocate PCOs on site), require SFMTA Board approval, and such approval is currently considered uncertain. Thus, based upon such current uncertainty of full implementation of Mitigation Measure M-TR-6, the transit delay impacts of Variant 3 would remain ***significant and unavoidable with mitigation***.

The proposed project would not cause significant impacts on regional transit routes. Since the number of peak hour transit trips are identical between Variant 3 and the proposed project, like the proposed project, Variant 3 would have a ***less-than-significant*** impact on regional transit routes.

BICYCLE AND PEDESTRIAN IMPACTS

The bicycle and pedestrian network and facilities for Variant 3 would be identical to those for the proposed project. Variant 3 would generate an identical number of bicycle and pedestrian trips as the proposed project.

As with the proposed project, Variant 3 would cause pedestrian and bicycle hazards due to queues at the proposed project garages as documented in Impact TR-3 and TR-6. Mitigation Measures M-TR-3 and M-TR-6 would also apply to Variant 3. With implementation of these measures, vehicle impacts on pedestrian and bicycles generated by trips to the projects' parking garage under Variant 3 would be reduced to a less-than-significant level.

As documented in Impact TR-9, the proposed project would cause significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. Variant 3 would have the same significant pedestrian impacts as the proposed project and Mitigation Measure M-TR-9 would also apply to Variant 3. Implementation of Mitigation Measure M-TR-9 would resolve pedestrian safety impacts and reduce them to less than significant. However, at this time, the approval of the signalization improvements is considered somewhat uncertain, because they will require SFMTA Board approval. Thus, because implementation of Mitigation Measure M-TR-9, is uncertain to such extent, the Reduced Intensity Alternative's pedestrian safety impacts would continue to be considered ***significant and unavoidable with mitigation***, similar to the proposed project.

As documented in Impact TR-9, the proposed project would cause a significant impact at the bicycle-truck interface at Pier 48. Variant 3 would have the same significant bicycle impact as the proposed project and Mitigation Measure M-TR-9 would apply to Variant 3. Implementation of Mitigation Measure M-TR-9 would resolve bicycle safety impacts and reduce the impact to ***less-than-significant with mitigation***. Improvement Measure I-TR-9.1 would also apply to Variant 3 and would further enhance vehicle/bicycle safety.

LOADING IMPACTS

Variant 3 would have identical peak loading demands to the proposed project, which would not be accommodated by the proposed loading supply and therefore result in a significant impact. Mitigation Measures M-TR-11.1 and M-TR-11.2 would apply to Variant 3. Implementation of Mitigation Measures M-TR-11.1 and M-TR-11.2 would resolve the loading shortfall and the loading impacts would be ***less than significant with mitigation.***

EMERGENCY ACCESS IMPACTS

Emergency access to the project site for Variant 3 would be similar to that of the proposed project, with the only difference being that 3,000 parking spaces are located in the Block D2 parking garage, rather than 2,300 spaces in the Block D2 parking garage and 700 in the Mission Rock Square underground garage under the proposed project. The proposed internal roadway network would accommodate emergency vehicles including fire trucks. Emergency vehicle access to Pier 48 would be provided via Terry A. Francois Boulevard. The proposed cross-section for this roadway includes a 26-foot-wide shared zone for vehicular access, including emergency vehicles. The aforementioned fire access evaluation indicates that emergency vehicles can access Pier 48 via any of the three east-west project streets that connect to Terry A. Francois Boulevard. Variant 3 includes implementation of a "Keep Clear" zone on Mission Rock Street in front of the police and fire truck access to ensure that police vehicles and fire trucks are provided with clear access to and egress to the Public Safety Building.

During events at AT&T Park, pre-event and post-event vehicular traffic destined for the proposed on-site garages would be managed as it is currently to minimize impacts on emergency-vehicle circulation and access as well as private vehicles destined for the UCSF emergency room and urgent care center. Before events at AT&T Park, up to 21 parking control officers (PCOs) are stationed at 17 locations. Post-events at AT&T Park, up to 19 PCOs are stationed at 14 locations. These locations include intersections along Third Street, Mission Rock Street, and Terry A. Francois Boulevard along the project boundaries. During major events, the north–south Shared Public Way within the project site would be closed to vehicles, with the exception of emergency vehicles. If necessary, emergency vehicles would be able to travel on Muni's light rail right-of-way in the median of Third Street.

To address the circumstance of simultaneous events at AT&T Park and the Mission Rock site, the Proposed Project has prepared detailed event management plans that include combinations of strategies as described in Chapter 5 of the Mission Rock Transportation Plan. These would apply to Variant 3 as well. The Event Management measures identified in the Mission Rock Transportation Plan describe strategies for a primary event at AT&T Park (40,000+ attendees), a secondary event at AT&T Park (15,000 to 25,000 attendees), and on-site events (2,000 to 5,000 attendees). Additionally, event traffic management systems at AT&T Park are reviewed and refined continuously to plan for such simultaneous events. Therefore, both AT&T Park and on-site events would develop refinements to their plans as needed to ensure emergency vehicle circulation is accommodated, both under the proposed project and Variant 3.

Roadway improvements adjacent to the UCSF facilities would facilitate emergency vehicle access. Before and after events, emergency vehicle access to the project site and UCSF Medical Center uses would be maintained, under the proposed project and Variant 3, as would emergency access for persons traveling to the emergency room and urgent care center in their personal vehicles. For these reasons, Variant 3 would not inhibit emergency vehicle access to the project site and nearby vicinity under the event scenario. Similar to the proposed project, Variant 3 would be designed to provide access for Police and Fire department vehicles into the Public Safety Building across Mission Rock Street. However, until final street design is coordinated with the Police and Fire Department, this would conservatively be a significant impact. Mitigation Measure M-TR-12 would reduce this significant impact to a less-than-significant level. Improvement Measure I-TR-12 would also apply to Variant 3 and would enhance emergency vehicle access.

PARKING IMPACTS

The peak parking demand for Variant 3 would be identical to the proposed project. As with the proposed project, Variant 3 would have a ***less-than-significant*** parking impact.

NOISE

With regard to operational noise, and as described in Appendix 6-1, Variant 3 would generate the same number of trips as the proposed project's High Commercial land use assumption. However, some of the trips under Variant 3 would be redistributed along nearby project roadway segments compared to the proposed project. Specifically, with the removal of the parking garage under Mission Rock Square and the increase in size of the parking lot under Block D2, the number of p.m. peak hour trips under the Existing plus Variant 3 would decrease along most segments, and would increase along Mission Rock Street from Terry A Francois Boulevard to 3rd street by approximately 20 percent compared to Existing plus Project conditions.

A 20 percent increase in traffic on this given roadway segment would result in an approximately 1.5 dB increase in traffic noise over what was assumed under the proposed project, which was modeled to be 62 dBA L_{dn}. Noise levels along this segment were modeled to increase with the project (as compared to existing) by 12 dB and would increase (as compared to existing) by approximately 13 to 14 dB under this variant. As noise levels would only increase by 1.5 dB above noise levels with the proposed project (which is below the perceptibility threshold of a 3 db increase) and as both the project and this variant would result in substantial permanent increases in noise along this segment (increase of more than 5 dB in a place where existing noise levels are below the standard), the proposed project and Variant 3 would result in similar traffic noise levels along this roadway. Traffic noise impacts for this variant related to a substantial permanent increase in noise would be significant along this segment. As there are no feasible mitigation measures available to reduce the 12 dB Project increase or 13-14 dB increase from this variant along this segment of Mission Rock Street to less than the allowable 3 dB increase, traffic-noise impacts related to a substantial permanent increase in noise would be ***significant and unavoidable***, similar to the proposed project.

With regard to traffic noise impacts to onsite (project) and offsite noise-sensitive receptors, similar to the project, Variant 3 would result in a ***significant and unavoidable*** impact on both offsite and future onsite land uses.

Variant 3 would not change the outdoor event uses under the proposed project so, to the extent that project uses would still be subject to Mitigation Measure M-NOI-2.1, (Noise Control Plan for Outdoor Amplified Sound), this mitigation would equally apply, as outdoor events would still occur, and would be the same under Variant 3 and as under the proposed project. Impacts associated with outdoor noise from outdoor events would remain ***less than significant with mitigation***.

Variant 3 also would not change uses from stationary noise sources and, as the same as those described for the project, these impacts would remain ***less than significant with mitigation.***

AIR QUALITY

Criteria pollutant and toxic air contaminant emissions under Variant 3 were analyzed using same methodologies and assumptions as those used for the proposed project. The emissions modeling details for the Reduced Intensity Alternative are provided in Appendix 6-2. The modeling uses the same methodology contained Air Quality Technical Report.

CONSTRUCTION IMPACTS

Similar to the proposed project, construction impacts of Variant 3 would be significant and unavoidable with mitigation. For the proposed project, as described in Section 4.G, *Air Quality*, estimated construction-related emissions of ROG would exceed the BAAQMD's significance thresholds for the year 2019 at 66 pounds per day, and estimated construction-related emissions of NOx would exceed the BAAQMD's significance thresholds for the years 2018 through 2021 at between approximately 69 and 156 pounds per day. Even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4 under Variant 3 and the proposed project, NOx levels would exceed the significance threshold from 2018 through 2020, at between approximately 63 and 91 pounds per day. Similarly, as shown in Table 6-18 on the following page (also see Tables 34 and 35 in Appendix 6-2), construction-related criteria air pollutant emissions for Variant 3 would exceed the thresholds for emissions of ROG for the year 2019 at 65 pounds per day and exceed the thresholds for emissions of NOx for the years 2018 through 2021 at between approximately 57 and 125 pounds per day. As shown in Table 6-19 on page 6-64 (also see Tables 36 and 37 in Appendix 6-2), emissions of NOx under Variant 3 would still be significant even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4 for the years 2018 through 2020 at between approximately 62 and 88 pounds per day. Thus, similar to the proposed project, an offset emissions mitigation measure would be required to provide for reduction of NOx exceeding the significance thresholds through implementation of pollution reduction programs elsewhere in the air basin. Accordingly, additional mitigation is required to reduce the residual NOx emissions. Pursuant to Mitigation Measure M-AQ-1f, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated NOx emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of construction emissions of NOx are conservatively considered ***significant and unavoidable with mitigation*** for Variant 3, same as for the proposed project.

TABLE 6-18. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR VARIANT 3

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	2.3	25.6	0.9	0.8
2018	37.1	**124.5**	5.3	5.0
2019	**64.6**	**154.6**	6.1	5.9
2020	47.6	**103.5**	3.9	3.8
2021	33.4	**57.1**	2.1	2.0
2022	18.7	30.3	1.1	1.1
2023	4.5	7.3	0.3	0.2
2024	0.0	0.0	0.0	0.0
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.3	3.3	0.1	0.1
2018	4.8	**16.2**	0.7	0.7
2019	8.4	**20.1**	0.8	0.8
2020	6.1	**11.9**	0.4	0.4
2021	4.4	7.4	0.3	0.3
2022	2.4	3.9	0.1	0.1
2023	0.6	0.9	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**10**	**10**	**15**	**10**

Source:

ENVIRON International Corporation and the California Air Districts. 2013. CalEEMod User's Guide. Version 2013.2. Appendix A: Calculation Details for CalEEMod. Prepared for the California Air Pollution Control Officers Association. July. Available: <http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixa.pdf?sfvrsn=2>. Accessed: October 12, 2015.

Notes:

Emissions over threshold levels are in **bold**

Abbreviations:

ROG: reactive organic gases

NOx: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 6-19. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR VARIANT 3

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.8	9.7	<0.1	<0.1
2018	10.8	**62.7**	1.0	1.0
2019	18.5	**87.6**	1.3	1.3
2020	13.9	**61.7**	1.0	1.0
2021	9.2	39.2	0.5	0.5
2022	5.2	22.9	0.3	0.3
2023	1.3	5.9	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	<0.1	1.3	<0.1	<0.1
2018	1.4	8.1	0.1	0.1
2019	2.4	**11.4**	0.2	0.2
2020	1.7	7.3	<0.1	<0.1
2021	1.2	5.1	<0.1	<0.1
2022	0.7	3.0	<0.1	<0.1
2023	0.2	0.8	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	**10**	**10**	**15**	**10**

Source:

Refer to Table 6-18.

Notes:

a. Emissions over threshold levels are in **bold**

b. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Does not include effect of Mitigation Measure M-AQ-1.5, which requires NOx offsets.

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

OPERATIONAL IMPACTS

Similar to the proposed project, operational impacts of Variant 3 would be less than significant with mitigation. As described in Section 4.G, *Air Quality*, estimated operational emissions of ROG under the proposed project for the High Commercial land use assumption (the most impactful scenario) would exceed the BAAQMD's significance threshold for the years 2020 through 2024 and all following operational years at between approximately 66 and 123 pounds per day and emissions of NOx would exceed the threshold for the years 2023 through 2024 and all following operational years at between approximately 57 and 60 pounds per day. As shown in Table 6-20 on the following page (also see Tables 38 and 39 in Appendix 6-2), Variant 3 would result in operational criteria air pollutant emissions of ROG and NOx slightly lower than those for the proposed project, and still at levels that would exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to Variant 3, although the amount of emissions offset through Mitigation Measure M-AQ-1.5 would be adjusted to the emissions calculated for this variant. Even with implementation of Mitigation Measures M-AQ-2.1 through M-AQ-2.3 under Variant 3 (similar to the proposed project), ROG levels would exceed the significance threshold from 2021 through 2024 and beyond at between 80 and 108 pounds per day, as shown in Table 6-21 on page 6-67 (also see Tables 40 and 41 in Appendix 6-2). However, these mitigation measures would reduce NOx emissions to below the significance threshold. Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee would be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of operational emissions of ROG are conservatively considered ***significant and unavoidable with mitigation*** for Variant 3, same as for the proposed project.

TABLE 6-20. SUMMARIZED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR VARIANT 3

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	47.8	24.3	13.3	4.1
2021	**87.8**	38.6	31.2	9.3
2022	**102.8**	46.1	37.4	11.2
2023	**118.0**	**55.8**	49.1	14.6
2024 (full buildout)	**117.8**	53.4	49.0	14.5
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	8.7	4.2	2.4	0.8
2021	**16.0**	7.0	5.7	1.7
2022	**18.8**	8.4	6.8	2.0
2023	**21.5**	**10.2**	9.0	2.7
2024 (full buildout)	**21.5**	9.8	8.9	2.7
Significance Threshold	**10**	**10**	**15**	**10**

Source:

1. California Air Resources Board. 2012. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California. Available: <http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf>.
2. Fehr & Peers. 2016. Screencheck Draft - Transportation Impact Study: Mission Rock (Seawall Lot 337/Pier 48). Prepared for the San Francisco Planning Department. July. San Francisco, CA.
3. United States Environmental Protection Agency. 1996. Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors. 9.12.1 Malt Beverages. Available: <https://www3.epa.gov/ttnchie1/ap42/>. Accessed: February 29, 2016.

Notes:

a. Emissions over threshold levels are in **bold**.
b. PM10 and PM2.5 include both exhaust and dust emissions.

Abbreviations:

ROG: reactive organic gases
NOx.: nitrogen oxides
PM10: particulate matter less than or equal to 10 microns in diameter
PM2.5: particulate matter less than or equal to 2.5 microns in diameter
lbs: pounds

TABLE 6-21. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR VARIANT 3

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	46.2	23.3	10.9	3.4
2021	**79.9**	36.1	25.5	7.6
2022	**94.1**	43.2	30.5	9.1
2023	**108.0**	52.2	39.9	11.8
2024 (full buildout)	**107.9**	49.8	39.9	11.8
Significance Threshold	**54**	**54**	**82**	**54**
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	8.4	4.0	2.0	0.6
2021	**14.6**	6.6	4.6	1.4
2022	**17.2**	7.9	5.6	1.7
2023	**19.7**	9.5	7.3	2.2
2024 (full buildout)	**19.7**	9.1	7.3	2.1
Significance Threshold	**10**	**10**	**15**	**10**

Source:

Refer to Table 6-20.

Notes:

a. Mitigated emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1), 90% all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-2.2), and auto vehicle trips are reduced by 20% (Mitigation Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG offsets.

b. PM10 and PM2.5 include both exhaust and dust emissions.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

VDECS: Verified Diesel Emissions Control Strategies

COMBINED CONSTRUCTION AND OPERATIONAL IMPACTS

Similar to the proposed project, combined construction and operational impacts of Variant 3 would be significant and unavoidable with mitigation. As described in Section 4.G, *Air Quality*, estimated combined construction and operational emissions of ROG and NOx under the proposed project for the High Commercial land use assumption would be between approximately 66 and 123 pounds per day of ROG for the years 2019 through 2024 and beyond and between approximately 57 and 156 pounds per day of NOx for the years 2018 through 2024 and beyond, and or the High Residential land use assumption would be between approximately 66 and 124 pounds per day of ROG for the years 2019 through 2024 and beyond and between approximately 62 and 156 pounds per day of NOx between 2018 and 2023, exceeding significance thresholds. As shown in Table 6-22 on the following page (also see Table 42 in Appendix 6-2), Variant 3 would result in combined construction and operational criteria air pollutant emissions of ROG and NOx slightly lower than those for the proposed project, and still at levels that would exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to Variant 3, although the amount of emissions offset would be adjusted to the emissions calculated for this variant. Even with implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 under Variant 3 (similar to the proposed project), ROG levels would exceed the significance threshold from 2020 through 2024 and beyond at between 60 and 109 pounds per day, and NOx levels would exceed the significance threshold from 2018 through 2023 at between 58 and 88 pounds per day, as shown in Table 6-23 on page 6-70 (also see Table 43 in Appendix 6-2). Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG and NOx emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee would be conducted by the BAAQMD and is outside the jurisdiction and control of the City and is not fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of ROG and NOx emissions is conservatively considered ***significant and unavoidable with mitigation*** for Variant 3, same as for the proposed project.

TABLE 6-22. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR VARIANT 3

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	2.3	25.6	0.9	0.0	0.9	0.8	0.0	0.8
2018	37.1	**124.5**	5.3	0.0	5.3	5.0	0.0	5.0
2019	**64.6**	**154.6**	6.1	0.0	6.1	5.9	0.0	5.9
2020	**95.4**	**127.8**	4.7	12.5	17.2	4.5	3.4	7.9
2021	**121.2**	**95.7**	3.3	29.9	33.3	3.2	8.1	11.3
2022	**121.5**	**76.4**	2.7	35.8	38.6	2.6	9.7	12.3
2023	**122.5**	**63.1**	2.2	47.1	49.3	2.2	12.7	14.8
2024	**117.8**	53.4	1.9	47.1	49.0	1.9	12.7	14.5
Significance Threshold	**54**	**54**	**82**	**82**	**82**	**54**	**54**	**54**
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.3	3.3	0.1	0.0	0.1	0.1	0.0	0.1
2018	4.8	**16.2**	0.7	0.0	0.7	0.7	0.0	0.7
2019	8.4	**20.1**	0.8	0.0	0.8	0.8	0.0	0.8
2020	**14.8**	**16.1**	0.6	2.3	2.8	0.5	0.6	1.2
2021	**20.4**	**14.5**	0.5	5.5	6.0	0.5	1.5	2.0
2022	**21.2**	**12.4**	0.4	6.5	7.0	0.4	1.8	2.2
2023	**22.1**	**11.1**	0.4	8.6	9.0	0.4	2.3	2.7
2024	**21.5**	9.8	0.3	8.6	8.9	0.3	2.3	2.7
Significance Threshold	**10**	**10**	**15**	**-**	**15**	**10**	**-**	**10**

Source:

Refer to Tables 6-18 and 6-20.

Notes:

All table references below refer to tables in the Activity Data section above

a. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

b. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

c. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 6-23. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR VARIANT 3

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.8	9.7	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	10.8	**62.7**	1.0	0.0	1.0	1.0	0.0	1.0
2019	18.5	**87.6**	1.3	0.0	1.3	1.3	0.0	1.3
2020	**60.0**	**85.0**	1.6	10.3	11.9	1.6	2.8	4.3
2021	**89.1**	**75.3**	1.4	24.5	25.9	1.4	6.6	8.0
2022	**99.3**	**66.2**	1.5	29.4	30.8	1.4	7.9	9.4
2023	**109.3**	**58.1**	1.5	38.5	40.0	1.5	10.4	11.9
2024	**107.9**	49.8	1.4	38.5	39.9	1.4	10.4	11.8
Significance Threshold	**54**	**54**	**82**	**82**	**82**	**54**	**54**	**54**
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	<0.1	1.3	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	1.4	8.1	0.1	0.0	0.1	0.1	0.0	0.1
2019	2.4	**11.4**	0.2	0.0	0.2	0.2	0.0	0.2
2020	**10.2**	**11.3**	0.2	1.9	2.1	0.2	0.5	0.7
2021	**15.8**	**11.7**	0.2	4.5	4.7	0.2	1.2	1.4
2022	**17.9**	**10.9**	0.3	5.4	5.6	0.2	1.4	1.7
2023	**19.9**	**10.3**	0.3	7.0	7.3	0.3	1.9	2.2
2024	**19.7**	9.1	0.3	7.0	7.3	0.2	1.9	2.1
Significance Threshold	**10**	**10**	**15**	**-**	**15**	**10**	**-**	**10**

Source:

Refer to Tables 6-19 and 6-21.

Notes:

All table references below refer to tables in the Activity Data section above

a. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1), 90% all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-2.2), and auto vehicle trips are reduced by 20% (Mitigation Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG and NOx offsets.

b. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

	Average Daily Emissions (lbs/day)							
Year	ROG	NO_x	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]

c. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

d. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases
NO_x.: nitrogen oxides
PM10: particulate matter less than or equal to 10 microns in diameter
PM2.5: particulate matter less than or equal to 2.5 microns in diameter
lbs: pounds
VDECS: Verified Diesel Emissions Control Strategies

TOXIC AIR CONTAMINANTS

Similar to the proposed project, construction and operation of Variant 3 would generate toxic air contaminants, including PM2.5 and DPM. The sources of emissions would be exactly the same as for the proposed project. The quantity of emissions would vary slightly for construction due to slightly different construction activity associated with the parking structures, but would be exactly the same for operations because operational activities that generate TACs are identical to the proposed project.

PM2.5 ANALYSIS

The PM2.5 contribution at sensitive receptors under Variant 3 would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this variant. For the proposed project (see Tables 4.G-22 and 4.G-23 in Section 4.G, *Air Quality*), the PM2.5 contribution would exceed the significance threshold and although implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.5 and M-AQ-2.1 through M-AQ-2.3 would reduce the PM2.5 concentration, it would not be reduced below the thresholds of significance at the onsite MIR in the study area that is not located in the APEZ under existing/future conditions, but that would be placed in the APEZ under existing/future plus proposed project conditions.

For Variant 3, as shown in Table 6-24 on the following page, the maximum annual average PM2.5 concentration would not exceed the significance threshold of 0.2 $\mu g/m^3$ for the MIR that is currently located in the APEZ. However, it would exceed the significance threshold of 0.3 $\mu g/m^3$ for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 3.

TABLE 6-24. MAXIMUM ANNUAL AVERAGE PM2.5 EXHAUST EXPOSURE WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS NOT LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS BUT WOULD BE LOCATED IN THE APEZ DURING EXISTING/FUTURE PLUS PROPOSED PROJECT CONDITIONS FOR VARIANT 3

	Annual Average PM2.5 Concentration (μg/m³) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	**Variant 3**	**Mitigated [c]**	**Variant 3**	**Mitigated [c]**
Construction				
Total (Background + Project)	10.7	8.7	-	-
Background	8.4	8.4	-	-
Construction Contribution	**2.3**	0.3	-	-
Significance Threshold for Project Contribution	0.3	N/A[d]	-	-
Above Threshold?	**Yes**	N/A[d]	-	-

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1) and auto vehicle trips are reduced by 20% (Mitigation Measure M-AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

c. The mitigated values may represent different receptor locations than the Variant 3 values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e. the total background plus project annual average PM2.5 concentration is less than the APEZ threshold of 10.0 μg/m³), the project-level threshold does not apply

Emissions over threshold levels are in **bold**

More specifically, the onsite MIR currently outside the APEZ but that would be located in the APEZ with the contribution from Variant 3 could be exposed to a maximum annual average PM2.5 concentration from Variant 3 of up to 2.3 μg/m^3. This exceeds the project contribution threshold of 0.3 μg/m^3. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this impact. There are currently no offsite MIRs currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 3. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce PM2.5 exhaust emissions from off-road construction equipment, on-road haul trucks, construction generators, in-water construction equipment, emergency generators, and mobile sources, and would reduce the maximum annual average PM2.5 concentration from Variant 3 for the onsite MIR to 0.3 μg/m^3, which would not exceed the threshold of significance. For the onsite MIR, the maximum modeled mitigated annual average PM2.5 concentrations of 0.3 μg/m^3 combined with background annual average PM2.5 concentrations of 8.4 μg/m^3 would equal 8.7 μg/m^3, which would not exceed the APEZ threshold of 10.0 μg/m^3. Therefore, under mitigated conditions, the onsite MIR would not be placed into the APEZ. Consequently, with mitigation, the maximum annual average PM2.5 concentration for receptors currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 3 would be ***less than significant with mitigation***, same as for the proposed project.

CANCER RISK ANALYSIS (DPM/TOG)

The lifetime cancer risk at receptors under Variant 3 would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this variant. For the proposed project (see Tables 4.G-23 and 4.G-24 in Section 4.G, *Air Quality*), the risk would exceed the significance threshold and although implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 under Variant 3 (similar to the proposed project) would reduce the risk below the thresholds of significance for the onsite MIR in the study area that is not located in the APEZ under existing/future conditions, but that would be placed in the APEZ under existing/future plus proposed project conditions.

For Variant 3, as shown in Table 6-25 on the following page (also see Tables 45 and 46 in Appendix 6-2), the lifetime excess cancer risk would exceed the significance threshold of 7.0 per one million persons exposed for the MIR currently located in the APEZ. It would also exceed the significance threshold of 10.0 per one million persons exposed for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 3.

TABLE 6-25. MAXIMUM LIFETIME EXCESS CANCER RISK WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS FOR CONSTRUCTION PLUS OPERATION FOR VARIANT 3

	Lifetime Excess Cancer Risk (per million) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	Variant 3	Mitigated [c]	Variant 3	Mitigated [c]
RECEPTORS CURRENTLY LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS				
Total (Background + Project)	-	-	130.4	111.2
Background	-	-	107.2	107.2
Construction Plus Operation Contribution	-	-	**23.2**	4.0
Significance Threshold for Project Contribution	-	-	7.0	7.0
Above Threshold?	-	-	**Yes**	No
RECEPTORS NOT LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS BUT WOULD BE LOCATED IN THE APEZ DURING EXISTING/FUTURE PLUS PROPOSED PROJECT CONDITIONS				
Total (Background + Project)	160.3	68.1	175.3	100.5
Background	48.6	48.6	70.3	91.7
Construction Plus Operation Contribution	**111.7**	19.6	**105.0**	8.8
Significance Threshold for Project Contribution	10.0	N/A[d]	10.0	10.0
Above Threshold?	**Yes**	N/A[d]	**Yes**	No

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Mitigation Measure M-AQ-1.1), all haul trucks are model year 2010 (Mitigation Measure M-AQ-1.2), 90% of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Mitigation Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Mitigation Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Mitigation Measure M-AQ-2.1) and auto vehicle trips are reduced by 20% through the TDM plan (Mitigation Measure M-AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

c. The mitigated values may represent different receptor locations than the Variant 3 values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e. the total background plus project lifetime excess cancer risk is less than the APEZ threshold of 100), the project-level threshold does not apply.

Abbreviations:

APEZ: Air Pollutant Exposure Zone

VDECS: Verified Diesel Emissions Control Strategies

Emissions over threshold levels are in **bold**

More specifically, the offsite MIR currently located in the APEZ could be exposed to a lifetime excess cancer risk from Variant 3 of up to 23.2 per one million. This exceeds the project contribution threshold of 7.0 in one million. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this impact. The lifetime excess cancer rick at the onsite MIR currently located in the APEZ would be less than the project contribution threshold of 7.0 in one million, a less than significant impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 under Variant 3 (similar to the proposed project) would reduce the lifetime excess cancer risk from Variant 3 to 4.6 in one million for the offsite MIR currently located in the APEZ. This is less than the project contribution threshold of 7.0 in one million, a less than significant impact, similar to the proposed project. The onsite and offsite MIRs currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 3 could be exposed to a lifetime excess cancer risk from Variant 3 of up to 111.7 and 105.0 per one million, respectively (for construction plus operation). This exceeds the project contribution threshold of 10.0 in one million. This is considered a significant impact. Therefore, mitigation is required to reduce this impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the lifetime excess cancer risk from Variant 3 for the onsite and offsite MIRs to 19.5 and 8.8 in one million, respectively. For the onsite MIR, the mitigated lifetime excess cancer risk for Variant 3 of 19.6 combined with background cancer risk of 48.6 would equal 68.1, which would not exceed the APEZ threshold of 100.0 per million. Therefore, under mitigated conditions, the onsite MIR would not be placed into the APEZ. Therefore, under mitigated conditions, neither the onsite MIR nor the offsite MIR would be placed into the APEZ. Therefore, with mitigation, lifetime excess cancer risk impacts for receptors currently outside the APEZ but that would be placed in the APEZ with the contribution from Variant 3 would be ***less than significant with mitigation***, the same as for the proposed project.

Consistency with Clean Air Plan. Similar to the proposed project, impacts related to consistency with the 2010 Clean Air Plan (CAP) for Variant 3 would be less than significant with mitigation. Variant 3 would be consistent with the 2010 CAP because it would incorporate mitigation measures that include offsetting residual ROG and NOx emissions above significance thresholds. Additionally, Variant 3 would be consistent with the 2010 CAP through the incorporation of control measures of the CAP, including land use/local impact measures (such as TCM C-1 – Voluntary Employer-Based Trip Reduction Programs and TCM D-2 – Pedestrian Access and Facilities Improvements) and energy/climate measures (such as ECM 1 – Energy Efficiency and ECM 2 – Renewable Energy) now required through the various components of the City's Greenhouse Gas Reduction Strategy as well as the transportation demand management measures that would be implemented through Mitigation Measure M-AQ-2.3, similar to those for the proposed project. Variant 3 would also not hinder implementation of the 2010 CAP because Variant 3 would place a dense, walkable urban area near a concentration of regional and local transit service and would not preclude the extension

of a transit line or a bike path or any other transit improvement. Therefore, similar to the proposed project, Variant 3 would not conflict with, or obstruct implementation of the 2010 CAP, and this impact would be ***less than significant***.

E. VARIANT 4: HOTEL USE

DESCRIPTION

Under Variant 4, hotel uses would be included on the project site. The potential hotel use would be included in a building that would be intended for residential uses under the proposed project. The hotel would be approximately 200,000 gsf in size, with up to 300 rooms. The hotel use would displace other programmed uses. No increase in total development at the site would be necessary. However, this variant would result in approximately 200,000 gsf less residential space than the proposed project, which equates to approximately 200 units.[22] All project features under this variant would remain the same as the proposed project. No additional construction beyond what is assumed for the project would be required. The project footprint would not be altered, and no additional height, bulk, or excavation would be necessary.

The *Regulatory Framework* discussions throughout Chapter 4 also apply to Variant 4.

IMPACT ANALYSIS

ENVIRONMENTAL TOPICS NOT REQUIRING FURTHER ANALYSIS UNDER VARIANT 4

Variant 4 and the proposed project would have the same environmental effects related to land use and land use planning, aesthetics, population and housing, cultural resources, noise, air quality, wind/shadow, public services and recreation, utilities and service systems, biological resources, geology and soils, hydrology and water quality, and hazardous materials, for the reasons discussed below.

The overall site plan, building footprints and heights, and intensity of development would be the same under Variant 4 and the proposed project, and overall land uses would be similar, with the exception of a 300-room hotel within one of the proposed residential buildings (and consequently, fewer residential units on that block). As a result, Variant 4 would have less than significant land use and land use planning impacts. There would be no changes to the site layout or physical characteristics of the buildings (e.g., height, massing, bulk, orientation, setbacks, architectural treatments) that would change the analysis or conclusions made for the proposed project regarding aesthetics, wind, or shadow impacts under Variant 4.

[22] Using the assumptions of each residential unit = 1,000 sf used throughout this EIR.

Variant 4 and the proposed project would have a similar mix of land use types, with the exception of a 300-room hotel within one of the proposed residential buildings under Variant 4 (and consequently, less residential units on that block than under the proposed project). Compared to the proposed project, Variant 4 would have 200,000 gsf (approximately 200 units) less for residential uses; that space would instead accommodate a hotel with up to 300 rooms. The hotel would employ a staff onsite and accommodate an estimated 252 people per night, on average, based on the average occupancy rate of 84 percent within the San Francisco metropolitan area.[23] This would result in fewer onsite guests under Variant 4 compared with the proposed project, which would accommodate approximately 470 permanent residences in the same space.[24] As a result, the number of onsite residents and hotel guests, employees, and employee-induced residents would be less under Variant 4 compared with the proposed project. Similarly, impacts on public services and recreation as well as utilities and services (e.g., wastewater, stormwater, solid wastes), which are based largely on increased demand associated with population and housing growth, would be less under Variant 4. Impacts would be less than significant, similar to the proposed project.

Variant 4 and the proposed project would have the same site plan, building characteristics, and construction characteristics and would require similar operational and maintenance activities. As a result, there would be no meaningful difference in potential physical environmental impacts related to cultural resources, geology and soils, or hazardous materials. There would be no change in the amount of impervious surface as a result of Variant 4; therefore, there would be no additional impacts related to hydrology and water quality. Similarly, there would be no change in the potential for impacts on biological resources, including candidate, sensitive, or special-status species, or wildlife movement.

Construction activities, equipment, phasing, and durations for Variant 4 are expected to be the same as those of the proposed project. As a result, construction-related air quality and greenhouse gas impacts would be comparable to the proposed project. Long-term operational greenhouse gas emissions and air quality correlate with population growth and the resulting increase in the number of vehicle trips and demand for utilities. Population growth would be less under Variant 4 relative to the proposed project. Since the change between the project and Variant 4 is not significant (470 permanent residents under the project to be replaced by 252 temporary hotel guests per night) greenhouse gas emissions and air quality impacts are expected to be largely the same as the project.

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[23] Kathleen Pender. 2015. "Like Rents, S.F. Hotel Room Rates Going through the Roof." *San Francisco Chronicle*. Published April 25, 2015. Available: http://www.sfchronicle.com/business/networth/article/Like-rents-S-F-hotel-room-rates-going-through-6224193.php. Accessed: October 7, 2016.

[24] Using a persons per household ratio of 2.35 as discussed in Section 4.C, *Population and Housing*.

Variant 4 would require the same types of construction activities and durations, equipment, and staging locations as the proposed project. As a result, construction-related noise and vibration would be the same as that described for the proposed project.

All mitigation measures described for these impacts under the proposed project would be applicable to this variant. Therefore, these environmental topics require no further analysis under Variant 4.

TRANSPORTATION

Travel demand for Variant 4 was analyzed using methodologies and assumptions similar to those used for the proposed project. The travel demand forecasts for Variant 4 are provided in Appendix 6-1. The forecasts are based on methodology contained in the SF Guidelines and supplemented with information that accounts for the large-scale and mixed-use qualities of the proposed project.

As shown in Table 6-26 on the following page, Variant 4 would generate more external person trips during the weekday a.m. peak hour (2 percent) and p.m. peak hour (3 percent) than the High Commercial Assumption. This table conservatively assumes that the High Commercial land use assumption would be implemented at Seawall Lot 337 under Variant 4 because that land use assumption would generate more person and vehicle trips than the High Residential land use assumption. Therefore, this table shows only a comparison to the High Commercial land use assumption.

TABLE 6-26. PROPOSED PROJECT AND VARIANT 4 TRIP GENERATION

Land Use	Proposed Project High Commercial Assumption	Hotel Use Variant	Option A Change from High Commercial Assumption	
Weekday A.M. Peak Hour				
Total Person Trips	6,864	6,980	116	2%
Auto	***2,524***	*2,565*	*41*	*2%*
Transit	***2,635***	*2,655*	*20*	*2%*
Other[a]	***1,705***	*1,760*	*55*	*3%*
Total Vehicle Trips	1,449	1,446	-3	-<1%
Weekday P.M. Peak Hour				
Total Person Trips	9,145	9,454	309	3%
Auto	*3,488*	*3,570*	82	2%
Transit	*2,841*	*2,906*	65	2%
Other[a]	*2,816*	*2,978*	162	6%
Total Vehicle Trips	1,755	1,775	20	1%

Source: Fehr & Peers, 2016; Adavant, 2016.

Note:

a. "Other" includes bicycles, walking, motorcycles, taxis, and additional modes.

CONSTRUCTION IMPACTS

Variant 4 would have similar construction impacts as the Proposed Project because it would involve construction of the same number of buildings and parking structures. Construction of Variant 4 would not result in significant impacts on the transportation and circulation network because any effects would be of limited duration and temporary.

Construction-related work for Variant 4 would have a ***less-than-significant impact*** on transportation and no mitigation measures would be required. Improvement Measure I-TR-1 requires the applicant to prepare a Construction Traffic Control Plan for the proposed project. Improvement Measure I-TR-1 would also apply to Variant 4 to further reduce less-than-significant impacts related to potential conflicts between construction activities and pedestrians, bicyclists, transit and vehicles, and between construction activities and nearby businesses and residents.

VMT IMPACTS

Variant 4 would generate slightly more daily VMT than the proposed project, as it would generate 15,380 daily vehicle trips or one percent more daily vehicle trips than the High Commercial Assumption under the proposed project. Because the proposed project is located within a Traffic Analysis Zone that has existing average daily VMT per capita for residential,

office, and retail uses that is more than 15 percent below the existing regional average daily VMT per capita, the proposed project and therefore Variant 4 would not cause significant additional VMT. As with the proposed project, Variant 4 would also not substantially induce automobile travel. As such, Variant 4 would have a ***less-than-significant*** impact on VMT.

TRAFFIC HAZARD IMPACTS

Variant 4 would result in similar queues at the Block D2 parking garage as the proposed project, as it would generate one percent more daily vehicle trips. Westbound vehicles on Long Bridge Street waiting to turn left into the easternmost garage driveway would queue into the Long Bridge Street/Bridgeview Street intersection and impede the flow of pedestrian, bicycle and vehicle traffic. This would be a *significant* impact. The same mitigation measures identified for the proposed project would apply to Variant 4. With implementation of Mitigation Measure M-TR-3, the traffic hazard impact of Variant 4 would be reduced to ***less-than-significant*** levels.

TRANSIT IMPACTS

As shown in Table 6-26 on the previous page, the number of transit trips generated by Variant 4 would be 2 percent higher during both the a.m. and p.m. peak hour compared to the High Commercial Assumption. Impacts on transit capacity utilization associated with Variant 4 would be similar to those of the proposed project. Impact TR-4 and Impact TR-6 indicate that the proposed project would have a significant impact on two transit lines (10 Townsend and 30 Stockton) due to a substantial increase in transit demand that would not be accommodated by local transit capacity and an increase in transit delays due to queues at the proposed project's Block D2 parking garage. Variant 4 would have the same significant transit impacts as the proposed project; Mitigation Measures M-TR-4.1, M-TR-4.2 and M-TR-6 would apply to Variant 4.

Implementing Mitigation Measures M-TR-4.1 and M-TR-4.2 would allow Muni to maintain transit headways, and would reduce the Variant 4 impact to less-than-significant levels. However, because the method and total cost of providing additional service and the SFMTA's ability to implement improvements is uncertain, the Variant 4 transit impacts would be ***significant and unavoidable with mitigation***, similar to under the proposed project.

Implementation of Mitigation Measure M-TR-6 would resolve transit delay impacts to being less than significant. However, at this time they may not be considered to fully resolve transit delay impacts because, and to the extent that, implementation of some of components of the mitigation (i.e., approval of restriping on Third Street and entering into an Event Management Agreement with the project sponsor to allocate PCOs on site), require SFMTA Board approval, and such approval is currently considered uncertain. Thus, based upon such current uncertainty of full implementation of Mitigation Measure M-TR-6, the transit delay impacts of Variant 4 would remain ***significant and unavoidable with mitigation***, similar to under the proposed project.

The proposed project would not cause significant impacts on regional transit routes. Since the number of peak hour transit trips are similar between Variant 4 and the proposed project, like the proposed project, Variant 4 would have a ***less-than-significant*** impact on regional transit routes.

BICYCLE AND PEDESTRIAN IMPACTS

The bicycle and pedestrian network and facilities for Variant 4 would be identical to those for the proposed project. Variant 4 would produce higher levels of bicycle and pedestrian trips (approximately 3 percent more in the a.m. peak hour and 6 percent more in the p.m. peak hour) compared to the High Commercial Assumption, as shown in Table 6-26, page 6-79.

As with the proposed project, Variant 4 would cause pedestrian and bicycle hazards due to queues at the proposed project garages as documented in Impact TR-3 and TR-6. Mitigation Measures M-TR-3 and M-TR-6 would also apply to Variant 4. With implementation of these measures, vehicle impacts on pedestrian and bicycles generated by trips to the projects' parking garage under Variant 4 would be reduced to a less-than-significant level.

As documented in Impact TR-9, the proposed project would cause significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. Variant 4 would have the same significant pedestrian impacts as the proposed project and Mitigation Measure M-TR-9 would also apply to Variant 4. Implementation of Mitigation Measure M-TR-9 would resolve pedestrian safety impacts and reduce them to less than significant. However, at this time, the approval of the signalization improvements is considered somewhat uncertain, because they will require SFMTA Board approval. Thus, because implementation of Mitigation Measure M-TR-9, is uncertain to such extent, the Reduced Intensity Alternative's pedestrian safety impacts would continue to be considered ***significant and unavoidable with mitigation***, similar to the proposed project.

As documented in Impact TR-10, the proposed project would cause a significant impact at the bicycle-truck interface at Pier 48. Variant 4 would have the same significant bicycle impact as the proposed project and Mitigation Measure M-TR-10 would apply to Variant 4. Implementation of Mitigation Measure M-TR-10 would resolve bicycle safety impacts and reduce the impact to ***less-than-significant with mitigation*** under Variant 4. Improvement Measure I-TR-10 would also apply to Variant 4 and would further enhance vehicle/bicycle safety.

LOADING IMPACTS

Variant 4 would have similar peak loading demands to the proposed project (50 spaces as opposed to 49 for the High Commercial Assumption), which would not be accommodated by the proposed loading supply and therefore result in a significant impact. Mitigation Measures M-TR-11.1 and M-TR-11.2 would apply to Variant 4. Implementation of Mitigation Measures M-TR-11.1 and M-TR-11.2 would resolve the loading shortfall and the loading impacts would be ***less than significant***.

EMERGENCY ACCESS IMPACTS

Emergency access to the project site for Variant 4 would be similar to that of the proposed project. The proposed internal roadway network would accommodate emergency vehicles including fire trucks. Emergency vehicle access to Pier 48 would be provided via Terry A. Francois Boulevard. The proposed cross-section for this roadway includes a 26-foot-wide shared zone for vehicular access, including emergency vehicles. The aforementioned fire access evaluation indicates that emergency vehicles can access Pier 48 via any of the three east-west project streets that connect to Terry A. Francois Boulevard. Variant 4 includes implementation of a "Keep Clear" zone on Mission Rock Street in front of the police and fire truck access to ensure that police vehicles and fire trucks are provided with clear access to and egress to the Public Safety Building.

During events at AT&T Park, pre-event and post-event vehicular traffic destined for the proposed onsite garages would be managed as it is currently to minimize impacts on emergency-vehicle circulation and access as well as private vehicles destined for the UCSF emergency room and urgent care center. Before events at AT&T Park, up to 21 parking control officers (PCOs) are stationed at 17 locations. Post-events at AT&T Park, up to 19 PCOs are stationed at 14 locations. These locations include intersections along Third Street, Mission Rock Street, and Terry A. Francois Boulevard along the project boundaries. During major events, the north–south Shared Public Way within the project site would be closed to vehicles, with the exception of emergency vehicles. If necessary, emergency vehicles would be able to travel on Muni's light rail right-of-way in the median of Third Street.

To address the circumstance of simultaneous events at AT&T Park and the Mission Rock site, the Proposed Project has prepared detailed event management plans that include combinations of strategies as described in Chapter 5 of the Mission Rock Transportation Plan. These would apply to Variant 4 as well. The Event Management measures identified in the Mission Rock Transportation Plan describe strategies for a primary event at AT&T Park (40,000+ attendees) or a secondary event at AT&T Park (15,000 to 25,000 attendees) and on-site events (2,000 to 5,000 attendees). Additionally, event traffic management systems at AT&T Park are reviewed and refined continuously to plan for such simultaneous events. Therefore, both AT&T Park and on-site events would develop refinements to their plans as needed to ensure emergency vehicle circulation is accommodated, both under the proposed project and Variant 4.

Roadway improvements adjacent to the UCSF facilities would facilitate emergency vehicle access. Before and after events, emergency vehicle access to the project site and UCSF Medical Center uses would be maintained under the proposed project and Variant 4, as would emergency access for persons traveling to the emergency room and urgent care center in their personal vehicles. For these reasons, Variant 4 would not inhibit emergency vehicle access to the project site and nearby vicinity under the event scenario. Similar to the proposed project, Variant 4 would be designed to provide access for Police and Fire department vehicles into

the Public Safety Building across Mission Rock Street. However, until final street design is coordinated with the Police and Fire Department, this would conservatively be a significant impact. Mitigation Measure M-TR-12 would reduce this significant impact to a less-than-significant level. Improvement Measure I-TR-12 would also apply to Variant 4 and would enhance emergency vehicle access.

PARKING IMPACTS

The midday peak parking demand would be 3,543 spaces for Variant 4. These levels are less than the midday parking demand of 3,655 spaces for the proposed project's High Commercial Assumption.[25] As with the proposed project, Variant 4 would have a ***less-than-significant*** parking impact.

NOISE

With regard to operational noise, and as described in Appendix 6-1, Variant 4 would generate two percent more external person trips during the weekday AM peak hour and three percent more external person trips during the PM peak hour (with a two percent increase in auto trips for both peak hours) than the proposed project. Increasing the project-added traffic volumes by two percent on roadways in the project vicinity would result in an approximately 0.2-decibel (dB) increase in noise levels on any given roadway segment. As such, project-generated noise impacts would be essentially the same under Variant 4 as they would be under the proposed project. As with the proposed project, traffic noise impacts to offsite and onsite land uses would be ***significant and unavoidable***.

With regard to traffic noise impacts to onsite (project) and offsite noise-sensitive receptors, similar to the project, Variant 4 would result in a ***significant and unavoidable*** impact on both offsite and future onsite land uses.

Variant 4 would not change the outdoor event uses under the Project so to the extent Project uses are subject to Mitigation Measure M-NOI-2.1, Noise Control Plan for Outdoor Amplified Sound), this mitigation would equally apply under Variant 4 and noise from outdoor events would remain ***significant and unavoidable with mitigation***.

Variant 4 also would not change uses from stationary noise sources and as for the project, these impacts would remain ***less-than-significant with mitigation***.

[25] The peak parking demand is based on SF Guidelines Appendix 4.E-4 and analysis conducted by Adavant Consulting, 2016. See Appendix 4-4, Travel Demand Memo.

7. ALTERNATIVES

A. INTRODUCTION

This chapter presents the alternatives analysis, as required by the California Environmental Quality Act (CEQA), for the proposed project. The chapter includes a discussion of the CEQA requirements for an alternatives analysis and the methodology used for the selection of alternatives, with the intent of developing potentially feasible alternatives that avoid or substantially lessen the significant impacts identified for the proposed project while still meeting most of the project sponsor's objectives. This chapter also identifies a reasonable range of alternatives that meet the criteria.

The alternatives are evaluated for their comparative merits with respect to minimizing adverse environmental effects. After identifying the alternatives, the chapter evaluates the alternatives' impacts compared to existing environmental conditions and compared to the impacts of the proposed project. Based on this analysis, this chapter then identifies the environmentally superior alternative. Finally, it describes other alternative concepts that were considered but eliminated from detailed consideration and the reasons for their elimination.

CEQA REQUIREMENTS FOR ALTERNATIVES ANALYSIS

The CEQA Guidelines require the analysis of a reasonable range of alternatives to the proposed project or to the location of the project that would feasibly attain most of the basic objectives of the project and avoid or substantially lessen any of the significant effects of the project (CEQA Guidelines Section 15126.6). The range of alternatives required in an environmental impact report (EIR) is governed by a "rule of reason," which stipulates that an EIR shall set forth only those alternatives that are necessary for informed public participation and an informed and reasoned choice by the decision-making body (CEQA Guidelines Section 15126.6(f)). The following factors may also be taken into consideration when assessing the feasibility of alternatives: site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and the ability of the proponent to attain site control (CEQA Guidelines Section 15126.6(f)(1)).

CEQA also requires that a No Project Alternative be evaluated (CEQA Guidelines Section 15126.6(e)); the analysis of the No Project Alternative is based on the assumption that the project would not be approved. In addition, an environmentally superior alternative must be identified among the alternatives considered. The environmentally superior alternative is generally defined as the alternative that would result in the least adverse environmental impacts on the project site and affected environment. If the No Project Alternative is found to be the environmentally superior alternative, the EIR must identify an environmentally superior alternative among the other alternatives.

CEQA Guidelines Section15126.6(c) also requires an EIR to identify and briefly discuss any alternatives that were considered by the lead agency but rejected as infeasible during the scoping process. In identifying alternatives, primary consideration was given to alternatives that would reduce significant impacts while still meeting most of the basic project sponsor's objectives. Those alternatives that would have impacts identical to or more severe than the proposed project, or that would not meet most of the project sponsor's objectives, were rejected from further consideration.

ALTERNATIVES SELECTION

As mentioned above, this chapter identifies alternatives to the proposed project and discusses environmental impacts associated with each alternative. For the purposes of this analysis, the "proposed project" assumes development of either the High Commercial Assumption or High Residential Assumption, depending on which land use assumption was determined to result in the greatest impacts as analyzed in the corresponding Chapter 4, *Environmental Setting and Impacts*, section for the environmental topic being addressed. If the EIR analysis for that topic determined that the two land use assumptions would generally result in the same impacts, then references to the "proposed project" are assumed to refer to either land use assumption.

SUMMARY OF SIGNIFICANT IMPACTS

The alternatives to the proposed project are meant to feasibly attain most of the basic project objectives (discussed in more detail below) while avoiding or substantially lessening significant impacts. Significant impacts from the proposed project would occur in the areas of cultural resources, transportation and circulation, noise, air quality, wind, biological resources and geology and soils. Significant and unavoidable project-specific and cumulative impacts from the proposed project in the areas of transportation, noise, air quality, and wind are listed below. For other significant impacts that are reduced to less than significant with mitigation, please refer to the Summary chapter and Chapter 4.

TRANSPORTATION IMPACTS

- The proposed project would result in an adverse impact by increasing ridership by more than 5 percent on two individual Muni routes that exceed 85 percent capacity utilization under baseline conditions. (Impact TR-4)
- The proposed project would result in an adverse impact related to a substantial increase in transit delays on Third Street between Channel Street and Mission Rock Street. (Impact TR-6)
- The proposed project would have significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. (Impact TR-9)

- The proposed project would contribute considerably to a significant cumulative transit impact because it would increase ridership by more than 5 percent on one individual Muni route that would exceed 85 percent capacity utilization. (Impact C-TR-4)
- The proposed project would contribute considerably to significant cumulative impacts related to transit delay. (Impact C-TR-6)
- The proposed project would contribute considerably to significant cumulative pedestrian impacts. (Impact C-TR-7)

NOISE IMPACTS

- Construction of the proposed project would generate noise levels in excess of standards or result in substantial temporary increases in ambient noise levels. (Impact NOI-1)
- Operation of the proposed project could result in the exposure of persons to or generation of noise levels in excess of the San Francisco Noise Ordinance or a substantial permanent, temporary, or periodic increase in ambient noise levels in the project vicinity, above levels existing without the project. (Impact NOI-2.)
- Construction of the project would expose persons to or generate excessive ground-borne vibration or ground-borne noise levels. (Impact NOI-3)
- Construction activities for the proposed project, in combination with other past, present, and reasonable future projects in the city, would result in a substantial temporary increase in noise or noise levels in excess of the applicable local standards. (Impact C-NOI-1)
- Construction activities associated with project-related development, in combination with other past, present, and reasonable future projects in the city, would expose sensitive receptors to excessive ground-borne vibration related to annoyance. (Impact C-NOI-2)
- Operation of the proposed project, in combination with other past, present, and reasonable future projects in the city, could result in the exposure of persons to noise in excess of the applicable local standards or a substantial permanent ambient noise level increase in the project vicinity. (Impact C-NOI-3)

AIR QUALITY IMPACTS

- Construction of the proposed project would generate fugitive dust and criteria air pollutants, which for criteria air pollutants but not fugitive dust, would violate an air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. (Impact AQ-1)
- During project operations, the proposed project would result in emissions of criteria air pollutants at levels that would violate an air quality standard, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. (Impact AQ-2)

- During combined project construction and operations, the proposed project would result in emissions of criteria air pollutants at levels that would violate an air quality standard, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. (Impact AQ-3)
- The proposed project's construction and operation, in combination with other past, present, and reasonable future projects, would contribute to cumulative regional air quality impacts. (Impact C-AQ-1)

WIND IMPACTS

- The proposed project would alter wind in a manner that would substantially affect public areas. (Impact WS-1)
- The proposed project, in combination with past, present, and reasonably foreseeable future projects, would alter wind in a manner that would substantially affect public areas. (Impact C-WS-1)

ALTERNATIVES SCREENING AND SELECTION

In accordance with CEQA Guidelines Section 15126.6(a), this chapter examines a reasonable range of alternatives to the proposed project. An alternative selected for analysis must meet three criteria: (1) the alternative would attain most of the project's basic objectives, (2) the alternative would avoid or substantially lessen any of the significant environmental impacts of the proposed project, and (3) the alternative would be potentially feasible. An EIR need not consider an alternative whose impact cannot be reasonably ascertained and whose implementation is remote and speculative. Furthermore, an EIR need not consider every conceivable alternative but must consider a reasonable range of alternatives that would foster informed decision-making and public participation. In addition, the EIR must evaluate the "no project' alternatives to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project.

The alternatives selection process for the proposed project first identified strategies that would avoid or lessen any of the significant and unavoidable impacts listed above. The alternative strategies were then screened for their feasibility and their ability to meet most of the project sponsor's objectives. The process resulted in two alternatives that were determined to represent a reasonable range of alternatives, in addition to the no project alternative, as follows:

- **No Project Alternative (Alternative A)**: The project site would remain in its current condition, and no new development or redevelopment of existing uses would occur. Seawall Lot 337 would continue to operate as a surface parking lot and an area for pop-up retail; it would not be developed. No physical or operational changes would be made to the existing sheds, aprons, or the valley on Pier 48; seismic upgrades to the pier structure would not be implemented. China Basin Park would remain as a 3.3-acre park, and no other open space would be added to the project site.

- **Reduced Intensity Alternative (Alternative B)**: This alternative was selected because of its potential to reduce wind impacts as well as some transit delays and operational- and construction-related air quality impacts due to reduced building heights. Mission Rock Square and the Mission Rock Square Garage would not be constructed in the middle of Seawall Lot 337. In their place, a building (Building K) would be constructed. The area where Building K would be located under the proposed project would instead be used to extend China Basin Park under this alternative. The combined removal of Mission Rock Square and extension of China Basin Park would result in a slight decrease in open space (approximately 0.48 acre less than the proposed project), which would be compensated for by provision of an equivalent amount or more of publicly available open space on rooftops on the buildings on Blocks E and/or K. Building heights adjacent to China Basin Park would be reduced. In addition, the Reduced Intensity Alternative would not include flexible parcels on Blocks H, I, and J. Instead, Block H would be commercial, while Blocks I and J would be residential. The D1 residential tower would be relocated to the east side of Block D and the D2 garage. The D2 garage (and its driveways) would be shifted to the west. Active retail use would increase on the Block D frontage on Third Street as well as on the relocated Block K. All proposed changes to Pier 48 would remain the same. In total, the Reduced Intensity Alternative would result in between 240,000 to 340,000 gross square feet [gsf] less development at Seawall Lot 337 compared with the proposed project. Development on Pier 48 would occur as designed under the proposed project.
- **No Change to Pier 48 Alternative (Alternative C)**: This alternative was selected because of its potential to reduce noise and biological resource impacts associated with in-water construction or pile driving, traffic, loading, and pedestrian/bicycle conflicts, at Pier 48, and also transit impacts, and operational- and construction-related air quality and greenhouse gas emission impacts, impacts. No rehabilitation or reuse would occur on Pier 48; Pier 48 would remain in its existing condition, except that the Pier 48 aprons would continue to be designated for public access and open space, consistent with the proposed project plan. Development on the remaining portions of the project site, including Seawall Lot 337, Parcel P20, China Basin Park, Channel Wharf, and Terry A. Francois Boulevard, would occur as proposed under the proposed project. Eliminating the reuse and rehabilitation of Pier 48 could avoid or reduce various impacts without changing the proposal for Seawall Lot 337.

Alternative A is included as required by CEQA Guidelines Section 15126.6(e); Alternatives B and C are potentially feasible options that would most likely meet most of the project sponsor's objectives. Table 7-1 on the following page summarizes and compares the characteristics of the proposed project with those of Alternatives A, B, and C. Detailed descriptions of each alternative are presented below, along with an evaluation of their environmental impacts.

The ultimate determination of consistency with objectives and feasibility of project alternatives will be made by decision-makers and documented in CEQA findings for the approved project.

TABLE 7-1. COMPARATIVE DESCRIPTION OF THE PROPOSED PROJECT AND PROJECT ALTERNATIVES

	Proposed Project: High Commercial/ High Residential	Alternative A	Alternative B	Alternative C
Building Areas (gsf)				
Seawall Lot 337	2.7M/2.8M gsf	0 gsf	2.46M gsf	2.7M/2.8M gsf
Residential	1.1M/1.6M gsf	0 gsf	1.2M gsf	1.1M/1.6M gsf
Commercial	1.4M/972,200 gsf	0 gsf	966,100 gsf	1.4M/972,200 gsf
Active/Retail/Production	244,800/241,000 gsf	0 gsf	263,200 gsf	244,800/241,000 gsf
Pier 48	288,500 gsf	261,000	288,500	261,000
Building Heights (feet)				
Minimum Building Height	90 feet	0 feet	90 feet[a]	90 feet
Maximum Building Height	240 feet	0 feet	240 feet[a]	240 feet
Parking				
Total Parking Spaces	3,100 spaces	2,170 spaces[b]	2,400 spaces	3,100 spaces
Total Floor Area	1.06M gsf	0 gsf	873,200 gsf	1.06M gsf
Mission Rock Square Garage	Yes	No	No	Yes
Open Space (acres)				
China Basin Park	4.4 acres	2.2 acres	5.0 acres	4.4 acres
Mission Rock Square	1.1 acres	0 acres	0 acres	1.1 acres
Channel Wharf/Channel Lane	0.7 acres	0 acres	0.7 acres	0.7 acres
Pier 48 Aprons/Waterfront Promenade	1.1 acres	1.1 acres	1.1 acres	1.1 acres
Pedestrian Paseos	0.6 acres	0 acres	0.6 acres	0.6 acres
Rooftop Open Space	0 acres	0 acres	0.5 acres	0 acres
Total Open Space	*7.9 acres*	*3.3 acres*	*7.9 acres*	*7.9 acres*
Activity				
Employment Seawall Lot 337	5,850/4,310 employees	0	4,335 employees	5,850/4,310 employees
Employment Pier 48	200	0	200	0
Units	1,000/1,600 units	0	1,100 units	1,000/1,600 units
Onsite Residents	2,350/3,760 residents	0	2,585 residents	2,350/3,760 residents
Total Project-Induced Population	7,660/7,720 residents	0	6,390 residents	7,460/7,520 residents

Notes:

a. Although the minimum and maximum building heights would be the same for Alternative B, as with the proposed project, the building height of buildings adjacent to China Basin Park would be reduced.

b. The number of parking spaces for Alternative A does not include parking within Pier 48. Pier 48 would continue to be used for parking during special events and AT&T ballpark events.

B. ALTERNATIVE A: NO PROJECT ALTERNATIVE

DESCRIPTION

One of the alternatives that must be analyzed is the No Project Alternative. The No Project analysis must discuss the existing conditions at the time the Notice of Preparation (NOP) is published as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved and development continued to occur in accordance with existing plans and consistent with available infrastructure and community services (CEQA Guidelines Section 15126.6(e)(2)). Therefore, pursuant to CEQA Guidelines, this section discusses and analyzes a No Project Alternative.

Under the No Project Alternative, the project site would remain in its current condition, mainly a paved surface parking lot, with the Pier 48 structure used for indoor parking and storage and warehouse uses, and no new development or redevelopment of existing uses would occur. Seawall Lot 337 would continue to operate as a surface parking lot for up to 2,170 spaces and an area for pop-up event space and retail. It would not be developed with a mix of residential, commercial, active/retail, and parking/loading uses. Parcel P20, which would continue to function as a surface parking lot and would not be incorporated into Seawall Lot 337. No physical or operational changes would be made to the existing sheds, aprons, or the valley on Pier 48; seismic upgrades to the pier structure would not be implemented. China Basin Park would remain in its existing condition, and no additional open space would be developed onsite. No changes would be made to the circulation system that serves the project site, including Terry A. Francois Boulevard.

The existing development controls on the project site would continue to govern site development and would not be changed by Planning Code and Zoning Map amendments, and there would be no changes related to a Special Use District (SUD) or the Development Controls and Design Guidelines (Design Controls). The project site would remain under the existing density and height and bulk standards, as defined by the applicable Mission Bay Open Space (MB-OS), Open Space (OS), and Heavy Industrial Use (M-2) Districts as well as the Mission Rock Height and Bulk District.

IMPACT ANALYSIS

LAND USE AND LAND USE PLANNING

No changes to existing land uses would occur with implementation of the No Project Alternative. The project sponsor would not seek approval to rezone the project site through an SUD or amend the Planning Code and Zoning Map. Although Bulk and Height District zoning amendments approved by the voters would remain in place, no actual development could occur

without further approvals that would not be sought or obtained under the No Project Alternative. Because no changes would occur, this alternative would not physically divide an established community or conflict with existing plans, policies, and regulations that govern development on the project site. The No Project Alternative would have ***no impact*** related to land use and land use planning compared to the less-than-significant impacts of the proposed project.

AESTHETICS

The No Project Alternative would not alter existing conditions at the project site and, therefore, would not change the site's existing visual character. Currently, the project site consists of a paved surface parking lot (Lot A) for approximately 2,170 vehicles, pop-up retail and event space, Pier 48, and China Basin Park. Except for the park, the project site does not include vegetation; the majority of the project site consists of urban and paved features in an urban environment. Unlike the proposed project, the No Project Alternative would not add maintained landscaping, bicycle/pedestrian amenities, or modern buildings to the project site. The No Project Alternative would not create new landscaped open space areas and would not construct buildings that would reflect a similar architectural design as the existing development in Mission Bay. Because no new features would be added to the project site, there would be no changes to views seen from scenic vistas or public view corridors. Because no new structures would be built under the No Project Alternative, no new source of light and glare would be created. Therefore, ***no impact*** on aesthetics would result with the No Project Alternative, compared to the less-than-significant impacts of the proposed project.

POPULATION AND HOUSING

The No Project Alternative would not directly or indirectly induce population growth because no new land uses would be constructed. No new jobs would be created, and no housing units would be constructed. Therefore, the No Project Alternative would not result in a demand for new housing at the project site, within the city, or in other local jurisdictions. Similar to the proposed project, the No Project Alternative would not displace existing housing. The No Project Alternative would have ***no impact*** related to population and housing, compared to less-than-significant impacts under the proposed project.

CULTURAL RESOURCES

The No Project Alternative would not alter or rehabilitate Pier 48, resulting in no impacts on this structure. In addition, because no ground-disturbing construction would occur at the project site, the No Project Alternative would not result in impacts on archeological resources or human remains. Overall, the No Project Alternative would have ***no impact*** on cultural resources at the project site, compared to the less-than-significant impacts with mitigation of the proposed project associated with archaeological resources, human remains, and tribal cultural

resources. Implementation of Mitigation Measures M-CP-2, M-CP-3, and M-CP-4 as identified for the proposed project to reduce these impacts, would not be required for the No Project Alternative. This alternative would also not contribute to a significant cumulative impact related to cultural resources.

TRANSPORTATION AND CIRCULATION

The No Project Alternative would retain existing conditions at the project site. Under existing conditions, the only vehicle trips to and from the project site are associated with Parking Lot A, which is used for some commuter parking, and particularly on game days at AT&T Park or during special events at Seawall Lot 337. Pier 48 is also used on game days and during special events. Because land uses would not change, no new person trips and no new vehicle trips would be generated. Therefore, the No Project Alternative would be consistent with historic trip generation for the project site. The No Project Alternative would not result in any changes to the existing transportation network on the project site. No new streets, bicycle facilities, or sidewalks would be constructed, and no improvements to existing streets, bicycle facilities, or sidewalks would occur. Under the No Project Alternative, the transit capacity utilization standard would not change. No changes to emergency access to the project site would occur, and no construction travel would be generated. The No Project Alternative would result in no additional person trips, transit trips, pedestrian trips, bicycle trips, or vehicle trips and ***no impacts*** related to transportation, compared to the significant impacts of the proposed project. Implementation of Mitigation Measures M-TR-3, M-TR-4.1, M-TR-4.2, M-TR-6, M-TR-9, M-TR-10, M-TR-11.1, M-TR-11.2, and M-TR-12 as identified for the proposed project to reduce these impacts, would not be required for the No Project Alternative.

NOISE

No construction activities would occur under the No Project Alternative. The project site would remain in its current condition, and no new development or redevelopment of existing uses would occur. Therefore, the No Project Alternative would avoid the significant noise and vibration impacts that would occur during construction of the proposed project. The No Project Alternative would also avoid the significant cumulative noise and vibration impacts that would result from construction of the proposed project in combination with future development in the city. Implementation of the construction noise and vibration mitigation measures identified for the proposed project (Mitigation Measures M-NOI-1, M-NOI-2.1, M-NOI-2.2, M-NOI-2.3, M-NOI-2.4, M-NOI-3.1 and M-NOI-3.2) would not be required under the No Project Alternative.

Because no changes to existing land uses would occur, no new stationary or mobile (traffic) noise sources would be introduced to the project site or vicinity. Therefore, the No Project Alternative would avoid the proposed project's significant impacts related to increasing ambient noise levels and exceeding noise-level standards during operation. The No Project Alternative would also avoid the significant cumulative impacts related to increasing ambient

noise levels and exceeding noise-level standards that would result from operation of the proposed project in combination with future development in the city. The No Project Alternative would result in ***no impact*** related to noise.

AIR QUALITY

No construction activities would occur under the No Project Alternative. The project site would remain in its current condition, and no new development or redevelopment of existing uses would occur. Therefore, the No Project Alternative would avoid the significant impacts from construction-related criteria pollutant emissions and would not be required to offset NOx emissions through Mitigation Measure M-AQ-1.5. Implementation of the construction mitigation measures identified for the proposed project (Mitigation Measures M-AQ-1.1 through M-AQ-1.5) would not be required under the No Project Alternative.

Because no changes to existing land uses would occur, no new stationary, area, or mobile emissions sources would be introduced to the project site or vicinity. Therefore, the No Project Alternative would also avoid the significant impacts from operation-related criteria pollutant emissions and would not be required to offset ROG and NOx emissions through Mitigation Measure AQ-2.3. Implementation of the operational mitigation measures identified for the proposed project (Mitigation Measures M-AQ-2.1 through M-AQ-2.3) would not be required under the No Project Alternative. Unlike the proposed project, operation of the No Project Alternative would not generate toxic air contaminants, including diesel particulate matter and PM2.5. Therefore, there would be no increase in annual average PM2.5 concentrations or lifetime excess cancer risk associated with the No Project Alternative, which were determined to be less than significant with mitigation for the proposed project. Consequently, the No Project Alternative would result in ***no impact*** related to air quality.

GREENHOUSE GAS EMISSIONS

Because no new development would occur under the No Project Alternative, there would be no increase in direct or indirect greenhouse gas (GHG) emissions, compared to baseline conditions. ***No impact*** would occur, compared to the less-than-significant impacts of the proposed project.

WIND AND SHADOW

The No Project Alternative would retain existing conditions at the project site, and no buildings would be constructed. Existing wind conditions would remain the same, with 10 existing locations exceeding the hazard criterion, for a total of 104 hours of wind exceedance per year. Because no new buildings would be constructed, existing shadow conditions would remain the same under the No Project Alternative. Mission Creek Park South, Mission Creek Park Esplanade, China Basin Building Promenade, Kids' Park, AT&T Park Plaza, and Dog Run Park would not receive new net shadow. In addition, there would be no new net shadow on the

existing China Basin Park, Mission Rock Square, Channel Lane, or Channel Wharf (China Basin Park would not be expanded and Mission Rock Square, Channel Lane, or Channel Wharf would not be constructed). The No Project Alternative would have ***no impact*** on wind and shadow, compared to the significant and unavoidable and less-than-significant impacts of the proposed project on wind and shadow, respectively. Implementation of Mitigation Measure M-WS-1.1, as identified for the proposed project, would not be required for the No Project Alternative.

PUBLIC SERVICES AND RECREATION

Impacts on public services and recreation occur because of increased demand from the increased population in the service area. As discussed above under *Population and Housing*, the No Project Alternative would not directly or indirectly induce population growth because no new development would be constructed. Therefore, the No Project Alternative would not result in increased demand for fire, police, school, park, or other public services, which could require the construction of new governmental or recreational facilities or alterations to such facilities to maintain acceptable performance standards for public services. The No Project Alternative would have ***no impact*** on public services and recreation, compared to the proposed project's less-than-significant impacts.

UTILITIES AND SERVICE SYSTEMS

The No Project Alterative would not change the existing uses at the project site. Utilities at the project site would continue to serve Pier 48 and China Basin Park, as needed. Because no additional employees or residents would be added to the project site, and the majority of the project site uses little to no utilities, the No Project Alternative would not demand any additional utilities, compared to existing conditions. Compared to the proposed project, the No Project Alternative would avoid the proposed project's less-than-significant impacts related to water supply, water treatment, wastewater treatment, stormwater drainage facilities, solid waste disposal, and energy supplies, resulting in ***no impact***.

BIOLOGICAL RESOURCES

No construction activities, including seismic upgrades to Pier 48, would occur under the No Project Alternative. As such, this alternative would have no potential to release contaminants or increase turbidity in San Francisco Bay (Bay) or generate underwater noise and vibration from pile driving. Therefore, the No Project Alternative would avoid the less-than-significant impacts with mitigation resulting from underwater construction activities on candidate, sensitive, and special-status species. Implementation of Mitigation Measures M-BI-3.1, M-BI-3.2, and M-BI-3.3, which would reduce impacts of the proposed project to less than significant, would not be required. Furthermore, the No Project Alternative would not contribute to significant cumulative impacts associated with decreased water quality and noise and vibration from underwater construction activities on candidate, sensitive, or special-status species.

No trees would be removed from the project site, and there would be no potential for construction activities to disturb nesting migratory birds in adjacent trees. Therefore, the No Project Alternative would avoid the proposed project's significant impact on nesting migratory bird species. Implementation of Mitigation Measure M-BI-5, which would reduce impacts of the proposed project to less than significant, would not be required. Furthermore, unlike the proposed project, the No Project Alternative would not contribute to less-than-significant cumulative impacts with mitigation on nesting migratory birds.

Similar to the proposed project, the No Project Alternative would have no impact on riparian habitat, sensitive natural communities, federally protected wetlands, or resources that are subject to a habitat conservation plan because no such resources are present on the project site. Therefore, the No Project Alternative would result in no impacts on biological resources.

GEOLOGY AND SOILS

No construction activities would occur under the No Project Alternative. Therefore, ***no impacts*** related to geology and soils would occur under this alternative. Because no ground disturbance would occur, the No Project Alternative would avoid the proposed project's significant impact related to the potential for accidental discovery of paleontological resources. Implementation of Mitigation Measure M-GE-5, which would reduce the proposed project's impacts on paleontological resources to less than significant, would not be required. The No Project Alternative also would not contribute to significant cumulative impacts on paleontological resources.

HYDROLOGY AND WATER QUALITY

No physical changes would occur to the project site, including Sewall Lot 337 and Pier 48, under the No Project Alternative. Therefore, this alternative would have ***no impact*** on surface and groundwater hydrology and quality. No water quality impacts related to construction in the San Francisco Bay would occur. Therefore, no impacts on hydrology and water quality would occur under the No Project Alternative (compared to less-than-significant impacts under the proposed project). However, it should be noted that the improvements to onsite drainage that would be implemented under the proposed project would not be realized under this alternative. No new and renovated facilities would drain the area, and no stormwater treatment areas would be implemented to increase infiltration, reduce stormwater runoff, and improve water quality in the Bay. These proposed project improvements would include a substantial increase in the amount of pervious surface area onsite and, as a result, reduce the overall volume of stormwater runoff draining from the site. In addition, the No Project Alternative would not include the installation of new high-quality drainage infrastructure as well as bio-retention areas, rain gardens, and flow-through planter areas to provide onsite treatment and minimize runoff, erosion, and siltation.

HAZARDS AND HAZARDOUS MATERIALS

Under the No Project Alternative, no construction activities would occur onsite, and no changes to existing onsite operations would occur. Therefore, there would be no potential to release hazardous materials; create hazardous conditions through the routine transport, use, or disposal of hazardous materials; or interfere with an emergency evacuation plan. ***No impacts*** related to hazards and hazardous materials would occur, (compared to less-than-significant impacts under the proposed project).

C. ALTERNATIVE B: REDUCED INTENSITY ALTERNATIVE

DESCRIPTION

Under Alternative B, the Reduced Intensity Alternative, Mission Rock Square and the Mission Rock Square Garage would not be constructed, reducing parking spaces from 3,100 to 2,400 spaces as compared to the proposed project. A building (Block K) that under the proposed project is located adjacent to China Basin Park would be relocated and constructed in the middle of Seawall Lot 337 instead. In addition, the 240 feet D1 residential tower at the corner of Third Street and Mission Rock Street would be relocated to the corner of Mission Rock Street and Bridgeview Street. As shown in Figure 7-1, page 7-15, in the area where Block K would be located under the proposed project, there would be an extension of China Basin Park under the Reduced Intensity Alternative. Building heights adjacent to China Basin Park (Blocks A and G) would be reduced from 240 feet and 190 feet, respectively under the proposed project to 90 feet under the Reduced Intensity Alternative. All proposed changes to Pier 48 would remain as under the proposed project. In total, the Reduced Intensity Alternative would result in 240,000 to 340,000 gsf less building area at Seawall Lot 337 compared with the proposed project, but an increase of 18,000 to 24,000 gsf of active, retail and production uses as compared to the proposed project. Table 7-2 on the following page summarizes the differences between the proposed project and the Reduced Intensity Alternative, and Figure 7-1 (page 7-15) shows the proposed site plan for the Reduced Intensity Alternative compared to the proposed project.

Unlike the proposed project, the Reduced Intensity Alternative would not include flexible parcels on Blocks H, I, and J and, therefore, would not include the two different land use assumptions that are assumed for the proposed project. As shown in Figure 7-1 (page 7-15), the building heights under the Reduced Intensity Alternative would be consistent with the heights of commercial and residential buildings proposed throughout the rest of the site. Block H, which would be commercial, would include a 90-foot height, while Blocks I and J would be 120 feet and residential. The relocation of the D1 tower would move the D2 garage to the west, but the garage driveways would remain in the same location, as under the proposed project. Active retail use would be located on the Block D frontage on Third Street, as under the proposed project.

TABLE 7-2. ALTERNATIVE B DEVELOPMENT COMPARED TO THE PROPOSED PROJECT

	High Commercial/ High Residential	Alternative B	Difference
Building Areas (gsf)			
Seawall Lot 337	2.7M/2.8M gsf	2.46M gsf	- 240,000/-340,000 gsf
Residential	1.1M/1.6M gsf	1.2M gsf	+100,000/-400,000 gsf
Commercial	1.4M/972,200 gsf	966,100 gsf	- 433,900/-6,100 gsf
Active/Retail/Production	244,800/241,000 gsf	263,200 gsf	+18,400/+22,200 gsf
Pier 48	288,500 gsf	288,500 gsf	—
Building Heights (feet)			
Minimum Building Height	90 feet	90 feet	—[a]
Maximum Building Height	240 feet	240 feet	—[a]
Parking			
Total Parking Spaces	3,100 spaces	2,400 spaces	-700 spaces
Total Floor Area	1.06M gsf	873,200 gsf	-186,800
Mission Rock Square Garage	Yes	No	—
Open Space (acres)			
China Basin Park	4.4 acres	5.0 acres	+0.6 acre
Mission Rock Square	1.1 acres	0 acres	- 1.1 acres
Channel Wharf/Channel Lane	0.7 acres	0.7 acres	—
Pier 48 Aprons/Waterfront Promenade	1.1 acres	1.1 acres	—
Pedestrian Paseos	0.6 acre	0.6 acre	—
Rooftop Open Space	0 acres	0.5 acre	+0.5 acre
Total Open Space	*7.9 acres*	*7.9 acres*	—
Activity			
Employment Seawall Lot 337	5,850/4,310 employees	4,335 employees	- 1,510/+30 employees
Employment Pier 48	200	200	—
Units	1,000/1,600 units	1,100 units	+100/-500 units
Onsite Residents	2,350/3,760 residents	2,585 residents	+ 250/-1,160 residents
Total Project-Induced Population	7,660/7,720 residents	6,390 residents	- 1,260/-1,320 residents

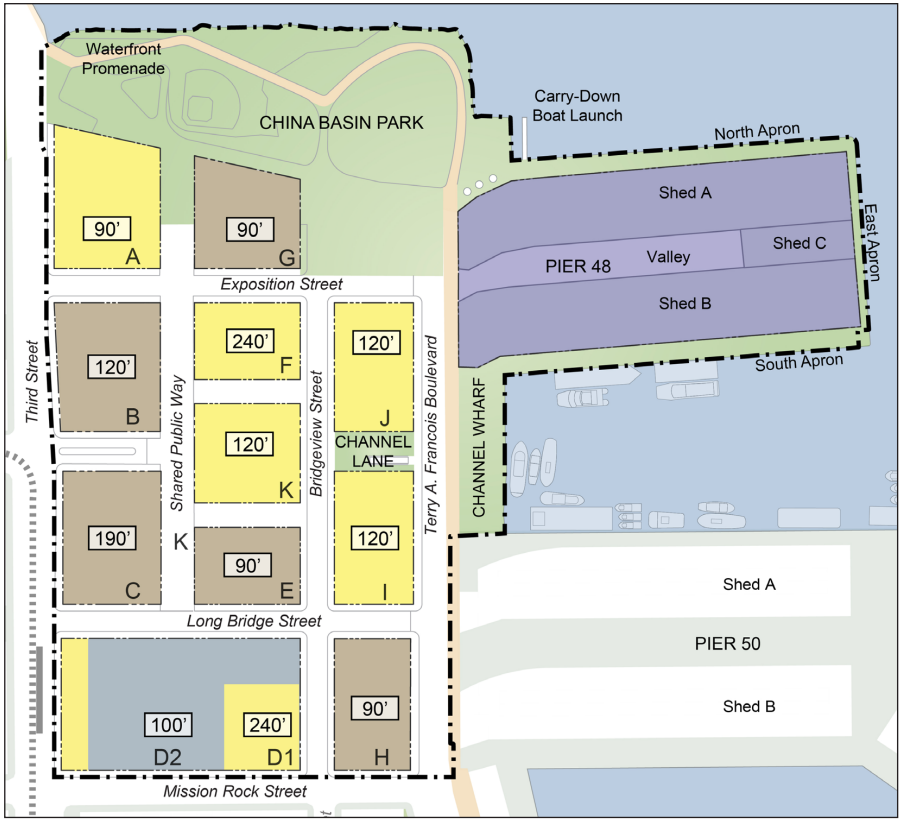
Notes:

a. Although the minimum and maximum building heights would be the same for Alternative B as with the proposed project, the building heights of buildings adjacent to China Basin Park would be reduced.

Proposed Project



Alternative



LEGEND

- Residential
- Commercial
- Flex Residential/Commerical
- Parking
- Production
- 120' Building Height
- Open Space
- Blue Greenway/ Waterfront Promenade
- Muni Line
- Project Boundary
- 40' Base Height
- 60' Base Height

*90 feet if Commercial Use (e.g. High Commercial), 120 feet if Residential Use (e.g. High Residential).

N

0 200 400

Feet

Source: Seawall Lot 337 Associates, LLC, 2016

Graphics ... 00336.13 (3-22-2017)

Seawall Lot 337 and Pier 48 Mixed-Use Project EIR
Case No. 2013.0208E

Figure 7-1
Comparison of Proposed Project to Reduced Intensity Alternative

The same discretionary approvals required for the proposed project, including an SUD and Design Controls, would be required for the Reduced Intensity Alternative. Compared to the flexible zoning designations under the proposed project, the Reduced Intensity Alternative would designate Block H as commercial, while Blocks I and J would be designated as residential rather than flexible (commercial or residential).

BUILDING AREAS

The sizes, heights, and locations of the new building footprints would be the same as under the proposed project, except for Block K, which would be relocated as described above and would have a larger building footprint (an increase from 25,000 to 33,000 square feet), and at Blocks A and G, which would be shorter in height, but would be in the same locations and have the same building footprints as under the proposed project. As shown in Table 7-2 (page 7-14), the Reduced Intensity Alternative would result in approximately 2.46 million gsf of building area on Seawall Lot 337, which is an overall decrease of up to 340,000 to 240,000 gsf compared to the proposed project. Compared to the High Commercial Assumption, the Reduced Intensity Alternative would decrease total building area by approximately 240,000 gsf, while compared to the High Residential Assumption, the Reduced Intensity Alternative would decrease total building area by approximately 340,000 gsf. The Reduced Intensity Alternative would result in approximately 1.2 million gsf of residential uses, which equates to an increase of 100,000 gsf compared to the proposed project's High Commercial Assumption and a decrease of 400,000 gsf compared to the proposed project's High Residential Assumption. Approximately 1,235 housing units would be provided under the Reduced Intensity Alternative, compared to approximately 1,000 units under the proposed project's High Commercial Assumption and 1,600 under the proposed project's High Residential Assumption. Residential uses would be provided on Blocks A, D1, F, K, I, and J.

The Reduced Intensity Alternative would result in approximately 966,000 gsf of commercial uses, which would result in a decrease of 433,900 gsf and 6,100 gsf of commercial uses for Alternative B, compared to the proposed project's High Commercial and proposed project's High Residential Assumptions, respectively. Commercial uses would be provided on Blocks B, C, G, E, and H under the Reduced Intensity Alternative, which is the same as under the proposed project except at Block H, which is a flexible zoning block under the proposed project. Active/retail/production uses on Seawall Lot 337 could be located on the ground floor of each block (as under the proposed project). Due to the additional ground floor area resulting from the larger building footprint at Block K, active/retail/production uses would increase by 18,400 gsf and 22,200 gsf, respectively, compared to the proposed project's High Commercial and High Residential assumptions, for a total of 263,200 gsf of active/retail/production uses under the Reduced Intensity Alternative.

As with the proposed project, the Reduced Intensity Alternative would repurpose the existing Pier 48 sheds and valley to accommodate a range of uses, including industrial/manufacturing, associated general office and storage, retail, restaurant, tour and exhibition space, and event-

related uses. Alterations to the interior of the Pier 48 sheds and the aprons could result in a change in Pier 48 square footages compared with existing conditions, resulting in a total building area of approximately 288,500 gsf, as with the proposed project.

BUILDING HEIGHTS

Building heights on Blocks A and G adjacent to China Basin Park would be reduced, compared to the proposed project with implementation of the Reduced Intensity Alternative. Instead of building heights of 240 feet and 190 feet at Blocks A and G, respectively, the buildings on these blocks would be reduced to 90 feet under the Reduced Intensity Alternative. In addition, because Blocks H, I, and J would not be flexible parcels, the building heights on these blocks would be 90 feet, 120 feet, and 120 feet, respectively. As shown in Table 7-3, below, all other building heights under this alternative would remain the same as those of the proposed project. However, under the Reduced Intensity Alternative the 240-foot tower at Block D1 would be moved to a different location on Block D than under the proposed project, as shown in Figure 7-1 (page 7-15). Buildings at Block K would retain its height of 120 feet but would be moved from next to China Basin Park to the center of Seawall Lot 337 under this alternative (as shown in Figure 7-1); under the proposed project, this is the location of Mission Rock Square. The footprint and square footage of the building at Block K (relocated to a different location compared to the proposed project) would increase from 25,000 to 33,000 square feet and from 135,000 gsf to 175,000 gsf, respectively, under this alternative, compared to the proposed project.

TABLE 7-3. ALTERNATIVE A BUILDING HEIGHTS COMPARED TO THE PROPOSED PROJECT

	Proposed Project (feet)	Alternative B (feet)
Block A	240	90
Block B	120	120
Block C	190	190
Block D1	240	240
Block D2	100	100
Block E	90	90
Block F	240	240
Block G	190	90
Block H[a]	90/120	90
Block I[a]	90/120	120
Block J[a]	90/120	120
Block K	120	120

Notes:

a. Unlike the proposed project, Blocks H, I, and J would not be flex parcels under the Reduced Intensity Alternative.

PARKING AND CIRCULATION

The Reduced Intensity Alternative would include 2,400 parking spaces, compared to 3,100 spaces under the proposed project. Mission Rock Square would not be developed and would be replaced by a relocated Block K, and Mission Rock Square Garage would not be constructed. This would result in a decrease of approximately 700 parking spaces and approximately 186,800 gsf in parking area, throughout the project site. However, the Reduced Intensity Alternative would still include approximately 2,300 parking spaces within the above-grade parking structure at Block D2 and up to 100 spaces within the proposed buildings, which is the same as the parking provided under the proposed project at these locations. The garage at Block D2 would be shifted to the west to accommodate relocation of the D1 tower to the east side of Block D under this alternative, but the garage driveways would remain in the same location as under the proposed project.

Traffic and circulation improvements under the Reduced Intensity Alternative would be identical to those under the proposed project, including streets that would be generally multi-modal and would include bicycle and pedestrian facilities. Recommended curb-cut and driveway standards under the Reduced Intensity Alternative would be identical to those under the proposed project. Loading under this alternative would be the same as under the proposed project, except that the loading and service area for relocated Building K would be added on Bridgeview Street.

OPEN SPACE

As explained above, the 1.1-acre Mission Rock Square included as part of the proposed project would not be constructed at the center of Seawall Lot 337, but instead it would be replaced by the 120-foot-tall building on Block K under the Reduced Intensity Alternative. However, China Basin Park would be expanded from 4.4 acres under the proposed project to 5 acres under this alternative, and 0.5 acre or more of publicly available open space would be provided on rooftops of buildings on Block E and/or Block K, or a combination thereof, which would not be included under the proposed project. All other open space areas proposed under the proposed project would remain the same under this alternative. The expansion of China Basin Park and provision of additional publicly accessible private open space on building rooftops would offset the reduction in open space related to the elimination of Mission Rock Square under this alternative. Therefore, the Reduced Intensity Alternative would result in at least the same overall total of open space as the proposed project (7.9 acres).

IMPACT ANALYSIS

As discussed above, the proposed project assumes development of either the High Commercial Assumption or High Residential Assumption on Seawall Lot 337. For purposes of impact analyses in Chapter 4, *Environmental Setting and Impacts*, the analysis is based on whichever land

use assumption under the proposed project results in the greater level of impacts. As also discussed, the Reduced Intensity Alternative includes reduced development at Seawall Lot 337 but the same rehabilitation and reuse of Pier 48 as under the proposed project. Therefore, the analysis for the Reduced Intensity Alternative focuses on the differences between impacts for the alternative and the impacts discussed in Chapter 4 for the proposed project at Seawall Lot 337. It is assumed that all impacts that would occur at Pier 48 with implementation of the proposed project would also occur at Pier 48 with implementation of the Reduced Intensity Alternative.

LAND USE AND LAND USE PLANNING

Physically Divide an Established Community. The Reduced Intensity Alternative would develop the same types of land uses on the project site but less total square footage. Although the replacement of existing surface parking with mixed-use development under this alternative would increase building intensity on the project site compared to existing conditions, new buildings would not isolate areas or constitute a barrier to access because the majority of the project site presently serves as a parking facility rather than an access route between adjoining areas. As with the proposed project, the Reduced Intensity Alternative would retain and expand existing pedestrian access and connect the project site with the surrounding neighborhoods, the proposed Blue Greenway, and the existing Bay Trail. The Reduced Intensity Alternative would, therefore, improve connectivity compared to existing conditions and would not divide an established community, resulting in ***less-than-significant*** impacts.

Conflicts with Applicable Land Use Plans, Policies, or Regulations. The same discretionary approvals required for the proposed project, including a request for an SUD and Design Controls, would be required for the Reduced Intensity Alternative. These approvals would bring this alternative into compliance with the development restrictions set forth for the project site in the Planning Code and other plans and policies that govern development on the project site. Therefore, similar to the proposed project, the Reduced Intensity Alternative would result in a ***less-than-significant*** impact with regard to consistency with applicable land use plans, policies, and regulations.

Cumulative Impacts. As with the proposed project, none of the reasonably foreseeable projects would combine with the Reduced Intensity Alternative to physically divide an established community because none would be located immediately adjacent to the project site. As discussed above, the discretionary approvals that would be required for the Reduced Intensity Alternative would result in compliance with the land use plans and policies that govern development on the project site. Furthermore, each individual development project or plan would be evaluated for consistency with applicable land use policies and programs, and any physical impacts associated with policy conflicts would be identified and mitigated to the extent feasible as discussed throughout this Draft EIR. Similar to the proposed project, the mix of

residential, commercial, active/retail, and production uses proposed under the Reduced Intensity Alternative would be consistent and compatible with the varied mix of land uses that are planned for the Mission Bay community, including the cumulative projects. Therefore, cumulative impacts would be ***less than significant***.

AESTHETICS

Scenic Vistas. As with the proposed project, the Reduced Intensity Alternative would result in additional height, bulk, and massing from development of the proposed buildings on the project site. However, the height, bulk, and massing under this alternative would be slightly reduced compared to the proposed project because of the decreases in building heights for Blocks A and G, from 240 feet and 190 feet, respectively (under the proposed project), to 90 feet under this alternative. In addition, the building on Block K under this alternative, which would be 120 feet in height, would be located in the center of the project site rather than along the northern portion. In general, the reduction in height under this alternative would not result in a substantial difference compared to the proposed project as seen from distant scenic vistas such as Potrero Hill and Twin Peaks. However, the shorter building heights and the repositioning of Building K under this alternative would be noticeable from the scenic vista along the Bay Trail to the north. Therefore, similar to the proposed project, the Reduced Intensity Alternative would not block the majority of scenic views seen from any scenic vista, resulting in a ***less-than-significant*** impact.

Scenic Resources. The project site does not include landmarks, significant trees, or scenic routes adjacent to the site. The scenic resources that exist at the project site include Pier 48, a contributing resource to The Embarcadero Historic District. As with the proposed project, the only noticeable changes to Pier 48 under this alternative would be the proposed signage and those features that would surround the structure, such as the proposed silos and the outdoor beer garden. All other renovations would be limited mainly to the interior of Pier 48. Therefore, similar to the proposed project, the Reduced Intensity Alternative would result in improved access to scenic resources at Pier 48, resulting in ***less-than-significant*** impacts on scenic resources.

Visual Character or Quality. The Reduced Intensity Alternative would increase onsite building heights and the density of development, although to a slightly lesser extent compared to the proposed project. However, this alternative, similar to the proposed project, would generally improve the current visual setting by adding maintained landscaping, bicycle/pedestrian connections and amenities, and modern buildings to the project site. As with the proposed project, the Reduced Intensity Alternative would adhere to the Design Controls, which guide physical development on the project site. Implementation of the Design Controls under this alternative would ensure that the proposed buildings would not be seen as visually intrusive but, rather, elements that would blend into the fabric of the existing neighborhood. Therefore, similar to the proposed project, the impact on onsite visual character or quality would be ***less than significant***.

Light and Glare. As with the proposed project, impacts resulting from light and glare under the Reduced Intensity Alternative would most likely occur at locations that have immediate foreground views of the project site. Standard exterior lighting and light emitting diode (LED) lighting, if used, could affect sensitive receptors if not properly designed. Similarly, windows would be the most prominent source of daytime glare and could affect viewers in the mid- to upper-level stories of nearby existing buildings to the south and west as well as viewers who are outside or driving to the north of the project site. Glare is most likely to be an issue where the buildings would be taller than surrounding development (Blocks D1 and F) and where proposed building faces would be exposed along the outer edge of the development and shoreline (Blocks A, G, and H–J). Because of decreased building heights under the Reduced Intensity Alternative compared to the proposed project, this impact would be slightly less than that of the proposed project. Nonetheless, as with the proposed project, the Design Controls under this alternative, which would guide physical development on the project site, would ensure that the buildings would not result in substantial light and glare impacts on the surrounding community. The Design Controls (at page 180) specify that all exterior light must be suitable for a given "Lighting Zone," as defined by the U.S. Green Building Council (USGBC) and Illuminating Engineering Society of North American (IESNA). Additionally, the this alternative, similar to the proposed project, would be required to adhere to Planning Code Section 139, which focuses on buildings that create location-specific hazards and building-feature hazards, and City Planning Commission Resolution 9212, which prohibits projects from using mirrored or reflective glass on buildings. Therefore, the light and glare impacts of the Reduced Intensity Alternative would be ***less than significant***, similar to those of the proposed project.

Cumulative Impacts. The other reasonably foreseeable projects are likely to be consistent with the design requirements set forth in their respective Design Controls. Although the Reduced Intensity Alternative and the other development would add height, bulk, massing, light, and glare to the project vicinity, these changes would fit within the dense urban context and would not result in a significant impact on a scenic vista, scenic resource, or the overall visual character of the area, similar to the proposed project. The increased development would represent a small portion of the overall vista and development pattern. Therefore, as with the proposed project, the cumulative impacts of the Reduced Intensity Alternative on aesthetics would be ***less than significant***.

POPULATION AND HOUSING

As with the proposed project, the Reduced Intensity Alternative would not result in impacts related to the displacement of housing or people.

Population and Housing Growth. Estimates for resident and employee generation under the Reduced Intensity Alternative are provided in Table 7-4, below. As shown, the Reduced Intensity Alternative would include approximately 1,230 onsite housing units, resulting in housing for approximately 2,900 onsite residents, and provide jobs for approximately 4,535 employees. As stated in Section 4.C, *Population and Housing*, approximately 50.4 percent of city residents also work in the city. Therefore, assuming that approximately 50.4 percent of project employees would also live in the city and create their own households, the Reduced Intensity Alternative would induce approximately 3,800 additional residents to move to the city, which is a conservative estimate since some new project employees may already be renting in the city. This alternative could result in population growth within the city totaling approximately 6,700 residents, compared to 7,660 under the proposed project's High Commercial Assumption and 7,720 under the High Residential Assumption.

TABLE 7-4. REDUCED INTENSITY ALTERNATIVE – ONSITE RESIDENTS AND EMPLOYEES

Land Use	Gross Square Footage (gsf)/Units	Generation Rate	Estimated Residents/Employees[a]
Onsite Residents			
Residential	1.2M gsf/1,230 units	2.35 persons/household	2,900 residents
Total Residents			*2,900 residents*
Employees			
Commercial	966,100 gsf	276 gsf/employee	3,500 employees
Active/Retail/Production	263,200 gsf	327 gsf/employee	800 employees
Residential	1,100 units	1 employee/32 units	35 employees
Pier 48	288,500 gsf	—	200 employees
Total Employees			*4,535 employees*
Employee-Induced City Residents			
Employees Who also Live in the City		50.4%	1,185 employees
Employee-Induced Housing Demand		1.35 workers/household	1,620 households
Employee-Induced Residents		*2.35 persons/household*	*3,800 residents*
Total Alternative Population Growth in City			***6,700 residents***

Sources: Adavant Consulting, 2015; U.S. Census Bureau. 2014. ACS. One-year estimate. IDs B08406, B08008, S0501.

A comparison of the proposed project population under both the High Commercial Assumption and the High Residential Assumption is provided in Table 7-5, below. As shown, because of the removal of the flexible parcels on Blocks H, I, and J, the Reduced Intensity Alternative would result in more onsite residents than the High Commercial Assumption (approximately 550 more residents) but fewer than the High Residential Assumption (approximately 860 fewer residents). The alternative would result in fewer employees than the High Commercial Assumption (approximately 1,515 fewer employees) but slightly more employees than the High Residential Assumption (approximately 25 more employees). Therefore, the Reduced Intensity Alternative would induce less population growth (6,700 residents) in the city than the High Commercial Assumption and High Residential Assumption, which would result in approximately 7,660 residents and 7,720 residents, respectively.

TABLE 7-5. COMPARISON OF ONSITE RESIDENTS AND EMPLOYEES – PROPOSED PROJECT AND ALTERNATIVE B

Land Use	High Commercial Assumption	High Residential Assumption	Alternative B
Onsite Residents	2,350 residents	3,760 residents	2,900 residents
Employees	6,050 employees	4,510 employees	4,535 employees
Employee-Induced City Residents	5,310 residents	3,960 residents	3,800 residents
Total Population Growth in the City	7,660 residents	7,720 residents	6,700 residents

Sources: Adavant Consulting, 2015; U.S. Census Bureau. 2014. ACS. One-year estimate. IDs B08406, B08008, S0501.

As with the proposed project, the Reduced Intensity Alternative would induce residential population, housing, and employment growth, albeit slightly decreased growth, in the project area and the city. The proposed project would constitute a limited share of the population, housing, and employment growth, as projected by the Association of Bay Area Governments (ABAG). Because the Reduced Intensity Alternative would result in between 960 to 1,020 fewer total residents in the city than the proposed project, the alternative would similarly be within the ABAG projections. Given that the project site is located in an undeveloped and underutilized location within a rapidly growing city and region, and that the project site is located within the Port of San Francisco Priority Development Area (PDA), which is an area designated for new development to support the needs of city residents and employees, and that the Reduced Intensity Alternative is within ABAG projections, the growth impacts would be ***less than significant***, same as under the proposed project. The Reduced Intensity Alternative would not induce substantial population growth either directly or indirectly and would result in the same impacts, although to a slightly lesser extent, as the proposed project.

Cumulative Impacts. As explained above, the population growth and housing demand induced by both the proposed project and the Reduced Intensity Alternative would not be considered substantial in the context of the regional growth projections provided by ABAG. Neither the

proposed project nor the Reduced Intensity Alternative would combine with the reasonably foreseeable projects to exceed cumulative population or housing projections because citywide growth projections already take into account the large projects in the vicinity of the project site. Therefore, the Reduced Intensity Alternative's cumulative impacts related to population, housing, and employment would be ***less than significant***, similar to the proposed project.

CULTURAL RESOURCES

Historical Resources. As with the proposed project, the Reduced Intensity Alternative would physically alter Pier 48, which is a contributor to the National Register of Historic Places–(National Register-) listed Port of San Francisco Embarcadero Historic District and is individually eligible for listing in the National Register. However, rehabilitation and reuse of Pier 48 under the Reduced Intensity Alternative would be the same as under the proposed project, resulting in the same less-than-significant impacts under the proposed project. In addition to Pier 48, the alternative would also introduce new construction within the Port of San Francisco Embarcadero Historic District, which has the potential to alter the character of the district. However, similar to proposed project (although to a slightly lesser extent because of the decrease in some building heights under this alternative, compared to the proposed project), the new development would not impair the historical qualities that qualify the Port of San Francisco Embarcadero Historic District as an historical resource under CEQA.[1] Development on Seawall Lot 337 also has the potential to change the historical setting of the CEQA historical resources (in the Lefty O'Doul Bridge and the Pier 50 office buildings) located in the project study area. However, the Reduced Intensity Alternative would not materially impair any of the features that qualify the Lefty O'Doul Bridge or the Pier 50 office buildings as CEQA historical resources. Therefore, the impact of the Reduced Intensity Alternative on historic resources, similar to that of the proposed project, would be ***less than significant***.

Archaeological Resources. There are no known archaeological resources in the project area. However, the project site is determined to be sensitive for deeply buried prehistoric resources. Construction activities for the Reduced Intensity Alternative would include pile driving for proposed building foundations, similar to the proposed project. However, unlike the proposed project, no excavation would be required because the Mission Rock Square Garage would not be constructed. Nonetheless, implementation of Mitigation Measure M-CP-2, as required for the proposed project, would reduce potentially significant impacts on archaeological resources to ***less than significant with mitigation***.

[1] According to State CEQA Guidelines Section 15064.5, a historical resource is defined as a resource that is listed in or determined to be eligible for listing in the California Register of Historical Resources (California Register).

Human Remains. Because of the location of the project site on previously submerged lands, the potential for encountering human remains is low. However, as with the proposed project, it is possible that human remains may be encountered during construction activities associated with the Reduced Intensity Alternative. Implementation of Mitigation Measure M-CP-3, as required for the proposed project, would reduce impacts on human remains to ***less than significant with mitigation***.

Tribal Cultural Resources. Based on the background research and Native American outreach, there are no known tribal cultural resources on the project site. However, based on the archeological sensitivity assessment, as with the proposed project, there is the potential for prehistoric archeological resources to be present on the project site under this alternative. Prehistoric archeological resources may also be considered tribal cultural resources. In the event that project activities disturb unknown archeological sites that are considered tribal cultural resources, any inadvertent damage would be considered a significant impact under this alternative, same as the proposed project. Implementation of Mitigation Measure M-CP-4, as required for the proposed project, would reduce impacts on tribal cultural resources to ***less than significant with mitigation***.

Cumulative Impacts. The Reduced Intensity Alternative, in combination with future development in the city, could result in cumulative impacts on historic resources, archaeological resources, and human remains. All projects, including this alternative, would be required to comply with the *Secretary of the Interior's* rehabilitation standards and, therefore, they would not result in cumulatively considerable adverse effects related to historic resources. Although the project area contains a stratigraphic interface with moderate archaeological sensitivity at great depth, there is low potential for projects in the study area to encounter human remains or tribal cultural resources. Implementation of Mitigation Measures M-CP-2, M-CP-3, and M-CP-4 would reduce these impacts to a in less-than-significant level. Thus, as with the proposed project, the Reduced Intensity Alternative's incremental contribution to these cumulative effects would not be cumulatively considerable. Cumulative impacts would be ***less than significant with mitigation***.

TRANSPORTATION AND CIRCULATION

Travel demand under the Reduced Intensity Alternative was analyzed using the same methodologies and assumptions as those used for the proposed project. The travel demand forecasts for the Reduced Intensity Alternative are provided in Appendix 7-1 of the Draft EIR. The forecasts are based on methodology contained in the San Francisco Guidelines and supplemented with information to account for the large-scale and mixed-use qualities of the proposed project and its alternatives.

As shown in Table 7-6, below, the Reduced Intensity Alternative would generate fewer external[2] person trips during the a.m. peak hour (10 percent) and more during the p.m. peak hour (1 percent) than the proposed project's High Commercial Assumption. In comparison to the High Residential Assumption, the Reduced Intensity Alternative would generate fewer external person trips during the weekday a.m. peak hour (2 percent) and more during the weekday p.m. peak hour (4 percent) than the proposed project's High Residential Assumption. Although the overall amount of development would be less under the Reduced Intensity Alternative than under the Proposed Project, the amount of retail square footage would increase. As a result of the larger share of retail uses under this alternative relative to the proposed project, the total number of external person trips would be slightly higher during the p.m. peak hour when retail uses generate more trips, particularly in comparison to the High Commercial Assumption. The Reduced Intensity Alternative would generate fewer external vehicle trips during both the a.m. peak hour and p.m. peak hour than either the High Commercial Assumption or the High Residential Assumption of the proposed project. The Reduced Intensity Alternative has slightly more retail uses than the proposed project, and retail trips have a higher average vehicle occupancy rate than other project uses that are reduced under this Alternative, resulting in the slightly lower number of external peak hour vehicle trips.

TABLE 7-6. PROPOSED PROJECT AND REDUCED INTENSITY ALTERNATIVE EXTERNAL TRIP GENERATION

Land Use	Proposed Project High Commercial Assumption	Proposed Project High Residential Assumption	Reduced Intensity Alternative	Change from High Commercial Assumption		Change from High Residential Assumption	
Weekday A.M. Peak Hour							
Total Person Trips	6,864	6,354	6,239	-625	-10%	-115	-2%
Auto	*2,524 (37%)*	*2,331 (37%)*	*2,298 (37%)*	-226	-10%	-33	-1%
Transit	*2,635 (38%)*	*2,451 (38%)*	*2,384 (38%)*	-251	-11%	-67	-3%
Other[a]	*1,705 (25%)*	*1,572 (25%)*	*1,557 (25%)*	-148	-10%	-15	-1%
Total Vehicle Trips	1,449	1,396	1,337	-112	-8%	-59	-4%
Weekday P.M. Peak Hour							
Total Person Trips	9,145	8,791	9,199	54	1%	408	4%
Auto	*3,488 (38%)*	*3,345 (38%)*	*3,449 (37%)*	-39	-1%	104	3%
Transit	*2,841 (31%)*	*2,768 (32%)*	*2,785 (30%)*	-56	-2%	17	1%
Other[a]	*2,816 (31%)*	*2,678 (30%)*	*2,965 (32%)*	149	5%	287	10%
Total Vehicle Trips	1,755	1,758	1,751	-4	0%	-7	0%

Source: Adavant, 2016.
Note:
a. "Other" includes bicycles, walking, motorcycles, taxis, and additional modes.

[2] External trips are those made between uses within the proposed project and destinations outside the proposed project. These external totals exclude internal person trips made between two or more uses located completely within the proposed project.

CONSTRUCTION IMPACTS

The Reduced Intensity Alternative would have similar construction impacts as the proposed project because it would involve construction of a similar number of buildings and parking structures. The construction duration, both for the overall project and individual buildings, may be shorter under this alternative, compared to the proposed project, given the reduced level of overall square footage and reduced excavation due to elimination of the Mission Rock Garage. Construction of the proposed project under this alternative would not result in significant impacts on the transportation and circulation network because any effects would be of limited duration and temporary.

Construction-related work for the Reduced Intensity Alternative would have a ***less-than-significant impact*** on transportation and no mitigation measures would be required. Improvement Measure I-TR-1 requires the applicant to prepare a Construction Traffic Control Plan for the proposed project. Improvement Measure I-TR-1 would also apply to the Reduced Intensity Alternative to further reduce less-than-significant impacts related to potential conflicts between construction activities and pedestrians, bicyclists, transit and vehicles, and between construction activities and nearby businesses and residents.

VMT IMPACTS

The Reduced Intensity Alternative would generate slightly less daily VMT than the proposed project, as it would generate 14,586 daily vehicle trips or four percent fewer daily vehicle trips than the High Commercial Assumption under the proposed project. Because the proposed project is located within a Traffic Analysis Zone that has existing average daily VMT per capita for residential, office, and retail uses that is more than 15 percent below the existing regional average daily VMT per capita, the proposed project and therefore the Reduced Intensity Alternative would not cause significant additional VMT. As with the proposed project, the Reduced Intensity Alternative would also not substantially induce automobile travel. As such, the Reduced Intensity Alternative would have a ***less-than-significant*** impact on VMT.

TRAFFIC HAZARD IMPACTS

The Reduced Intensity Alternative would result in similar or slightly smaller queues at the Block D2 parking garage as the High Commercial Assumption version of the proposed project, as it would generate slightly fewer daily and peak hour vehicle trips. Westbound vehicles on Long Bridge Street waiting to turn left into the easternmost garage driveway would queue into the Long Bridge Street/Bridgeview Street intersection and impede the flow of pedestrian, bicycle and vehicle traffic. This would be a significant impact. The same mitigation measures identified for the proposed project would apply to the Reduced Intensity Alternative. With implementation of Mitigation Measure M-TR-3, the traffic hazard impact of the Reduced Intensity Alternative would be reduced to ***less-than-significant*** levels.

TRANSIT IMPACTS

As shown in Table 7-6, page 7-26, the number of transit trips generated by the Reduced Intensity Alternative would be 11 percent lower during the a.m. peak hour and 2 percent lower during the p.m. peak hour, compared to the proposed project's High Commercial Assumption. Compared to the proposed project's High Residential Assumption, the Reduced Intensity Alternative would generate 3 percent fewer transit trips during the a.m. peak hour and 1 percent greater trips during the p.m. peak hour. Thus, impacts on transit capacity utilization associated with the Reduced Intensity Alternative would be somewhat less during the a.m. peak hour, particularly under the proposed project's High Commercial Assumption, and similar to those of the proposed project in the p.m. peak hour. Impact TR-4 and Impact TR-6 indicate that the proposed project would have a significant impact on two transit lines (10 Townsend and 30 Stockton) due to a substantial increase in transit demand that would not be accommodated by local transit capacity and a significant impact on transit delay due to queues at the proposed project's Block D2 parking garage. The Reduced Intensity Alternative would have similar significant transit impacts as the proposed project and the proposed project's Mitigation Measures M-TR-4.1, M-TR-4.2 and M-TR-6 would apply to the Reduced Intensity Alternative.

Implementing Mitigation Measures M-TR-4.1 and M-TR-4.2 would allow Muni to maintain transit headways, and would reduce the Reduced Intensity Alternative impact to less-than-significant levels. However, because the method and total cost of providing additional service and the SFMTA's ability to implement improvements is uncertain, the Reduced Intensity Alternative transit impacts would be ***significant and unavoidable with mitigation***, similar to under the proposed project.

Implementation of Mitigation Measure M-TR-6 would resolve transit delay impacts to being less than significant. However, at this time they may not be considered to fully resolve transit delay impacts because, and to the extent that, implementation of some of components of the mitigation (i.e., approval of restriping on Third Street and entering into an Event Management Agreement with the project sponsor to allocate PCOs onsite), require SFMTA Board approval, and such approval is currently considered uncertain. Thus, based upon such current uncertainty of full implementation of Mitigation Measure M-TR-6, the transit delay impacts of the Reduced Intensity Alternative would remain ***significant and unavoidable with mitigation***, similar to under the proposed project.

The proposed project would have less-than-significant impacts on regional transit routes. Since the number of peak hour transit trips is either lower for the Reduced Intensity Alternative, compared to the proposed project (under the High Commercial Assumption) or either slightly lower or slightly higher compare to the proposed project (under the High Residential Assumption), like the proposed project, the Reduced Intensity Alternative would have a ***less-than-significant*** impact on regional transit routes.

BICYCLE AND PEDESTRIAN IMPACTS

Due to slight changes in land use and mode of access assumptions, the Reduced Intensity Alternative would produce 10 percent fewer bicycle and pedestrian trips during the a.m. peak hour, but five percent more during the p.m. peak hour compared to the proposed project's High Commercial Assumption, as shown in Table 7-6, page 7-26. The Reduced Intensity Alternative would produce 1 percent fewer bicycle and pedestrian trips during the a.m. peak hour, but 10 percent more during the p.m. peak hour compared to the proposed project's High Residential Assumption. The Reduced Intensity Alternative generates more other trips than the proposed project because it has a slightly higher square footage of retail uses, which have a slightly higher walk/other mode share than residential and office uses. As with the proposed project, the Reduced Intensity Alternative would cause pedestrian and bicycle hazards due to queues at the proposed project garages as documented in Impact TR-3 and TR-6. Mitigation Measures M-TR_3.1 and M-TR-6 would also apply to the Reduced Intensity Alternative. With implementation of these measures, vehicle impacts on pedestrian and bicycles generated by trips to the projects' parking garage under the Reduced Intensity Alternative would be reduced to a less-than-significant level.

As documented in Impact TR-9 on page 4.E-145, the proposed project would cause significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. The Reduced Intensity Alternative would have similar significant pedestrian impacts as the proposed project and Mitigation Measure M-TR-9 would also apply to the Reduced Intensity Alternative. Implementation of Mitigation Measure M-TR-9 would resolve pedestrian safety impacts and reduce them to less than significant. However, at this time, the approval of the signalization improvements is considered somewhat uncertain, because they will require SFMTA Board approval. Thus, because implementation of Mitigation Measure M-TR-9, is uncertain to such extent, the Reduced Intensity Alternative's pedestrian safety impacts would continue to be considered ***significant and unavoidable with mitigation***, similar to the proposed project.

As documented in Impact TR-10 on page 4.E-146, the proposed project would cause a significant impact at the bicycle-truck interface at Pier 48. The Reduced Intensity Alternative would have the same significant bicycle impact as the proposed project and Mitigation Measure M-TR-10 would apply to the Reduced Intensity Alternative. Implementation of Mitigation Measure M-TR-10 would resolve bicycle safety impacts and reduce the alternative's impact to ***less-than-significant with mitigation***. Improvement Measure I-TR-10 would also apply to the Reduced Intensity Alternative and would further enhance vehicle/bicycle safety.

LOADING IMPACTS

The Reduced Intensity Alternative would have the same approximate amount of curb space dedicated to on-street loading as the proposed project. The on-street loading area for the Block K building would shift from the north side of Exposition Street under the proposed project to

the west side of Bridgeview Street under the Reduced Intensity Alternative. The Reduced Intensity Alternative would have slightly lower peak loading demands compared to the High Commercial Assumption (47 versus 49 spaces) for the proposed project and slightly higher peak loading demands compared to the High Residential Assumption (47 versus 45 spaces),[3] which would not be fully accommodated by the proposed loading supply and therefore result in a significant impact. Mitigation Measures M-TR-11.1 and M-TR-11.2 would apply to the Reduced Intensity Alternative. Implementation of Mitigation Measures M-TR-11.1 and M-TR-11.2 would resolve the loading shortfall and the loading impacts would be ***less than significant with mitigation***.

EMERGENCY ACCESS IMPACTS

Emergency access to the project site for the Reduced Intensity Alternative would be similar to that of the proposed project. The proposed internal roadway network would accommodate emergency vehicles including fire trucks. Emergency vehicle access to Pier 48 would be provided via Terry A. Francois Boulevard. The proposed cross-section for this roadway includes a 26-foot-wide shared zone for vehicular access, including emergency vehicles. A fire access evaluation indicates that emergency vehicles can access Pier 48 via any of the three east-west project streets that connect to Terry A. Francois Boulevard. The Reduced Intensity Alternative includes implementation of a "Keep Clear" zone on Mission Rock Street in front of the police and fire truck access to ensure that police vehicles and fire trucks are provided with clear access and egress to the Public Safety Building.

During events at AT&T Park, pre-event and post-event vehicular traffic destined for the proposed onsite garages would be managed as it is currently to minimize impacts on emergency-vehicle circulation and access as well as private vehicles destined for the UCSF emergency room and urgent care center. Before events at AT&T Park, up to 21 parking control officers (PCOs) are stationed at 17 locations. Post-events at AT&T Park, up to 19 PCOs are stationed at 14 locations. These locations include intersections along Third Street, Mission Rock Street, and Terry A. Francois Boulevard along the project boundaries. During major events at AT&T Park, the north–south Shared Public Way within the project site would be closed to vehicles, with the exception of emergency vehicles. If necessary, emergency vehicles would be able to travel on Muni's light rail right-of-way in the median of Third Street.

To address the circumstance of simultaneous events at AT&T Park and the Mission Rock site, the Proposed Project has prepared detailed event management plans that include combinations of strategies as described in Chapter 5 of the Mission Rock Transportation Plan. These would

[3] The delivery/service vehicle trips and loading demand is determined based on rates in SF Guidelines as well as truck count data collected for the existing Anchor Brewery in San Francisco and adjusted to reflect the proposed brewery on Pier 48 (as SF Guidelines do not provide loading data for brewery uses).

apply to this alternative as well. The Event Management measures identified in the Mission Rock Transportation Plan describe strategies for a primary event at AT&T Park (40,000+ attendees) or a secondary event at AT&T Park (15,000 to 25,000 attendees) and onsite events (2,000 to 5,000 attendees). Additionally, event traffic management systems at AT&T Park are reviewed and refined continuously to plan for such simultaneous events. Therefore, both AT&T Park and onsite events would develop refinements to their plans as needed to ensure emergency vehicle circulation is accommodated, both under the proposed project and this alternative.

Roadway improvements adjacent to the UCSF facilities would facilitate emergency vehicle access. Before and after events, emergency vehicle access to the project site and UCSF Medical Center uses would be maintained under the proposed project and this alternative, as would emergency access for persons traveling to the emergency room and urgent care center in their personal vehicles. For these reasons, the Reduced Intensity Alternative would not inhibit emergency vehicle access to the project site and nearby vicinity under the event scenario. Similar to the proposed project, the Reduced Intensity Alternative would be designed to provide access for Police and Fire department vehicles into the Public Safety Building across Mission Rock Street. However, until final street design is coordinated with the Police and Fire Department, this would conservatively be a significant impact. Mitigation Measure M-TR-12 would reduce this significant impact to a less-than-significant level. Improvement Measure I-TR-10 would also apply to the Reduced Intensity Alternative and would enhance emergency vehicle access.

PARKING IMPACTS

The midday peak parking demand would be 3,497 spaces for the Reduced Intensity Alternative. Parking demand outside of the midday peak period will be lower than during the midday peak. These levels are less than the midday peak parking demand of 3,846 spaces for the proposed project's High Residential Assumption or 3,655 spaces for the proposed project's High Commercial Assumption.[4] As with the proposed project, the Reduced Intensity Alternative would have a ***less-than-significant*** parking impact.

CUMULATIVE IMPACTS

The effects of the proposed project on the transportation network under cumulative (2040) conditions are deemed to be ***less-than-significant*** for construction impacts, VMT impacts, regional transit impacts, loading impacts, emergency vehicle access impacts, and parking impacts. The Reduced Intensity Alternative would likewise not make a considerable cumulative

[4] The peak parking demand is based on SF Guidelines Appendix 4.E-4 and analysis conducted by Adavant Consulting, 2016.

contribution to these impact areas because as compared to the proposed project, it would have less building square footage, generate either similar or an up to 8 percent decrease in daily peak hour vehicle trips, have slightly lower peak commercial loading demands, and have lower peak parking demands when compared to the proposed project. Loading impacts are by their nature localized and site-specific. As under the proposed project, the shortfall of loading facilities on the project site under the Reduced Intensity Alternative would not be expected to contribute to any loading impacts from other development projects near the project site. Overall, because loading tends to occur as close to the delivery point as possible, particularly in cases where loading occurs via double-parking, as may be the case within the project site, it is not expected that unmet loading demand associated with the Reduced Intensity Alternative would be accommodated outside of the project site. Similarly, it is not likely that unmet loading demand from other parts of the study area would interfere with the project site. Therefore, similar to the proposed project, the Reduced Intensity Alternative would not make a considerable contribution to cumulative loading impacts. The impacts of the Reduced Intensity Alternative related to construction, VMT impacts, regional transit impacts, loading impacts, emergency vehicle access, and parking under cumulative conditions would thus be ***less-than-significant*** as with the proposed project.

The cumulative impacts of the proposed project on traffic hazard impacts and bicycle impacts would be ***less-than-significant with mitigation***. Pedestrian impacts would be ***significant and unavoidable with mitigation*** under the proposed project. The cumulative contribution of the Reduced Intensity Alternative would be similar to the proposed project because it would have the same access design for the Parcel D2 parking garage, and would generate slightly more pedestrian and bicycle trips when compared to the proposed project under all scenarios except the High Commercial Assumption during the a.m. peak hour. By their nature, pedestrian circulation impacts are site specific and generally do not contribute to impacts from other development projects. The Reduced Intensity Alternative would have a similar pedestrian safety impact at two intersections on Fourth Street as the proposed project, but the pedestrian impact at these intersections would not be expected to affect or be further affected by other development projects near the project site. The impacts of the Reduced Intensity Alternative related to traffic impacts, and bicycle impacts under cumulative conditions would thus be ***less-than-significant with mitigation*** as with the proposed project. Implementation of Mitigation Measure M-TR-9 would fully resolve pedestrian safety impacts associated with Alternative B that such impacts would be less than significant. However, at this time, the approval of the signalization improvements is considered somewhat uncertain, because they will require SFMTA Board approval. For that reason, this alternative's contribution to potential cumulative pedestrian impacts would be considered to remain ***significant and unavoidable with mitigation,*** similar to the proposed project.

The cumulative impacts of the proposed project on transit impacts would be ***significant and unavoidable with mitigation***. The cumulative transit impacts of the proposed project result from a substantial increase in transit demand on one individual Muni route that would not be accommodated by local transit capacity (Impact C-TR-4). The proposed project also contributes considerably to transit delays (Impact C-TR-6). The Reduced Intensity Alternative would contribute a nearly identical number of transit trips to the proposed project under all scenarios except the High Commercial Assumption during the a.m. peak hour when the alternative would add 11 percent fewer transit trips than the proposed project and result in a ***significant*** cumulative transit impact. The cumulative transit mitigation measure described for the proposed project would be applicable to the Reduced Intensity Alternative. The impacts of the Reduced Intensity Alternative related to transit impacts under cumulative conditions would thus be ***significant and unavoidable with mitigation*** as with the proposed project.

NOISE

As with the proposed project, the Reduced Intensity Alternative would have no impacts related to adjacency to airports.

Exposure to Excessive Noise Levels. As described previously, implementation of the Reduced Intensity Alternative (instead of the proposed project) would result in between approximately 240,000 to 340,000 gsf less overall development than the proposed project at Seawall Lot 337. Although this alternative would involve less overall development, this alternative would result in similar noise impacts to those of the proposed project, as discussed below.

Construction. As with the proposed project, construction of the Reduced Intensity Alternative would require the use of heavy equipment, which would temporarily increase noise levels at properties near the project work sites. The Reduced Intensity Alternative would result in reduced development onsite and, therefore, could result in potentially shorter construction periods. However, noise levels at a given time during construction under this alternative would be similar to the levels expected under the proposed project (combined equipment construction levels for the proposed project were estimated to be approximately 88 dBA L_{eq}). Because of this, and because construction noise impacts are assessed not based on duration of construction period (how many days/months/years) but rather based on a reasonable worst-case noise level on a given day, construction noise impacts under the Reduced Intensity Alternative would be similar to the impacts identified for the proposed project.

Although construction associated with the proposed project and the Reduced Intensity Alternative would not violate the City Noise Ordinance, it would result in a substantial temporary increase in ambient noise at sensitive receptors in the project area (an increase of more than 10 dB over the ambient noise level of approximately 69 dBA L_{eq}). Mitigation Measure M-NOI-1 would reduce the severity of this impact under this alternative, similar to the

proposed project, but a substantial temporary increase in noise would still occur under the alternative as with the proposed project. Thus, as with the proposed project, this impact would be considered ***significant and unavoidable*** for the Reduced Intensity Alternative.

Traffic Noise Impacts on Offsite Uses. Similar to the proposed project, the Reduced Intensity Alternative would have the potential to increase noise on roadway segments in the vicinity of the project site. Project-specific traffic noise modeling was conducted for the proposed project's High Commercial Assumption, but given the small differences between traffic volumes under the two traffic assumptions (High Residential and High Commercial), the modeling results apply to both the proposed High Commercial Assumption and High Residential Assumption.

In order to determine the effects of the Reduced Intensity Alternative on traffic noise levels, the same scenario used in the project analysis (p.m. peak hour, High Commercial) was used for determining impacts for this alternative. As discussed above under *Transportation*, external project-related trips would increase under the Reduced Intensity Alternative by approximately 2 percent under the High Commercial Assumption during the p.m. peak hour compared to under the proposed project. Under the High Commercial Assumption, during the p.m. peak-hour, the proposed project would generate 3,488 trips. This would increase by 71 trips under the Reduced Intensity Alternative. Increasing the project-added volume by 2 percent on roadways in the project vicinity would result in an approximately 0.1- to 0.2-decibel (dB) increase in noise levels on any given roadway segment, which would be imperceptible (a change in sound level of 1 dB or less cannot typically be perceived by the human ear). As such, noise impacts under this alternative would be similar to under the proposed project.

The three segments in the project vicinity that would have significant project-related traffic noise effects related to a substantial permanent increase in noise at residential land uses under the proposed project would be similarly affected under the Reduced Intensity Alternative. A substantial permanent increase in noise would mean an increase by 3 dB or more in areas where project noise levels would exceed 60 dBA L_{dn}, or an increase by 5 dB or more in areas where project noise would be 60 dBA L_{dn} or less. As such, both the proposed project and this alternative could result in receptors being exposed to excessive noise levels, and traffic noise impacts on offsite uses would be significant. As with the proposed project, there are no feasible mitigation measures that could reduce these traffic noise impacts to less-than-significant levels for the Reduced Intensity Alternative. Therefore, as with the proposed project, traffic-noise impacts to offsite uses for this alternative would be ***significant and unavoidable***.

Traffic Noise Impacts on Onsite Uses. As with the proposed project, implementation of the Reduced Intensity Alternative would introduce new noise-sensitive land uses (residential and commercial) to areas where a substantial permanent increase in traffic noise levels may result from implementation of this alternative. Traffic generated by the Reduced Intensity Alternative (which would be approximately 2 percent higher than the volumes associated with the

proposed project) could result in an approximately 0.1 to 0.2 dB increase in noise levels compared to the proposed project on any given roadway segment in the area, which would be imperceptible. As such, project-generated noise impacts under this alternative on onsite land uses would be similar to those under the proposed project.

Under both the proposed project and the Reduced Intensity Alternative, one roadway segment adjacent to the project site may experience an increase in traffic noise levels greater than the allowable 3 dB if resulting noise levels are greater than 60 dBA L_{dn}. Additionally, the project site may experience an increase in traffic noise levels greater than 5 dB if resulting noise levels are less than or equal to 60 dBA L_{dn}. As with the proposed project, this alternative's proposed residential uses along Mission Rock Street (from Terry A. Francois Boulevard to Third Street) are predicted to experience a substantial increase (12 dB) in noise levels. The proposed project and the Reduced Intensity Alternative would be designed to ensure compliance with applicable noise standards (specifically, CCR Title 24), which would ensure that individual onsite residences would not experience excessive noise. However, even with implementation of Mitigation Measure M-NOI-2.3 – Design of Future Noise-Sensitive Uses, the increases in traffic associated with the proposed project and with this alternative would still result in a substantial permanent increase in ambient noise levels along this segment (the 12 dB increase that is expected to occur along Mission Rock Street from Terry A. Francois Boulevard to Third Street) that could affect onsite sensitive receptors. As with the proposed project, there are no additional feasible mitigation measures that could reduce this traffic noise impact to a less-than-significant level for the Reduced Intensity Alternative. Therefore, as with the proposed project, traffic-noise impacts for this alternative to onsite uses (related to a substantial permanent increase in noise) would be ***significant and unavoidable***.

Truck Pick-Ups and Deliveries. The offsite residential land uses closest to potential loading locations for both the proposed project and the Reduced Intensity Alternative would be the same and interior noise levels at the nearest offsite residential land uses would be less than the 45 dBA nighttime limit for the Reduced Intensity Alternative, similar to the proposed project. Further, the Reduced Intensity Alternative would involve a smaller development footprint and, therefore, may have correspondingly fewer daily deliveries. This may result in a slightly lower level of noise related to truck deliveries than the proposed project. Similar to the proposed project, this alternative would also be required to implement Mitigation Measure M-NOI-2.4, Design of Future Noise-Generative Uses near Residential Uses. As with the proposed project, under the Reduced Intensity Alternative, impacts related to truck deliveries would be ***less than significant with mitigation***.

Heating, Ventilation, and Air-Conditioning (HVAC) Systems. As with the proposed project, the new buildings associated with the Reduced Intensity Alternative would require HVAC systems. However, due to the fact that the same number of buildings would be constructed on the same project site under this alternative as the proposed project, the HVAC systems associated with the

Reduced Intensity Alternative would result in the same noise effects as the proposed project on nearby noise sensitive land uses. The proposed project and the Reduced Intensity Alternative would both incorporate design measures that would limit noise from HVAC equipment to the applicable standard at the property line of nearby noise-sensitive receptors in accordance with Mitigation Measure M-NOI-2.2 – Stationary Equipment Noise Controls. These acoustical treatments may include, but are not limited to: provision of sound enclosures/barriers, addition of roof parapets to block noise, increasing setback distances from sensitive receptors, provision of louvered vent openings, and location of vent openings away from adjacent residential uses. With the implementation of this mitigation measure, impacts related to HVAC noise would be ***less than significant with mitigation*** under the Reduced Intensity Alternative, as with the proposed project.

Emergency Generators. As with the proposed project, temporary increases in ambient noise levels from generator testing is considered a significant impact for the Reduced Intensity Alternative. However, the proposed project and the Reduced Intensity Alternative would implement Mitigation Measure M-NOI-2.2 – Stationary Equipment Noise Controls. This alternative would also be required to limit the testing of emergency generators to daytime hours (8:00 a.m. to 6:00 p.m.) and limit the testing of emergency generators such that only one generator is tested at a given time to limit the effects of additive noise from the equipment.

With the inclusion Mitigation Measure M-NOI-2.2, impacts related to noise from emergency generators would be ***less than significant with mitigation*** under the Reduced Intensity Alternative, as with the proposed project.

Noise from Onsite Outdoor Use areas to Offsite Land Uses. The Reduced Intensity Alternative, as with the proposed project, would include development of a number of public open spaces. The proximity of existing and proposed future residential uses to these types of open space uses would pose the potential for residents to be disturbed or annoyed by noise from outdoor space activities. It is not known at this time what specific events may occur and what the associated noise levels would be. However, promoters of any proposed outdoor events on the site's outdoor open space areas (for the proposed project or for this alternative) that would use amplified sound or music would be required to obtain a permit from the City prior to the event. Section 1060.1 of the Police Code requires a permit to conduct, operate, or maintain a place of entertainment, limited live performance locale or one-time event within the City and County of San Francisco.

Due to uncertainties as to the nature and extent of future outdoor events associated with the project site under the proposed project and the Reduced Intensity Alternative (including if amplified speech or music would occur at such events), the potential for the use of amplified sound equipment could result in significant noise impacts to nearby sensitive receptors in excess of standards established in the San Francisco General Plan or San Francisco Noise Ordinance. However, as with the proposed project, implementation of Mitigation Measure M-NOI-2.1, *Noise Control Plan for Outdoor Amplified Sound* with this alternative, would ensure that

sound levels generated by amplified equipment would be consistent with Section 2909 of the City's Police Code to the extent reasonable and appropriate given the nature and context of the event, which establishes a not-to-exceed (except through a variance) noise standard for fixed sources of noise and from events subject to regulation by the Entertainment Commission. This alternative would also comply with the Mission Bay Good Neighbor Policy.

With implementation of Mitigation Measure M-NO-2.1, periodic and temporary noise increases associated with special events would be reduced but, because their frequency, duration and character are not known at this time (e.g., some events could seek waivers from Police Code provisions and/or continue later than 10:00 p.m.), this impact would remain ***significant and unavoidable*** under this alternative, similar to the proposed project**.**

Expose Persons to or Generate Excessive Ground-borne Vibration or Ground-borne Noise Levels. Under the Reduced Intensity Alternative, as with the proposed project, pile driving associated with construction activities would have the potential to damage fragile or historic buildings. Based on the peak particle velocity (PPV) thresholds presented in Section 4.F, *Noise*, the proposed project is not expected to result in vibration-related impacts on surrounding fragile or historic buildings (with the closest sensitive building being the Pier 50 office building, which is considered historic for CEQA purposes because of the distance between these proposed activities and the offsite fragile or historic buildings (vibration would attenuate to below the applicable thresholds at these distances). Since construction activities under the Reduced Intensity Alternative would be in the same footprint as the proposed project and would require a similar number of piles, vibration associated with pile driving under the Reduced Intensity Alternative is anticipated to result in the same less-than-significant impacts on surrounding offsite buildings with respect to ground-borne noise and vibration damage as the proposed project.

With regard to vibration annoyance at offsite receptors, pile driving with this alternative could generate noise in excess of the "strongly perceptible" annoyance threshold at nearby residences, similar to under the proposed project. The nearest existing offsite land uses that could be considered sensitive to ground vibration are located approximately 100 feet west of the project site for both the proposed project and for this alternative (i.e., Mission Bay Block 1 residential uses located along Third and Fourth Streets between Channel and Long Bridge Streets). At a 100-foot distance, pile driving would result in a greater than "strongly perceptible" vibration level of 0.10 PPV (refer to Table 4.F-4). As such, vibration impacts from pile driving under this alternative and the associated annoyance it would cause offsite receptors would be potentially significant, similar to under the proposed project. Implementation of project Mitigation Measure M-NOI-3.1 under this alternative (similar to the proposed project) would reduce potential vibration impacts on residences of the Mission Bay Block 1 residences for both the proposed project and for the Reduced Intensity Alternative by, to the extent practical. This alternative, similar to under the proposed project, would require the use of "quiet" pile-driving technology where feasible and require that the construction contractor limit pile-driving activity

so that the PPV vibration level at neighboring uses is less than the strongly perceptible level of 0.10 inches per second, when possible. However, Mitigation Measure M-NOI-3.1 may not be feasible at all times under this alternative or under the proposed project because use of "quiet" pile-driving technology may not possible as a result of site-specific soil conditions, and because pile driving may need to occur within 100 feet of offsite residences. Because no feasible mitigation actions are available to further reduce vibration impacts from pile driving on these sensitive receptors, this impact is ***significant and unavoidable*** for both the proposed project and the Reduced Intensity Alternative.

Pile driving in proximity to Pier 48, an onsite building, would have the potential to result in adverse vibration effects related to building damage, as Pier 48 fits in the Caltrans vibration building category of "Historic and Some Old Buildings" (refer to Table 4.F-3). This type of building has a damage potential threshold of 0.25 in/sec PPV (based on the Caltrans criteria shown in Table 4.F-3), which was used in the project analysis and also applies to the analysis of the Reduced Intensity Alternative. Vibration in excess of this 0.25 in/sec PPV threshold could occur if pile driving were to occur within about 85 feet of Pier 48. Because pile driving would need to occur close to the existing building structure at distance less than 85 feet, this impact could be significant for this alternative, similar to under the proposed project. Implementation of project Mitigation Measure M-NOI-3.2, Pile-Driving Vibration Control Measures – Damage, for the Reduced Intensity Alternative (similar to under the proposed project) would reduce potential damage-related vibration impacts to less-than-significant levels. Given the measure's requirement for monitoring to ensure that vibration at potentially affected onsite buildings (Pier 48) would be limited to levels that have been recommended by an expert building evaluation team, building damage would not be expected to occur. Although vibration related to annoyance would be significant and unavoidable for the proposed project and for this alternative, as described above, the impact related to potential vibration-related damage would be reduced to ***less-than-significant*** levels with mitigation for both the proposed project and the Reduced Intensity Alternative.

Cumulative Impacts. As with the proposed project, the Reduced Intensity Alternative would result in significant and unavoidable cumulative impacts related to a substantial temporary increase in noise from construction (with less-than-significant impacts related to an exceedance of applicable thresholds). The contribution of the Reduced Intensity Alternative to the cumulative impact, related to temporary increase in noise or noise levels in excess of applicable local standards, would also be cumulatively considerable, similar to the proposed project.

The Reduced Intensity Alternative would add a similar number of daily trips to roadways in the area, compared to the proposed project. As such, it would result in the same cumulative impacts as the proposed project. As with the proposed project, cumulative impacts (from future with-project traffic) related to a substantial permanent increase in noise along 15 segments could be significant under this alternative. This occurs when there is an increase of 3 dB from

existing conditions to cumulative plus-project conditions in areas where the resultant (2040 plus-project) noise level exceeds the applicable compatibility criteria or an increase of 5 dB where the land use compatibility criteria are not exceeded (refer to Appendix 5 for more details).

Further, this alternative would result in a cumulatively considerable contribution to the same one roadway segment as the proposed project based on a substantial permanent increase in noise that would be expected to occur. There are no feasible mitigation measures available to reduce these impacts, or the proposed project's contribution to the one cumulatively considerable impact, to less-than-significant levels. Therefore, similar to the proposed project, cumulative traffic noise impacts, as well as the proposed project (and Reduced Intensity Alternative) contribution to a cumulative impact, would be ***significant and unavoidable*** for the Reduced Intensity Alternative.

Operational noise impacts from stationary sources associated with other cumulative development could combine with noise sources resulting from development under the Reduced Intensity Alternative and result in increased noise levels at from stationary noise sources (HVAC and other mechanical equipment) nearby noise-sensitive land uses, similar to under the proposed project. However, because acoustical treatments to reduce impacts from mechanical equipment on offsite land uses would be included in the designs for both the proposed project and the Reduced Intensity alternative (e.g., installing construction enclosures or barriers around equipment, using quiet models of equipment, incorporating mufflers or silencers on exhaust fans, etc.), equipment noise levels would comply with Police Code Section 2909 requirements. This would further reduce the noise experienced by onsite land uses from this equipment. Therefore, similar to the proposed project, cumulative impacts resulting from noise levels from stationary equipment associated with the Reduced Intensity Alternative would be reduced to ***less-than-significant*** levels.

As with the proposed project, cumulative effects related to construction vibration could occur with implementation of the Reduced Intensity Alternative if construction activities for other related projects in proximity to the project site involve impact equipment (e.g., pile drivers, impact hammers/hoe rams, jackhammers). Although vibration effects are highly localized, involving discrete single events such as pile strikes, several parcels immediately adjacent to the project site and south of the project site could undergo construction activities that would also involve pile driving. Given that construction of the proposed project and Reduced Intensity Alternative would take several years, it is possible that construction of foreseeable adjacent projects could occur simultaneously with the Reduced Intensity Alternative, which could include pile-driving activities. Implementation of Mitigation Measure M-NOI-3.1, Pile-Driving Control Measure – Annoyance, would help to reduce the severity of this significant impact; however, it may not reduce vibration to less than strongly perceptible (0.10 in/sec PPV) and, thus, less than significant levels. Because no other feasible mitigation actions are

available to further reduce vibration annoyance from pile driving at nearby sensitive receptors, cumulative vibration impacts related to annoyance would be ***significant and unavoidable with mitigation.***

As discussed above, the proposed project as well as the Reduced Intensity Alternative would result in a direct significant and unavoidable impact related to annoyance from ground-borne vibration; damage-related vibration impacts would be less than significant with mitigation. As other related projects in the vicinity are expected to be under construction simultaneously, it is likely that a cumulative impact could occur with regard to vibration damage and annoyance. Construction for the proposed project or the Reduced Intensity Alternative would make up a large proportion of potentially simultaneous pile driving occurring in the project vicinity. However, Mitigation Measure M-NOI-3.2 under this alternative (similar to the proposed project) would reduce vibration impacts related to potential building damage to less-than-significant levels. As such, and similar to the proposed project, cumulative impacts related to vibration damage are similarly considered to be less than significant with mitigation for the Reduced Intensity Alternative**.** With regard to potential vibration-related annoyance, however, it is not certain if Mitigation Measure M-NOI-3.1 would reduce direct vibration impacts related to annoyance to less-than-significant levels. As such, the contribution of the Reduced Intensity Alternative to cumulative vibration impacts related to annoyance would be cumulatively considerable, as is the case for the proposed project. Cumulative vibration impacts related to annoyance would be ***significant and unavoidable with mitigation.***

AIR QUALITY

Criteria pollutant and toxic air contaminant emissions under the Reduced Intensity Alternative were analyzed using same methodologies and assumptions as those used for the proposed project. The emissions modeling details for the Reduced Intensity Alternative are provided in Appendix 12. The modeling uses the same methodology contained Air Quality Technical Report.

Compared to the proposed project, the Reduced Intensity Alternative results in somewhat lower emissions of all criteria pollutants for both construction and operation. Specifically, daily construction emissions are approximately 11–19 percent lower than the proposed project and daily annual emissions are approximately 7–45 percent lower than the proposed project (depending on the pollutant) (Table 7-7, on the following page). The impacts (and emissions) for construction, operation, and construction plus operation for the Reduced Intensity Alternative are discussed in detail below.

Construction. Similar to the proposed project, construction air quality impacts of the Reduced Intensity Alternative would be significant and unavoidable with mitigation. Estimated Reduced Intensity Alternative construction-related emissions of NO_X would exceed the BAAQMD's significance thresholds for the years 2018 through 2021 at between 63 and 137 pounds per day.

TABLE 7-7. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR THE REDUCED INTENSITY ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	2.2	25.5	0.9	0.8
2018	26.5	**116.3**	5.1	4.9
2019	53.0	**137.3**	5.9	5.6
2020	50.7	**107.0**	4.2	4.1
2021	36.8	**62.8**	2.2	2.1
2022	16.3	25.9	0.9	0.9
2023	4.0	6.4	0.2	0.2
2024	0.0	0.0	0.0	0.0
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.3	3.3	0.1	0.1
2018	3.4	**15.1**	0.7	0.6
2019	6.9	**17.9**	0.8	0.7
2020	6.5	**12.4**	0.5	0.4
2021	4.8	8.2	0.3	0.3
2022	2.1	3.4	0.1	0.1
2023	0.5	0.8	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	*10*	*10*	*15*	*10*

Source:

ENVIRON International Corporation and the California Air Districts. 2013. CalEEMod User's Guide. Version 2013.2. Appendix A: Calculation Details for CalEEMod. Prepared for the California Air Pollution Control Officers Association. July. Available: http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixa.pdf?sfvrsn=2. Accessed: October 12, 2015.

Notes:

Emissions over threshold levels are in **bold**

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

Even with implementation of Mitigation Measure M-AQ-1.1 through M-AQ-1.4, NOx levels under the Reduced Intensity Alternative would exceed the significance threshold from 2018 through 2020, at between 57 and 78 pounds per day, as shown in Table 7-8, on the following page (also see Tables 12 and 13 in Appendix 12). Similar to the proposed project, an offset emissions mitigation measure would be required to provide for reduction of levels of ozone precursors (NOx) exceeding the significance thresholds through implementation of pollution reduction programs elsewhere in the air basin. Accordingly, additional mitigation is identified to reduce the residual NOx emissions. Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would pay an offset mitigation fee for all remaining unmitigated NOX emissions in excess of BAAQMD thresholds under this alternative, similar to the proposed project.

Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and would not be fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of construction emissions of NOx is conservatively considered ***significant and unavoidable with mitigation*** for the Reduced Intensity Alternative, same as the proposed project.

Operations. Similar to the proposed project, operational impacts of the Reduced Intensity Alternative would be significant and unavoidable with mitigation. As described in Section 4.G, *Air Quality*, operational emissions of ROG under the proposed project for the High Commercial Assumption would exceed the BAAQMD's significance thresholds for the years 2021 through 2024 and all following operational years at between 66 and 123 pounds per day and emissions of NOx would exceed the threshold for the years 2023 through 2024 and all following operational years at between approximately 57 and 60 pounds per day. As shown in Table 7-9 page 7-44 (also see Tables 14 through 17 in Appendix 12), the Reduced Intensity Alternative would result in operational criteria air pollutant emissions of ROG that are slightly lower than those for the proposed project, and still at levels that would exceed the applicable significance thresholds; emissions of NOx would not exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to the Reduced Intensity Alternative, although the amount of emissions offset through Mitigation Measure M-AQ-1.5 would be adjusted to the emissions calculated for the Reduced Intensity Alternative. Even with implementation of Mitigation Measure M-AQ-2.1 through M-AQ-2.3, ROG levels under this alternative would exceed the significance threshold from 2021 through 2024 and beyond, at between 71 and 98 pounds per day, as shown in Table 7-10, page 7-45 (also see Tables 16 and 17 in Appendix 12). Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor will pay an offset mitigation fee for all remaining unmitigated ROG emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City

TABLE 7-8. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR THE REDUCED INTENSITY ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.7	9.6	< 0.1	< 0.1
2018	7.6	**57.5**	0.9	0.9
2019	14.9	**77.7**	1.3	1.3
2020	14.4	**64.2**	1.1	1.1
2021	10.4	42.1	0.5	0.5
2022	4.9	18.9	0.2	0.2
2023	1.2	5.0	< 0.1	< 0.1
2024	7.6	0.0	0.0	0.0
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	<0.1	1.2	<0.1	<0.1
2018	1.0	7.5	0.1	0.1
2019	2.0	**10.1**	0.2	0.2
2020	1.8	7.6	0.1	0.1
2021	1.4	5.5	<0.1	<0.1
2022	0.6	2.5	<0.1	<0.1
2023	0.2	0.6	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	*10*	*10*	*15*	*10*

Source:

Refer to Table 7-7.

Notes:

a. Emissions over threshold levels are in **bold**

b. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Measure M-AQ-1.2), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Measure M-AQ-1.4). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG and NOx offsets.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 7-9. SUMMARIZED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR THE REDUCED INTENSITY ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	40.6	21.4	4.2	1.7
2021	**77.4**	34.3	11.8	4.2
2022	**94.8**	42.6	15.6	5.5
2023	**110.2**	51.2	19.3	6.9
2024 (full buildout)	**110.0**	48.9	19.2	6.8
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	7.4	3.6	0.8	0.3
2021	**14.1**	6.3	2.2	0.8
2022	**17.3**	7.8	2.8	1.0
2023	**20.1**	9.3	3.5	1.3
2024 (full buildout)	**20.1**	8.9	3.5	1.2
Significance Threshold	*10*	*10*	*15*	*10*

Sources:

1. California Air Resources Board. 2012. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California. Available: http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf.
2. Fehr & Peers. 2016. Screencheck Draft - Transportation Impact Study: Mission Rock (Seawall Lot 337/Pier 48). Prepared for the San Francisco Planning Department. July. San Francisco, CA.
3. United States Environmental Protection Agency. 1996. Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors. 9.12.1 Malt Beverages. Available: https://www3.epa.gov/ttnchie1/ap42/. Accessed: February 29, 2016.

Notes:

a. Emissions over threshold levels are in **bold**.

b. PM10 and PM2.5 include both exhaust and dust emissions.

Abbreviations:

ROG: reactive organic gases
NOx.: nitrogen oxides
PM10: particulate matter less than or equal to 10 microns in diameter
PM2.5: particulate matter less than or equal to 2.5 microns in diameter
lbs: pounds

TABLE 7-10. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR THE REDUCED INTENSITY ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	37.7	20.7	3.5	1.3
2021	**70.8**	32.2	9.9	3.4
2022	**85.4**	40.0	13.0	4.5
2023	**98.4**	48.0	16.1	5.6
2024 (full buildout)	**98.2**	45.7	16.1	5.6
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	6.9	3.5	0.6	0.2
2021	**12.9**	5.9	1.8	0.6
2022	**15.6**	7.3	2.4	0.8
2023	**18.0**	8.8	2.9	1.0
2024 (full buildout)	**17.9**	8.3	2.9	1.0
Significance Threshold	*10*	*10*	*15*	*10*

Source:

Refer to Table 7-9.

Notes:

a. Mitigated emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Measure M-AQ-2.1), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure M-AQ-2.2), and auto vehicle trips are reduced by 20 percent (Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG offsets.

b. PM10 and PM2.5 include both exhaust and dust emissions.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

VDECS: Verified Diesel Emissions Control Strategies

and would not be fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of operational emissions of ROG are conservatively considered ***significant and unavoidable with mitigation*** for the Reduced Intensity Alternative, same as for the proposed project.

Combined Construction and Operations. Similar to the proposed project, combined construction and operational impacts of the Reduced Intensity Alternative would be significant and unavoidable with mitigation. As described in Section 4.G, *Air Quality*, estimated proposed project combined construction and operational emissions of ROG and NOx under the proposed project for the High Commercial Assumption would be between 66 and 123 and between 57 and 156 pounds per day, respectively, exceeding significance thresholds. As shown in Table 7-11 on the following page (also see Tables 18 and 19 in Appendix 12), the Reduced Intensity Alternative would result in combined construction and operational criteria air pollutant emissions of both ROG and NOx slightly lower than those for the proposed project, but still at levels that would exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to the Reduced Intensity Alternative, although the amount of emissions offset through Mitigation Measure AQ-1.5 would be adjusted to the emissions calculated for the Reduced Intensity Alternative. Even with implementation of Mitigation Measure M-AQ-1.1 through M-AQ-1.4 and M-AQ-2.1 through M-AQ-2.3, ROG levels under this alternative would exceed the significance threshold from 2021 through 2024 and beyond at between 81 and 100 pounds per day, and NOx levels would exceed the significance threshold from 2018 through 2021 at between 57 and 85 pounds per day, as shown in Table 7-12, page 7-48 (also see Tables 18 and 19 in Appendix 12). Pursuant to Mitigation Measures M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG and NOx emissions in excess of BAAQMD thresholds for this alternative and the proposed project. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and would not be fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of ROG and NOx emissions is conservatively considered ***significant and unavoidable with mitigation*** for the Reduced Intensity Alternative, same as the proposed project.

Toxic Air Contaminants. Similar to the proposed project, construction and operation of the Reduced Intensity Alternative would generate toxic air contaminants, including PM2.5, diesel particulate matter (DPM), and total organic gases (TOG). The sources of emissions would be exactly the same for this alternative as for the proposed project. The quantity of emissions would vary slightly for construction due to slightly different construction activity for pile driving under this alternative, but would be exactly the same for operations because operational activities that generate TACs are identical to those of the proposed project.

TABLE 7-11. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR THE REDUCED INTENSITY ALTERNATIVE

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[b]	PM10 Total[c]	PM2.5 Exhaust	PM2.5 Dust[b]	PM2.5 Total[c]
2017	2.2	25.5	0.9	0.0	0.9	0.8	0.0	0.8
2018	26.5	**116.3**	5.1	0.0	5.1	4.9	0.0	4.9
2019	53.0	**137.3**	5.9	0.0	5.9	5.6	0.0	5.6
2020	**91.3**	**128.4**	4.9	3.5	8.4	4.7	1.0	5.8
2021	**114.2**	**97.1**	3.3	10.7	14.0	3.2	3.1	6.3
2022	**111.1**	**68.5**	2.4	14.1	16.5	2.4	4.1	6.4
2023	**114.2**	**57.6**	2.1	17.4	19.5	2.1	5.0	7.1
2024	**110.0**	48.9	1.9	17.4	19.2	1.8	5.0	6.8
Significance Threshold	*54*	*54*	*82*	*82*	*82*	*54*	*54*	*54*
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.3	3.3	0.1	0.0	0.1	0.1	0.0	0.1
2018	3.4	**15.1**	0.7	0.0	0.7	0.6	0.0	0.6
2019	6.9	**17.9**	0.8	0.0	0.8	0.7	0.0	0.7
2020	**13.8**	**16.0**	0.6	0.6	1.2	0.6	0.2	0.7
2021	**18.9**	**14.4**	0.5	1.9	2.4	0.5	0.6	1.0
2022	**19.4**	**11.1**	0.4	2.6	3.0	0.4	0.7	1.1
2023	**20.6**	**10.2**	0.4	3.2	3.5	0.4	0.9	1.3
2024	**20.1**	8.9	0.3	3.2	3.5	0.3	0.9	1.2
Significance Threshold	*10*	*10*	*15*	-	*15*	*10*	-	*10*

Source:

Refer to Tables 7-7 and 7-9.

Notes:

All table references below refer to tables in the memorandum Seawall Lot 337/Pier 48 (Mission Rock) Project Air Quality Technical Report: Modeling Data for Emission Results for Alternatives and Variants, October 28, 2016.

a. As shown in Tables 1 and 2, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

b. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

c. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 7-12. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR THE REDUCED INTENSITY ALTERNATIVE

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.7	9.6	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	7.6	**57.5**	0.9	0.0	0.9	0.9	0.0	0.9
2019	14.9	**77.7**	1.3	0.0	1.3	1.3	0.0	1.3
2020	52.1	**84.8**	1.6	3.1	4.6	1.5	0.9	2.4
2021	**81.2**	**74.4**	1.3	9.1	10.4	1.3	2.6	3.9
2022	**90.2**	**58.9**	1.3	12.0	13.3	1.3	3.5	4.8
2023	**99.6**	53.0	1.4	14.8	16.2	1.4	4.3	5.7
2024	**98.2**	45.7	1.3	14.8	16.1	1.3	4.3	5.6
Significance Threshold	*54*	*54*	*82*	*82*	*82*	*54*	*54*	*54*
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	<0.1	1.2	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	1.0	7.5	0.1	0.0	0.1	0.1	0.0	0.1
2019	2.0	**10.1**	0.2	0.0	0.2	0.2	0.0	0.2
2020	8.7	**11.1**	0.2	0.5	0.7	0.2	0.2	0.3
2021	**14.3**	**11.4**	0.2	1.7	1.9	0.2	0.5	0.7
2022	**16.2**	9.8	0.2	2.2	2.4	0.2	0.6	0.9
2023	**18.1**	9.4	0.3	2.7	3.0	0.3	0.8	1.0
2024	**17.9**	8.3	0.2	2.7	2.9	0.2	0.8	1.0
Significance Threshold	*10*	*10*	*15*	*-*	*15*	*10*	*-*	*10*

Source:

Refer to Tables 7-8 and 7-10.

Notes:

All table references below refer to tables in the memorandum Seawall Lot 337/Pier 48 (Mission Rock) Project Air Quality Technical Report: Modeling Data for Emission Results for Alternatives and Variants, October 28, 2016.

a. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Measure AQ-1.1), all haul trucks are model year 2010 or newer (Measure AQ-1.2), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Measure M-AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Measure M-AQ-2.1), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure M-AQ-2.2), and auto vehicle trips are reduced by 20 percent (Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG and NOx offsets.

b. As shown in Tables 1 and 2, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational

	Average Daily Emissions (lbs/day)							
Year	ROG	NO_x	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]

activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

c. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included.

d. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

VDECS: Verified Diesel Emissions Control Strategies

PM2.5 Analysis. Similar to the proposed project, the PM2.5 contribution at receptors under the Reduced Intensity Alternative would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this alternative. For the proposed project (see Table 4.G-22 in Section 4.G, *Air Quality*), the proposed project PM2.5 contribution would exceed the significance threshold but implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4 and M-AQ-2.1 through M-AQ-2.3 would reduce the PM2.5 concentration below the threshold of significance at the onsite maximally impacted receptor (MIR) in the study area that is not located in the air pollutant exposure zone (APEZ) under existing/future conditions, but would be placed in the APEZ under existing/future plus proposed project conditions.

For the Reduced Intensity Alternative, as shown in Table 7-13 on the following page (also see Table 20 in Appendix 12), the maximum annual average PM2.5 concentration would not exceed the significance threshold of 0.2 $\mu g/m^3$ for the MIR currently located in the APEZ. However, it would exceed the significance threshold of 0.3 $\mu g/m^3$ for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from the Reduced Intensity Alternative.

More specifically, the onsite MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from the Reduced Intensity Alternative could be exposed to a maximum annual average PM2.5 concentration from the Reduced Intensity Alternative of up to 2.3 $\mu g/m^3$ (for construction plus operation conditions). This exceeds the project contribution threshold of 0.3 $\mu g/m^3$. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this impact. There are currently no offsite MIRs currently outside the APEZ but that would be placed in the APEZ with the contribution from

TABLE 7-13. MAXIMUM ANNUAL AVERAGE PM2.5 EXHAUST EXPOSURE WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS NOT LOCATED IN THE APEZ DURING EXISTING/FUTURE CONDITIONS BUT WOULD BE LOCATED IN THE APEZ DURING EXISTING/FUTURE PLUS PROJECT CONDITIONS FOR THE REDUCED INTENSITY ALTERNATIVE

	Annual Average PM2.5 Concentration (μg/m³) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	Reduced Intensity Alternative	Mitigated [c]	Reduced Intensity Alternative	Mitigated [c]
Construction				
Total (Background + Project)	10.7	8.7	-	-
Background	8.4	8.4	-	-
Construction Contribution	**2.3**	0.3	-	-
Significance Threshold for Project Contribution	0.3	N/A[d]	-	-
Above Threshold?	**Yes**	N/A[d]	-	-

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (MM AQ-1.1), all haul trucks are model year 2010 (Measure AQ-1.2), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Measure AQ-1.3). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Measure AQ-2.1) and auto vehicle trips are reduced by 20 percent (Measure AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

c. The mitigated values may represent different receptor locations than the Reduced Intensity Alternative values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e., the total background plus project annual average PM2.5 concentration is less than the APEZ threshold of 10.0 μg/m³), the project-level threshold does not apply.

Abbreviations:

μg/m³: micrograms per cubic meter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

APEZ: Air Pollutant Exposure Zone

VDECS: Verified Diesel Emissions Control Strategies

Emissions over threshold levels are in **bold**

the Reduced Intensity Alternative. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce PM2.5 exhaust emissions from off-road construction equipment, on-road haul trucks, construction generators, in-water construction equipment, emergency generators, and mobile sources, and would reduce the maximum annual average PM2.5 concentration from the Reduced Intensity Alternative for the onsite MIR to 0.3 $\mu g/m^3$, which would not exceed the threshold of significance. Consequently, this impact would be ***less than significant with mitigation*** for the Reduced Intensity Alternative, same as for the proposed project.

Cancer Risk Analysis (DPM/TOG). The lifetime cancer risk at receptors under the Reduced Intensity Alternative would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this alternative. For the proposed project (see Tables 4.G-23 and 4.G-24 in Section 4.G, *Air Quality*), the proposed project risk would exceed the significance threshold and implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the risk below the thresholds of significance for the onsite MIR in the study area currently outside the APEZ under existing/future conditions, but that would be placed in the APEZ under existing/future plus proposed project conditions.

For the Reduced Intensity Alternative, as shown in Table 7-14 on the following page (also see Tables 21 and 22 in Appendix 12), the lifetime excess cancer risk would exceed the significance threshold of 7.0 in one million persons exposed for the MIR currently located in the APEZ. It would also exceed the significance threshold of 10.0 in one million persons exposed for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from the Reduced Intensity Alternative.

More specifically, the offsite MIR currently located in the APEZ could be exposed to a lifetime excess cancer risk from the Reduced Intensity Alternative of up to 22.7 per million (for construction plus operation conditions) (see Table 7-14). This exceeds the project contribution threshold of 10.0 in one million. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this significant impact. The lifetime excess cancer risk at the onsite MIR currently located in the APEZ would be below the project contribution threshold of 10.0 in one million, a less than significant impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the lifetime excess cancer risk from the Reduced Intensity Alternative to 4.1 in one million for the offsite MIR currently located in the APEZ, which would be below the threshold of 7.0 in one million. The onsite and offsite MIRs currently outside the APEZ but that would be placed in the APEZ with the contribution from the Reduced Intensity Alternative could be exposed to a lifetime excess cancer risk from the Reduced Intensity Alternative of up to 113.2 and 103.8 per million, respectively, (for construction plus operation). This exceeds the project contribution threshold of 10.0 per million. This is considered a significant impact (Table 7-14), similar to the

TABLE 7-14. MAXIMUM LIFETIME EXCESS CANCER RISK WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS FOR CONSTRUCTION PLUS OPERATION FOR THE REDUCED INTENSITY ALTERNATIVE

	Lifetime Excess Cancer Risk (per million) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	Reduced Intensity Alternative	Mitigated [c]	Reduced Intensity Alternative	Mitigated [c]
Receptors Currently Located in the APEZ during Existing/Future Conditions				
Total (Background + Project)	-	-	129.9	111.4
Background	-	-	107.2	107.2
Construction Plus Operation Contribution	-	-	**22.7**	4.1
Significance Threshold for Project Contribution	-	-	7.0	7.0
Above Threshold?	-	-	**Yes**	No
Receptors Not Located in the APEZ during Existing/Future Conditions but Would Be Located in the APEZ During Existing/Future plus Proposed Project Conditions				
Total (Background + Project)	166.2	75.6	170.8	100.0
Background	53.0	53.0	67.0	87.7
Construction Plus Operation Contribution	**113.2**	22.7	**103.8**	**12.3**
Significance Threshold for Project Contribution	10.0	N/A[d]	10.0	10.0
Above Threshold?	**Yes**	N/A[d]	**Yes**	No

Sources:
CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

a. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (MM AQ-1.1), all haul trucks are model year 2010 (Measure AQ-1.2), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Measure AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Measure AQ-2.1) and auto vehicle trips are reduced by 20 percent (Measure AQ-2.3).

b. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

c. The mitigated values may represent different receptor locations than the Reduced Intensity Alternative values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

d. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e., the total background plus project lifetime excess cancer risk is less than the APEZ threshold of 100), the project-level threshold does not apply.

Abbreviations:
APEZ: Air Pollutant Exposure Zone
VDECS: Verified Diesel Emissions Control Strategies
Emissions over threshold levels are in **bold**

proposed project. Therefore, mitigation is required to reduce this significant impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4 and M-AQ-2.1 through M-AQ-2.3 would reduce the lifetime excess cancer risk from the Reduced Intensity Alternative for the onsite and offsite MIRs to 22.7 per million and 12.3 per million, respectively. Compared to the proposed project, this is slightly lower than the onsite MIR risk of 25.9 per million and slightly higher than the offsite MIR risk of 8.8 per million for the proposed project. For the onsite MIR, the mitigated lifetime excess cancer risk for the Reduced Intensity Alternative of 22.7 per million combined with background cancer risk of 53.0 per million would equal 75.6 per million, which would not exceed the APEZ threshold of 100.0 per million. For the offsite MIR, the mitigated lifetime excess cancer risk of 12.3 per million combined with background cancer risk of 87.7 per million would equal 100.0 per million, which would not exceed the APEZ threshold of 100.0 per million. Therefore, under mitigated conditions under this alternative, neither the onsite MIR nor the offsite MIR would be placed into the APEZ. Consequently, this impact would be ***less than significant with mitigation*** for the Reduced Intensity Alternative, same as for the proposed project.

Consistency with Clean Air Plan. Similar to the proposed project, impacts related to consistency with the 2010 Clean Air Plan (CAP) for the Reduced Intensity Alternative would be less than significant with mitigation. The Reduced Intensity Alternative would be consistent with the 2010 Clean Air Plan, particularly with implementation of the mitigation measures listed above, which include offsetting ozone precursor emissions of ROG and NOx to below significance thresholds, in addition to project-specific measures to reduce pollutant emissions, similar to under the proposed project. Additionally, the Reduced Intensity Alternative would be consistent with the 2010 Clean Air Plan by incorporating various Clean Air Plan control measures, such as land use and local impact measures, energy and climate measures, and TDM measures, all of which are also incorporated in the proposed project. The Reduced Intensity Alternative would also not hinder implementation of the 2010 Clean Air Plan. Therefore, similar to the proposed project, the Reduced Intensity Alternative would not conflict with, or obstruct implementation of the 2010 CAP, and this impact would be ***less than significant with mitigation***.

GREENHOUSE GAS EMISSIONS

Generation of Greenhouse Gas (GHG) Emissions. Similar to the proposed project, the Reduced Intensity Alternative would increase the intensity of use at the project site by introducing new residential, commercial, parking, active/retail, and industrial uses. However, the amount of new development under this alternative would be less than that of the proposed project. Therefore, fewer direct and indirect GHG emissions would be emitted under this alternative, and the contribution to annual long-term increases in GHG emissions would be reduced compared to the proposed project. Similar to the proposed project, the Reduced Intensity Alternative would be subject to regulations adopted to reduce GHG emissions and

designed so as to be eligible for Leadership in Energy and Environmental Design (LEED) certification for all commercial office/retail buildings and residential development onsite, as outlined in the San Francisco Green Building Ordinance (SFGBO) and other City codes. Furthermore, the Reduced Intensity Alternative would be consistent with San Francisco's GHG Reduction Strategy. Impacts related to GHG would be ***less than significant*** and less than the GHG impacts of the proposed project.

WIND AND SHADOW

Wind. Under the Reduced Intensity Alternative, buildings at Blocks A and G would each be 90 feet tall, compared to 240 and 190 feet under the proposed project, respectively. Compared to the proposed project, this reduction in building heights, and the open space at the northeast corner of the project site that would be created as a result of the relocation of Block K from the northeast corner of the project site to the center of the project site, are expected to reduce wind speeds that cause wind hazards. Under the Reduced Intensity Alternative, because of the repositioning of the 240-foot Block D1 tower to the east side of Block D2 (from the west side of Block D2 under the proposed project), this alternative is also expected to reduce wind speeds anticipated with the proposed project by substantially reducing the potential for wind impacts at the southwest corner of the site. Thus, wind speeds previously anticipated under the proposed project surrounding the intersection and areas near the Public Health and Safety Building are expected to be reduced under this alternative. Therefore, compared to the proposed project, this change under the Reduced Intensity Alternative would reduce the impact of strong winds from the west.

The reduced building heights at Blocks A and G under this alternative would also reduce the impacts from strong winds that contribute to hazards in China Basin Park and on surrounding streets under the proposed project. However, the China Basin Park and Third Street are influenced by their exposure to the prevailing winds due to the relatively open surroundings to the north and northwest. These prevailing winds would continue to accelerate along Third Street by the 90-foot Block A massing at the northwest corner under this alternative, similar to the wind impact related to Block A under the proposed project. The height reduction to these two towers under this alternative could result in the elimination of hazard Locations 29 and 124 that were considered impacts under the proposed project. This is because these locations marginally exceed the hazard criteria (37 mph) However, this alternative is not expected to eliminate or affect the remaining hazard exceedances related to the proposed project predicted within the China Basin Park and along Third Street as with the proposed project.

Therefore, the Reduced Intensity Alternative is anticipated to provide an overall reduction in wind hazard conditions on the project site, compared to the proposed project. However, it cannot be stated with certainty whether all of the hazard exceedance locations would be

eliminated under the Reduced Intensity Alternative compared to the proposed project. Thus, Mitigation Measure M-WS-1.1, as required for the proposed project, would be implemented with the Reduced Intensity Alternative. Although wind impacts under the Reduced Intensity Alternative would remain ***significant and unavoidable***, they would be less than the wind impacts of the proposed project particularly at the southwest and northeast corners of the site, and at portions of China Basin Park.

Shadow. As with the proposed project, no parks or open spaces that are under the control of the San Francisco Recreation and Parks Department would receive any new shading from the Reduced Intensity Alternative. Therefore, Section 295 does not apply to any of the parks or open spaces.

Similar to wind impacts, shadow impacts on the expanded China Basin Park, all affected portions of Mission Creek Park, the China Basin Building Promenade, and the southern portion of AT&T Park Plaza would be reduced as a result of the reduced building heights on Blocks A and G under this alternative, compared to the proposed project. During the summer, morning shadows cast on the extended China Basin Park and the Mission Creek Park under this alternative would not be as great as those cast from the proposed project. During the fall, the extended China Basin Park and the Mission Creek Park and China Basin Building Promenade would receive a net increase in total square foot hours of available sunlight in the morning under this alternative. As a result, shadows cast on these parks and open spaces under this alternative would be less than those shadows cast from the proposed project. Similarly, during the winter, morning shadows cast on the extended China Basin Park, the Mission Creek Park, the China Basin Building Promenade, and the southern portion of AT&T Park Plaza would receive a net increase in total square foot hours of available sunlight in the morning under this alternative, and shadows cast on these parks and open spaces would be less under this alternative than those shadows cast on the proposed project. Under the Reduced Intensity Alternative, the repositioning of the Block D1 tower would move the shadow cast around (compared to the proposed project), but would not result in additional shadow. Therefore, shadow impacts under the Reduced Intensity Alternative would remain ***less than significant***, and would be reduced even further than the less-than-significant shadow impacts of the proposed project at China Basin Park, Mission Creek Park, the China Basin Building Promenade, and the southern portion of AT&T Park Plaza, due to the reduced building heights on Blocks A and G.

Cumulative. As stated above, the reduced heights of Blocks A and G under the Reduced Intensity Alternative would reduce the project-level wind and shadow impacts at the project site. Similarly, since impacts would not be substantially reduced under this alternative, compared to the proposed project, cumulative wind and shadow impacts under the Reduced Intensity Alternative would be similar to the cumulative wind and shadow impacts under the proposed project. Under the Reduced Intensity Alternative, Block K would be moved to the Mission Rock Square location,

Block D1 would be repositioned, and tower heights on Blocks A and G would be reduced compared to the proposed project. Each of these changes under the Reduced Intensity Alternative would reduce wind speed and wind hazard exceedances compared to the proposed project. Cumulative impacts under the Reduced Intensity Alternative would be slightly less than the wind impacts of the proposed project; however, cumulative wind impacts under this alternative would remain ***significant and unavoidable*** as under the proposed project. Under the Reduced Intensity Alternative, the reduced tower heights on Blocks A and G would reduce cumulative shadow impacts compared to the proposed project; cumulative shadow impacts under this alternative would remain ***less than significant***.

PUBLIC SERVICES AND RECREATION

Impacts on public services and recreation occur because of increased demand from the increased population in the service area. As discussed above under *Population and Housing*, the Reduced Intensity Alternative would introduce fewer onsite residents than the proposed project and induce less residential population growth citywide. Thus, impacts on public services and recreation as a result of the Reduced Intensity Alternative would be reduced compared to the proposed project.

Fire Protection Services. The Reduced Intensity Alternative would result in an increase in the number of calls for service compared to existing conditions; however, the increase would be less than that of the proposed project because there would be fewer onsite employees and residents. Nonetheless, response times from existing facilities to the project site would not be substantially affected. The Reduced Intensity Alternative, similar to the proposed project, would not result in a substantial adverse environment impact associated with the construction or alteration of fire and emergency service facilities to maintain acceptable service ratios, response times, or other performance objectives. Impacts related to fire protection services would be ***less than significant***, same as under the proposed project.

Police Services. Although the Reduced Intensity Alternative would increase the resident and daytime population at the project site, it would not result in unplanned population growth, which has already been factored into San Francisco Police Department (SFPD) forecasts. The SFPD would increase its staff accordingly and would continue to evaluate its performance (based on response times). When appropriate, it would reallocate resources to accommodate the need for services in specific parts of the city. Therefore, as with the proposed project, the Reduced Intensity Alternative would not result in substantial adverse environmental impacts associated with the construction or alteration of police service facilities to maintain acceptable service ratios, response times, or other performance objectives, resulting in ***less-than-significant*** impacts, same as under the proposed project.

Public Schools. The Reduced Intensity Alternative would include new residential development, which could generate students who would attend local public schools, although

to a slightly lesser extent than the proposed project. Per Government Code Section 65996, the San Francisco Unified School District (SFUSD) collects developer fees to provide for the construction or reconstruction of school facilities, including site acquisition, construction of permanent school facilities, and acquisition of interim school facilities. The proposed project would be required to pay these fees, as would new residential development that may indirectly result from the increase in employment and the number of students. Therefore, the Reduced Intensity Alternative would not result in substantial adverse impacts associated with the construction or alteration of school facilities, resulting in a ***less-than-significant*** impact, same as under the proposed project.

Parks and Recreational Facilities. Because of the increase in residential and commercial development under the Reduced Intensity Alternative, there would be increased demand for parks and open spaces, although to a lesser extent compared with the proposed project. To accommodate this demand, approximately 7.9 acres of open space would be provided at the project site, as under the proposed project, although some of the open space (at least 0.5 acres) would be provided on Block E and/or Block K building rooftops. The public space provided on Block E and/or Block K building rooftops would be privately owned but publicly accessible. The Reduced Intensity Alternative would not result in substantial adverse environmental impacts associated with the construction or alteration of park or open space facilities beyond those impacts associated with construction of the proposed project. In addition, given the wide variety and quantity of nearby public parks, plazas, and recreational opportunities, the anticipated increase in demand generated by the Reduced Intensity Alternative would not increase the use of adjacent or nearby recreational facilities such that substantial physical deterioration of existing facilities would occur or be accelerated. Therefore, impacts related to the use of adjacent or nearby recreational facilities as a result of the Reduced Intensity Alternative would be ***less than significant***, similar to the proposed project.

Library Services. It is anticipated that the existing libraries in the city would be able to accommodate the increase in residents and workers at the project site. As such, similar to the proposed project, the Reduced Intensity Alternative would not result in substantial adverse environmental impacts associated with the construction or alteration of library facilities in order to maintain acceptable service ratios or other performance objectives. Library service impacts would be ***less than significant***, same as under the proposed project.

Cumulative Impacts. As discussed in Section 4.J, *Public Services and Recreation*, cumulative impacts with respect to fire, police, schools, recreational facilities, and libraries would be less than significant. Because the Reduced Intensity Alternative would involve fewer residents and employees than the proposed project, cumulative impacts would also be ***less than significant***, same as under the proposed project.

UTILITIES AND SERVICE SYSTEMS

Water Supplies and Facilities. Implementation of the proposed project would incrementally increase demand for water in San Francisco. The Reduced Intensity Alternative would also increase demand because of the increase in the number of residents and employees at the project site, although to a slightly lesser extent. As with the proposed project, this alternative would install a recycled water main for landscaping and a new graywater treatment system. It would also include LEED certification in order to reduce water use. Regardless, the San Francisco Public Utilities Commission (SFPUC) would meet the estimated increase in demand with its anticipated water supply. The Water Supply Assessment (WSA) prepared for the proposed project accounted for a higher water demand than what would occur under this alternative. This is because this alternative would generate fewer residents and employees at the project site compared to the proposed project. New or expanded water supply resources or entitlements, or the construction of new water treatment facilities, would not be required to serve the Reduced Intensity Alternative. This impact would be ***less than significant***, as under the proposed project**.**

Stormwater, Wastewater, and Facilities. As with the proposed project, stormwater and wastewater flows from the Reduced Intensity Alternative would be collected and treated by the SFPUC. Wastewater flows from this alternative would be slightly less than those of the proposed project because of a reduction in the number of onsite residents and employees. However, similar to the proposed project, the Reduced Intensity Alternative would not cause the collection treatment capacity of the sewer system in the city to be exceeded. Stormwater flows would increase slightly compared to the proposed project because of the decrease in the amount of nonrooftop open space (pervious) areas. However, the majority of the project site is currently paved; therefore, compared to existing conditions, the Reduced Intensity Alternative would result in fewer impervious surfaces and would not increase stormwater runoff rates and volumes. In addition, as with the proposed project, the alternative would include stormwater management measures, such as bio-retention areas, rain gardens, and flow-through planter areas, and the installation of sanitary sewer laterals and new storm drainage pipe infrastructure. The construction of new stormwater and wastewater facilities at the project site would not result in environmental impacts beyond the construction impacts analyzed for the Reduced Intensity Alternative and are discussed in detail in the appropriate topical sections of this Draft EIR (e.g., Sections 4.E, *Transportation and Circulation*; 4.F, *Noise*; and 4.G, *Air Quality*) as part of the assessment of overall project impacts. Therefore, because wastewater flows would not exceed existing system capacities and stormwater flows would be less than existing conditions, impacts from the Reduced Intensity Alternative associated with construction or expansion of wastewater and stormwater facilities would be ***less than significant,*** same as under the proposed project.

Solid Waste Facilities. Construction debris from the Reduced Intensity Alternative would be similar to that of the proposed project. The Reduced Intensity Alternative would meet the construction waste recycling requirements for parking lot demolition and/or recycled construction waste. However, the Reduced Intensity Alternative would result in less soil off-haul and disposal than the proposed project because excavation for Mission Rock Square Garage would not be required. Operation of the Reduced Intensity Alternative would increase the generation of solid waste at the project site because of the increase in the number of residents and employees but to a slightly lesser extent than under the proposed project. The Reduced Intensity Alternative would be subject to the City's Mandatory Recycling and Composting Ordinance, which requires all residents and commercial landlords to separate their refuse into recyclables, compostables, and trash, which would minimize solid waste disposal. The Reduced Intensity Alternative, similar to the proposed project, would be served by a landfill with sufficient permitted capacity to accommodate its solid waste disposal needs and would comply with federal, state, and local statutes and regulations related to solid waste, resulting in a ***less-than-significant*** impact.

Energy Supplies. The project site would be designated as a Type 1 Eco-District under both the proposed project and the Reduced Intensity Alternative to help meet environmental goals. The goal for overall development includes LEED certification for all commercial office/retail buildings and residential development onsite. As with the proposed project, a Sustainability Strategy would be implemented under this alternative to achieve LEED certifications, along with other sustainability-related goals. Nonetheless, energy would be used for both construction and operation of the Reduced Intensity Alternative. Because energy use is required for ongoing operation of the project site and because various energy-saving measures would be implemented, energy use of the proposed project and the Reduced Intensity Alternative would not be wasteful, inefficient, or unnecessary, resulting in ***less-than-significant*** impacts.

Cumulative Impacts. As discussed in Section 4.K, *Utilities and Service Systems*, the City's water supplies, wastewater infrastructure, stormwater drainage facilities, solid waste facilities, and energy supplies would be able to serve cumulative development in the city. The City would have adequate supplies for customer demand, including demand from the proposed project when combined with existing and planned future uses. Because the Reduced Intensity Alternative would use less water and energy and generate less wastewater and solid waste than the proposed project, as well as less stormwater compared with existing conditions, cumulative impacts of the Reduced Intensity Alternative on utilities and service systems would not be cumulatively considerable and are, thus, ***less than significant***.

BIOLOGICAL RESOURCES

The project site is almost entirely paved and located within an urban setting. Therefore, impacts pertaining to riparian habitat, sensitive natural communities, and federally protected wetlands are not evaluated further. In addition, there are no adopted habitat conservation or natural community conservation plans within the city. This topics are not discussed further.

Decrease in Water Quality, Affecting Candidate, Sensitive, or Special-Status Species. The Reduced Intensity Alternative would result in construction impacts similar to those of the proposed project, although to a slightly lesser extent because of the reduction in development density. However, construction impacts from rehabilitation of Pier 48 and the aprons, including the seismic upgrade of Pier 48, would be the same under both the proposed project and the Reduced Intensity Alternative. Construction of the project components under both this alternative and the proposed project has the potential to contribute contaminants to and increase the turbidity of San Francisco Bay, potentially affecting fish. Releases of contaminants, such as gasoline, diesel fuel, lubricants, hydraulic fluid, and other fluids contained in construction equipment during construction activities that require the use of heavy equipment near open water, could result in acute negative effects on special-status fish species, such as steelhead, Chinook salmon, longfin smelt, and green sturgeon, and invertebrates. Impacts during construction from the Reduced Intensity Alternative would be minimized (similar to the proposed project) through implementation of best management practices (BMPs) and the standard measures specified in the Construction General Permit Stormwater Pollution Prevention Plan, 401 water quality certification, 404 permit, and Spill Prevention and Countermeasure Plan. Therefore, impacts during construction would be ***less than significant***, similar to the proposed project.

Runoff associated with operation of the Reduced Intensity Alternative (similar to the proposed project) would be handled through compliance with the City's Stormwater Management Ordinance which utilizes features such as self-contained treatment facilities and large-feature rain gardens which minimize pollutant discharges. Therefore, impacts on special-status fish species from a decrease in water quality during operation of both the proposed project and the Reduced Intensity Alternative would be ***less than significant***.

Changes in Shading and Habitat at Pier 48, Affecting Habitat for Candidate, Sensitive, or Special-Status Species. Overwater and in-water structures, including barges associated with construction activities, can alter underwater light conditions and result in a decrease in photosynthesis of diatoms, benthic algae, eelgrass, and other aquatic plants, thereby decreasing prey items for fish. The project site is currently developed with the Pier 48 structure, which already casts a permanent shadow on the waters below. Pier 48 would not increase in size as a result of the seismic upgrades under either the proposed project or the Reduced Intensity Alternative. Therefore, there would be no permanent increase in shading associated with operation of Pier 48, and impacts associated with a change in permanent shading would be ***less than significant*** under both this alternative and the proposed project.

Pier 48 Pile Driving and Construction, Affecting Fish and Marine Mammal Species. As with the proposed project, the Reduced Intensity Alternative would involve the installation of new piles with use of an impact hammer, the installation of new steel shells with use of a vibratory hammer, and the extraction of timber piles with use of a vibratory extractor. Noise, vibrations,

and other physical disturbances can harass fish, disrupt or delay normal activities, or cause injury or mortality. Given the estimated accumulated sound levels and uncertainty regarding the behavioral responses of the species of concern, impacts on special-status fish species from pile driving would be potentially significant for both the proposed project and the Reduced Intensity Alternative. Implementation of Mitigation Measures M-BI-3.1 and M-BI-3.2 with this alternative, as required for the proposed project, would decrease noise impacts on special-status species in the project area from impact pile driving by limiting in-water pile driving using impact hammers to months (June 1 to November 30) when special-status fish species are not likely to be in the project area, monitoring underwater noise, and implementing noise reduction measures (i.e., bubble curtains, wood blocks for cushioning) during construction of the Reduced Intensity Alternative to ***less than significant with mitigation***.

Marine mammal impacts would include temporary or permanent hearing loss and disorientation due to diminished communication and ecolocation clicks. All species could be disturbed by Pier 48 seismic upgrade construction, which would include impact pile driving and vibratory driving. Given the estimated sound levels, impacts on marine mammals from pile driving would be potentially significant. Under the Reduced Intensity Alternative, implementation of Mitigation Measures M-BI-3.2 and M-BI-3.3, as required for the proposed project, would reduce impacts on marine mammals from pile driving by reducing noise and monitoring marine mammal activity. These mitigation measures would restrict impact pile driving during spawning and migration seasons for special-status fish species and require underwater noise monitoring and attenuation plans. This impact would be ***less than significant with mitigation*** for both the proposed project and the Reduced Intensity Alternative.

Interference with the Movement of Native Resident or Migratory Fish or Wildlife Species. As with the proposed project, there would be no effect on fish movement in the project area under this alternative. On land, reflective and transparent glass used in project buildings, which mirrors the surrounding environment during daylight hours, could cause birds to collide with the new buildings. Further, during nighttime, new lighting could misdirect or confuse birds, resulting in disruption of natural behavioral patterns and navigational cues, similarly resulting in injury or death from exhaustion or collisions with buildings under both this alternative and the proposed project. Because of the project site's proximity to San Francisco Bay and its location within the Pacific Flyway, these impacts could adversely affect migratory birds. Building heights under the Reduced Intensity Alternative would be slightly lower than they would be under the proposed project; however, impacts could still occur because of the increase in development compared to existing conditions. Both the proposed project and the Reduced Intensity Alternative would be required to adhere to Planning Code Section 139 (Standards for Bird-Safe Buildings), which would reduce the reflectivity of the buildings by treating glass so that it is perceived by birds, minimize lighting by shielding outside light fixtures, direct light downwards, and not allow event searchlights. Therefore, through compliance with the

mandatory requirements of Planning Code Section 139, this impact would be considered ***less than significant*** for both the proposed project and the Reduced Intensity Alternative.

Migratory Nesting Birds. Existing vegetation and structures on the project site, such as Pier 48, could provide nesting habitat for a variety of protected migratory birds. As with the proposed project, if construction of the Reduced Intensity Alternative were to occur during the nesting season (February 1 to August 31), then the removal of shrubs and trees and/or rehabilitation of sheds and piers could result in the direct mortality of adult or young birds, destruction of active nests, and/or disturbance of nesting adults, causing nest abandonment and/or loss of reproductive effort. Under the Reduced Intensity Alternative, implementation of Mitigation Measure M-BI-5 (similar to the proposed project), which conducts pre-construction surveys for nesting migratory birds and provides a buffer around nests, as required for the proposed project, would reduce impacts on protected nesting migratory bird species from the removal of shrubs and trees and/or rehabilitation of the sheds and Pier 48 to ***less than significant with mitigation***.

Conflicts with Local Policies or Ordinances. All trees at the project site would be removed with implementation of either the proposed project or the Reduced Intensity Alternative. However, none of the trees at the project site, all of which are located in China Basin Park on Port property, are regulated by the Urban Forestry Ordinance. Removal of the trees at China Basin Park and replacement of those trees in the reconfigured park would occur under both the proposed project and the Reduced Intensity Alternative. Neither the proposed project nor the Reduced Intensity Alternative would conflict with the local tree protection ordinance. Therefore, the impact would be ***less than significant***.

Cumulative Impacts. Cumulative impacts, with respect to biological resources, from the proposed project would be less than significant with the implementation of Mitigation Measures M-BI-3.1, M-BI-3.2, M-BI-3.3, M-BI-5, and M-BI-6.1. Because this alternative would involve the same amount of tree removal, Pier 48 rehabilitation work, and a similar building footprint, cumulative impacts would not be significant and would be ***less than cumulatively considerable,*** same as the proposed project.

GEOLOGY AND SOILS

As with the proposed project, the Reduced Intensity Alternative would not result in impacts related to landslides, septic tanks, or substantial changes to topography or unique geologic or physical features. In addition, as discussed in Section 4.M, *Geology and Soils*, the California Supreme Court concluded in the *California Building Industry Association v. Bay Area Air Quality Management District* (*CBIA v. BAAQMD*) decision that "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or

residents."[5] Consequently, topics in Section 4.M, *Geology and Soils*, which concern existing geologic and soils conditions, are discussed only to the extent that the proposed project exacerbates existing conditions to cause a significant impact on the environment. The alternatives analysis follows the same approach. The focus of the alternatives analysis is a comparison of the significant impacts of the proposed project to the significant impacts of the alternatives.

Seismically Related Ground Failure. The project site is subject to liquefaction, lateral spreading, and earthquake-induced settlement hazards. Loads, such as buildings or utilities, constructed on the project site would exacerbate soil displacement as a result of strong ground shaking during an earthquake. Construction of the Reduced Intensity Alternative would result in similar liquefaction, lateral spreading, and earthquake-induced settlement effects as the proposed project. The magnitude of the difference in building scope between this alternative and the proposed project would not be great enough to result in substantial differences in ground failure hazards. However, all construction would be required to comply with the Seismic Hazards Mapping Act (SHMA), California Geological Society (CGS) Special Publication 117A, the 2016 Port Building Code, and 2016 CBC and prepare and implement the recommendations of a design-level geotechnical report, which would minimize ground failure associated with strong ground shaking during an earthquake. As with the proposed project, with compliance with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC as required by Port building code, impacts of this alternative related to seismically related ground failure would be ***less than significant***.

Soil Erosion or Loss of Topsoil. Because the soils at the project site are not native soils, there would be no loss of topsoil. However, construction activities associated with the Reduced Intensity Alternative, such as building construction, paving, cut-and-fill activities, and grading and excavation, could increase erosion but to a slightly lesser extent than the proposed project. This is because excavation would not be required for the Mission Rock Square Garage under this alternative, unlike the proposed project. However, all project construction activities would be subject to existing regulatory requirements. Because land disturbance associated with the proposed project and this alternative involve more than 1 acre, coverage under the Construction General Permit would be required, including development of and compliance with a

[5] The *CBIA v. BAAQMD* ruling provides several exceptions to the general rule regarding analysis of a project's impact on the environment: (1) If a project would exacerbate existing environmental hazards (e.g., expose hazardous waste that is currently buried); (2) if a project qualifies for certain specific exemptions (e.g., certain housing projects or transportation priority projects, per Public Resources Code [PRC] 21159.21(f),(h), 21159.22(a),(b)(3), 21159.23(a)(2)(A), 21159.24(a)(1),(3), or 21155.1(a)(4),(6)); (3) if project occupants would be exposed to potential noise or safety impacts due to proximity to an airport (per PRC 21096); and (4) if the project is a school project that requires assessment of certain environmental hazards (per PRC 21151.8).

Stormwater Pollution Prevention Plan (SWPPP). As with the proposed project, with implementation of a SWPPP, as required by law, impacts related to soil erosion would be ***less than significant***.

Location on a Geologic Unit or Soil Unit that Could Become Unstable, Potentially Resulting in liquefaction and lateral spreading. The project site is vulnerable to seismically induced liquefaction. Because the liquefiable layers are discontinuous and random across the site, there would be variability in the magnitude of potential liquefaction-induced settlement across the project site if a load were to be placed on the soil. In locations where there is a liquefiable layer between the surface soil and underlying soil on a slope, the surface soil may be transported downslope, initiated by either seismic or gravitational forces, leading to a progressive failure that could affect an area as far away as 110 feet west of the seawall at Pier 48. Construction of the Reduced Intensity Alternative would result in a similar magnitude of effect in liquefaction and lateral spreading as the proposed project because the magnitude of the building scope is similar. However, all construction would be required to comply with the 2016 CBC and prepare and implement the recommendations of a design-level geotechnical report, which would minimize effects of ground failure. As with the proposed project, with compliance with the 2016 CBC as required by Port building code, this alternative's impacts related to seismically related ground failure would be ***less than significant***.

Paleontological Resources or Unique Geologic Features. The Colma Formation, which underlies the project site, has high paleontological sensitivity and could contain vertebrate fossils at the project site. Although construction of the Mission Rock Square Garage would not occur under the Reduced Intensity Alternative (unlike for the proposed project), resulting in less excavation than the proposed project, drilling and pile driving for proposed buildings and streets would occur at depths where paleontological resources could potentially occur. Therefore, as with the proposed project, drilling and pile driving associated with construction of the Reduced Intensity Alternative could affect geologic units that could contain significant paleontological remains or traces of paleontological remains. However, Mitigation Measure M-GE-5, as required for the proposed project, would reduce impacts on paleontological resources to ***less than significant with mitigation***, under the Reduced Intensity Alternative.

Cumulative Impacts. The Reduced Intensity Alternative would result in the same cumulative impacts as the proposed project. The geographic context for an analysis of impacts associated with seismic hazards is the region. Although the Reduced Intensity Alternative would increase the likelihood of liquefaction, lateral spreading, and other ground-failure effects compared to existing conditions, similar to the proposed project, the effects would not cause ground failure in other parts of the city and would not directly affect other projects.

The geographic context for an analysis of impacts associated with erosion is the watershed. Erosion can affect loss of soil by removing it from the watershed, water quality by contributing sediment, and topography by transporting sediment. Thus, the geographic context for erosion

impacts is the Mission Creek subwatershed of the larger Lower San Francisco Bay watershed.[6] The alternative, in combination with other development within the city, would not substantially increase soil erosion potential, similar to the proposed project.

The geographic context for an analysis of impacts related to paleontological resources is the San Francisco area, Mission Bay, and San Francisco Bay. Cumulative impacts on paleontological resources could be significant under this alternative and the proposed project; however, Mitigation Measure M-GE-5 would reduce potential impacts to a ***less-than-significant*** level, as under the proposed project. Therefore, although cumulative development impacts related to paleontological resources would be considered potentially significant, the incremental effects of the Reduced Intensity Alternative, after mitigation, would not be cumulatively considerable.

HYDROLOGY AND WATER QUALITY

Violation of Water Quality Standards or Waste Discharge Requirements. Land-disturbing activities during construction and the placement of stockpiles in proximity to storm drain inlets or nearby surface waters may result in a temporary increase in sediment loads in San Francisco Bay. This could occur under both the proposed project and the Reduced Intensity Alternative. Pollutants, such as nutrients, trace metals, and hydrocarbons attached to sediment, can be transported with sediment to downstream locations and degrade water quality. The delivery, handling, and storage of construction materials and wastes (e.g., concrete debris), as well as the use of heavy construction equipment, could also result in stormwater contamination, thereby affecting water quality. Construction activities under this alternative and the proposed project may involve the use of chemicals and operation of heavy equipment, which could result in accidental spills of hazardous materials during construction activities. Such spills could enter the groundwater aquifer or nearby surface water bodies from runoff or storm drains. All construction activities would be subject to existing regulatory requirements, such as the Construction General Permit. As a performance standard, BMPs included in the SWPPP would represent the best available technology that is economically achievable and the best conventional pollutant control technology to reduce pollutants. Therefore, because the Reduced Intensity Alternative (similar to the proposed project) would be required to comply with the regulatory controls described above, potential water quality impacts associated with construction activities and degradation of stormwater runoff would be ***less than significant***.

The same in-water activities included in the proposed project at Pier 48 would be implemented under the Reduced Intensity Alternative. Construction activities within the Bay would be subject to the requirements of a Section 10 permit from the U.S. Army Corps of Engineers, which would

[6] San Francisco Bay Regional Water Quality Control Board. 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Originally published January 18, 2007. Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

receive water quality certification from the Regional Water Board as well as a Major Permit from the San Francisco Bay Conservation and Development Commission and conduct formal consultations with the National Marine Fisheries Service and California Department of Fish and Wildlife (CDFW) for the protection of biological resources. Because of the limited extent and temporary nature of construction activities in the Bay, as well as implementation of water quality control measures as part of compliance with permit requirements under this alternative and the proposed project, water quality impacts related to construction activities in the Bay would be ***less than significant***.

Operational and maintenance activities under the proposed project would generate pollutants of concern from landscape maintenance, building maintenance, the storage of materials and substances, maritime operations, and vehicle use. The Reduced Intensity Alternative would result in slightly fewer operational and maintenance activities compared to the proposed project because of the reduction in building floor area. Compliance with both the Stormwater Management Requirements and Design Guidelines (SMR) would allow the Reduced Intensity Alternative to achieve its long-term sustainable approach to planning and design as well as comply with stormwater requirements established by the City and the Port's National Pollutant Discharge Elimination System (NPDES) General Permit for Municipal Separate Storm Sewer Systems (MS4) requirements to ensure water quality standards and objectives, as defined in the Basin Plan, are achieved. Therefore, potential surface water quality impacts from operation of the Reduced Intensity Alternative, similar to the proposed project, would be ***less than significant***.

Depletion of Groundwater Supplies or Recharge. Although, because of elimination of the Mission Rock Square garage, less excavation would occur under this alternative compared to the proposed project; construction dewatering in areas of shallow groundwater may be required during excavation activities required for other project components. This could result in a temporary reduction in groundwater volumes. In the event that groundwater is encountered during construction, dewatering would be conducted on a one-time or temporary basis during the construction phase under this alternative and the proposed project. This Alternative would include approximately 7.9 acres of open space (similar to the proposed project), which is approximately 5.7 acres more than existing conditions.[7] Although not all of this open space area would be pervious, generally the increase in open space would allow for an increase in groundwater recharge potential under this alternative, similar to the proposed project, although to a lesser extent than the proposed project. This is because slightly less nonrooftop open space would be developed under this alternative. Groundwater within the downtown San Francisco groundwater basin is not used for water supply. Therefore, construction and operation of the Reduced Intensity Alternative would not utilize or affect groundwater supplies, resulting in a ***less than significant impact***, similar to the proposed project.

[7] Includes existing China Basin Park, but not the existing Pier 48 aprons, as open space because the Pier 48 aprons do not currently include pervious surfaces.

Alteration of Existing Drainage Patterns. As with the proposed project, the Reduced Intensity Alternative would implement BMPs, described in the SWPPP, to minimize the potential for erosion and sedimentation in nearby storm drains during construction. In addition, an Erosion and Sediment Control Plan (ESCP) would be submitted, further reducing the potential for substantial erosion or siltation onsite/offsite. For construction at Seawall Lot 337, the Reduced Intensity Alternative would also be required to comply with existing NPDES Construction General Permit requirements, the City's Construction Site Runoff Ordinance, and SFPUC Stormwater Management Requirements, similar to the proposed project. Soil management and the need to accommodate sea-level rise (SLR) by raising the site are expected to result in the majority of soil excavated onsite for cut-and-fill operations being maintained throughout the construction phases under this alternative and the proposed project, with a limited amount of soil import for landscaping. Soil would be stockpiled on the project site for use where fill is required.

Unlike the proposed project, the Reduced Intensity Alternative would not construct the underground Mission Rock Square Garage. The Reduced Intensity Alternative would eliminate approximately 76,221 cubic yards (cy) of soil excavation and off-haul from the Mission Rock Square Garage required under the proposed project.

For rehabilitation of Pier 48, impacts under this alternative and the proposed project would be minimized through implementation of BMPs and other measures specified in the Construction General Permit SWPPP, 401 water quality certification, and the 404 permit. Operation of the Reduced Intensity Alternative, as with the proposed project, would require soil stabilization (e.g., vegetation or other protective cover, stabilized slopes, and fills), in accordance with San Francisco stormwater requirements. With implementation of low-impact development (LID) features, such as bio-retention areas, and additional open space, the potential for erosion and siltation at the project site under this alternative and the proposed project would be reduced. Therefore, this alternative's impacts related to altering existing drainage patterns or substantially increasing the rate or amount of runoff would be ***less than significant***, similar to the proposed project.

Creation of Runoff. During construction, the proposed project or this alternative would not create or contribute runoff water that would exceed the capacity of the existing stormwater drainage systems or result in flooding onsite or offsite. New and renovated facilities that would be constructed for the Reduced Intensity Alternative (similar to the proposed project) would be drained by a combination of new and existing storm drains. To serve the proposed development parcels, storm drain lateral connections would be installed. The majority of the existing project site is paved. Because the Reduced Intensity Alternative would include more open space than existing conditions (although a lesser amount of pervious open space than the proposed project), the new impervious surfaces would not increase stormwater runoff rates and volumes. In addition, the project design under this alternative and the proposed

project would include stormwater management measures, such as bio-retention areas, rain gardens, and flow-through planter areas, all of which would reduce the volume of runoff entering the storm sewer system. The Construction Site Runoff Ordinance includes implementation of BMPs under this alternative and the proposed project to control construction site runoff and reduce the discharge of pollution to storm drain system and ensure water quality standards and objectives, as designated by the Basin Plan, are achieved. Through compliance with SFGBO requirements, and compliance with the San Francisco Stormwater Management Requirements, runoff water from the project site would not exceed the capacity of existing or planned stormwater drainage systems, and this impact for the Reduced Intensity Alternative would be ***less than significant,*** similar the proposed project.

Place Housing within a 100-year Flood Hazard Area. The project site is not within a 100-year floodplain identified on the City's 2008 Interim Floodplain Maps. Implementation of the proposed project or this alternative would not place housing within a current 100-year flood hazard area or increase the frequency of flooding. Although the Reduced Intensity Alternative would result in a slight decrease in pervious open space than the proposed project, new stormwater drainage infrastructure would minimize any potential for flooding during a 100-year flood event.

The project site is in a low-lying area and could be subject to inundation from future SLR. However, only the immediate waterfront portions of the project site along Mission Creek and Lower San Francisco Bay would be inundated (i.e., 12 and 36 inches of SLR under the 2050 and 2100 SLR scenarios, respectively). However, when the effects of 100-year storm surge are considered, over half of the site west of Pier 48 would be vulnerable to flooding at the mid-century level of the SLR scenario, and the entire site west of Pier 48 would be vulnerable to flooding with projected end-of-century SLR.

Both Blocks I and J would be designated as flexible-use parcels under the proposed project and therefore could include housing; under this alternative, Blocks I and J would not be flexible but would provide housing. Both are located adjacent to Lower San Francisco Bay and between Pier 48 and Pier 50. The proposed grading (under both the proposed project and the Reduced Intensity Alternative) would raise the center of the site, with the minimum elevations based on the preliminary FEMA 100-year BFE. By elevating the center of the site, the alternative (similar to the proposed project) would accommodate protection from the projected SLR by 2100 worst-case scenario plus 100-year storm surge. For the 100-year storm event and overland release, the storm drain system, street section, and street grading under this alternative and the proposed project would convey stormwater runoff to San Francisco Bay. Grades would slope down to the existing adjacent streets, the San Francisco Bay shoreline, or park areas. China Basin Park and Pier 48 would maintain shoreline elevations close to their existing grades. However, grades under this alternative and the proposed

project would be raised up to an elevation of 15.3 feet NAVD88 to finished floor elevations, which would provide up to of 5.5 feet (66 inches) of freeboard[8] above present-day BFE for the development area, to accommodate for the projected 2100 SLR estimates.

Although the Reduced Intensity Alternative would include construction of housing, any proposed housing or structures would be constructed more than 100 feet inland from the shoreline and would not be constructed within an identified 100-year flood zone. The project sponsor would review adaptive management strategies in the future and determine the feasibility of solutions if and when the need for such strategies arises. Therefore, this alternative's impacts related to placing housing within a 100-year flood hazard area that could be inundated by flooding due to SLR would be ***less than significant***, similar to the proposed project.

Flooding from Tsunami or Seiche Inundation. The project area is adjacent to Lower San Francisco Bay and, therefore, not subject to inundation by seiche. However, as with the proposed project, the majority of the project site (with the exception of the southwest portion) would be subject to flooding from tsunami inundation under the Reduced Intensity Alternative. To protect people and structures from a significant risk of loss or injury due to tsunami hazards, the grading elevations for both the proposed project and the Reduced Intensity Alternative would consider SLR and exceed the minimum requirements. Because flood protection planning for the site would be governed by the extreme high tides rather than tsunamis, the estimate for the 100-year tsunami event from the U.S. Army Waterways Experiment Station, which produces a minimum site grade of 8.2 feet NAVD88without an allowance for SLR, would be considered. Therefore, this alternative's impacts related to flood risks due to tsunami or seiche inundation would be ***less than significant***, similar to the proposed project.

Cumulative Impacts. The Reduced Intensity Alternative would result in the same, or slightly fewer, cumulative hydrology impacts compared to the proposed project, since this alternative would have a similar amount of development and site coverage as the proposed project. Cumulative water quality, groundwater supply and recharge, drainage, and runoff impacts under this alternative and the proposed project would result in less-than-cumulatively considerable impacts. As such, the Reduced Intensity Alternative would result in the same ***less-than-cumulatively considerable impacts*** as the proposed project.

[8] Freeboard is a factor of safety, usually expressed in feet above a flood level for purposes of floodplain management. Freeboard tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

HAZARDS AND HAZARDOUS MATERIALS

As with the proposed project, the Reduced Intensity Alternative would result in no impacts related to public-use airports and private airstrips. Therefore, these topics are not discussed further.

Routine Transport, Use, or Disposal of Hazardous Materials. Construction and operational activities of both the proposed project and the Reduced Intensity Alternative are expected to involve the routine use of hazardous materials (e.g., motor fuels, solvents, and lubricants), which could pose a significant threat to construction workers, the public, or the environment if not properly managed. Regulations require all hazardous waste transporters to have identification numbers and a hazardous waste manifest, which documents the legal transport and disposal of the waste and is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations require specific cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill, and for the safe packing and transport of hazardous waste. Because compliance with existing regulations is mandatory, construction of the Reduced Intensity Alternative, similar to the proposed project, would not create a significant hazard for the public or the environment through the routine transport, use, or disposal of hazardous materials, and this impact would be ***less than significant***.

During operation, it is anticipated that the Reduced Intensity Alternative (similar to the proposed project) would require the use of hazardous materials that are typical of residential, commercial, production, and active/retail uses as well as parking facilities and open space areas. Programs are in place in San Francisco to provide opportunities for residents to dispose of household hazardous waste. Under Articles 21 and 22 of the San Francisco Health Code, implemented by SFDPH, businesses are required by law to ensure employee safety by identifying hazardous materials in the workplace, providing safety information to workers who handle hazardous materials, and adequately training workers. Industrial/manufacturing and maritime uses proposed at Pier 48 could involve the use of larger quantities of hazardous materials. Because compliance with existing regulations would be mandatory, operation of the Reduced Intensity Alternative (similar to the proposed project) would not create a significant hazard for the public or the environment through the routine transport, use, or disposal of hazardous materials, and this impact would result in the same ***less-than-significant*** impacts as the proposed project.

Accidental Release of Hazardous Materials. Accidental releases of hazardous materials into the air, soil, and/or groundwater during construction could adversely affect construction workers, the public, and/or the environment adversely. Construction activities associated with the rehabilitation of sheds and removal of wood pilings at Pier 48, which would occur under the Reduced Intensity Alternative (similar to the proposed project), could release hazardous building materials into the environment. However, adherence to existing hazardous materials laws and regulations during construction and the removal of hazardous building materials

would reduce the potential for an accidental release. Previous environmental investigations indicate that the potential exists for residual soil and/or groundwater contamination to be present on the project site from documented releases of hazardous materials and historical land uses that were associated with hazardous materials. Specific construction activities under this alternative and the proposed project that could disturb contaminated subsurface soil and/or groundwater include earthwork activities and construction dewatering, although the Reduced Intensity Alternative would involve slightly less subsurface excavation than the proposed project as a result of the elimination of Mission Rock Garage. It is also possible that sediments that contain residual levels of contaminants could be disturbed during pile replacement activities at Pier 48, which, similar to the proposed project, would be required for the Reduced Intensity Alternative. If not properly managed, the disturbance of these sediments could re-suspend contaminants in the water column, potentially affecting the environment. The permits required for the pile replacement and construction activities (Section 10 permit from the U.S. Army Corps of Engineers, water quality certification from the Regional Water Quality Control Board, a Major Permit from the Bay Conservation and Development Commission, and formal consultations with the National Marine Fisheries Service and California Department of Fish and Wildlife) would specify BMPs and the preparation and implementation of plans for the protection of water quality, such as: a Debris Management Plan; a Spill Resource and Countermeasure Plan; equipment fueling requirements to require proper fuel transfer procedures; equipment maintenance requirements to minimize leaks and spills; a Materials Management Disposal Plan; barge mooring requirements to capture construction debris; measures to avoid cement, concrete, and saw water from entering the San Francisco Bay; and measures to assure proper disposal of construction material under this alternative and the proposed project. For example, the Bay Conservation and Development Commission's typical permit conditions include requirements to construct, guarantee, and maintain public access to the Bay, specified construction methods to ensure safety or to protect water quality, plan review requirements that must be met before construction can begin, and mitigation requirements to offset adverse environmental impacts.

Through the Maher process, SFDPH would require preparation and implementation of an approved Site Mitigation Report for this alternative and the proposed project. The Site Mitigation Report must present recommended measures to mitigate potential risks to the environment and to protect construction workers, nearby residents, workers and/or pedestrians from potential exposure to hazardous substances and underground structures that may be encountered during soil excavation and grading activities. In addition, the Site Mitigation Report must include measures to protect future users of the site from any residual contaminants that remain on the site after construction is completed. The Site Mitigation Report must identify procedures to identify unanticipated conditions such as underground storage tanks, sumps or pipelines that may be identified during excavation activities. Any such USTs would be required to be closed pursuant to Article 21 of the San Francisco Health Code. Article 21 provides that all closures and removals of USTs shall require approval of SFDPH, compliance with Article

21 and its implementing regulations, and compliance with applicable provisions of Chapter 6.7 and 6.75 of the California Health and Safety Code (commencing with Section 25280) and its implementing regulations for this alternative and the proposed project. The closure of any UST must also be conducted in accordance with a permit from the San Francisco Fire Department.

Further, as discussed above, existing OSHA and Cal/OSHA requirements provide for protective clothing and worker training; medical examinations and monitoring of employees engaged in activities that could disturb asbestos-containing building materials; precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; a maximum safe exposure level for construction work where lead exposure may occur; and protective measures, monitoring requirements, and compliance standards to ensure the safety of construction workers exposed to lead-based paint.

Finally, the Site Mitigation Report will include an Operations and Maintenance (O&M) Plan to provide for long-term management of the site. Future site users, utility maintenance workers, or other workers who may handle contaminated soils during project operations would need to comply with the site's O&M Plan. In accordance with any land use restrictions recorded on the project site, the site's O&M Plan would include measures that would need to be followed during any work that may disturb underlying soils. The O&M Plan would include maintenance logs, cap inspection reports, and annual inspection reports.

Because the project sponsor would be required to demonstrate compliance with the performance standards outlined in the Maher Ordinance, including preparation of a site-specific Site Mitigation Report, the Reduced Intensity Alternative would not create a significant hazard for construction workers, future site users, and/or the environment from contaminated soil and/or groundwater, resulting in a ***less-than-significant*** impact, similar to the proposed project.

Hazardous Materials Pursuant to Government Code Section 65962.5. One hazardous materials release site, as identified on the list compiled pursuant to Government Code Section 65962.5, was formerly located on the project site. The San Francisco Department of Public Health (SFDPH) issued a Remedial Action Completion Certification for the release site in 2008; SFDPH has determined that low levels of residual soil and/or groundwater contamination could be present at the project site. Hazardous materials releases were also reported at the H&H Ship Service Company, which was formerly located on the project site. Although this site is not included on a list compiled pursuant to Section 65962.5 of the Government Code, low levels of residual soil and/or groundwater contamination could remain at the site. Construction and operation of both the proposed project and the Reduced Intensity Alternative could disturb potential contamination in the soil and/or groundwater. Such work would be subject to OSHA and Cal/OSHA requirements and Construction Dust Control Ordinance requirements that would protect workers and members of the public, and hazardous materials would be required to be transported to and from the project site in accordance with RCRA and USDOT

regulations and disposed of in accordance with the RCRA and the California Code of Regulations at a facility that is permitted to accept the waste. Because the project sponsor would be required to demonstrate compliance with the performance standards established by the regulations described above, the Reduced Intensity Alternative, similar to the proposed project, would result in a ***less-than-significant*** impact related to development of a hazardous materials site included in a list compiled pursuant to Government Code Section 65962.5.

Hazards to Nearby Schools. There are no existing public or private schools within a 0.25 mile radius from the project site; however, a 500-student public school has been proposed in the Mission Bay neighborhood. Although the school is outside the 0.25 radius, potential impacts are conservatively disclosed below. Hazardous materials used during construction and operation of both the proposed project and the Reduced Intensity Alternative would be managed in accordance with applicable laws and regulations. In addition, as discussed in Section 4.G, *Air Quality*, sources of hazardous emissions during project construction and operation include diesel particulate matter from vehicle exhaust and emergency generators. A Site Mitigation Plan and dust control measures must be implemented to ensure that residual soil contamination is properly managed, and the site's O&M Plan will included measures that would need to be followed for any work that may disturb the underlying soils. The O&M Plan will include maintenance logs, cap inspection reports, and annual inspection reports. With mitigation, these emission sources would have a less-than-significant impact on nearby sensitive receptors (which include schools). Therefore, as with the proposed project, the handing or emission of hazardous or acutely hazardous materials during construction and operation of the Reduced Intensity Alternative would result in a ***less-than-significant impact*** on nearby schools.

Interference with an Adopted Emergency Response or Evacuation Plan. The proposed project would increase traffic in the vicinity of the project site. The Reduced Intensity Alternative would also increase traffic but to a lesser extent than the proposed project, because of the less intense nature of development. Implementation of the Reduced Intensity Alternative would not impede emergency access routes or alter adjacent roadways. Therefore, the Reduced Intensity Alternative, similar to the proposed project, would have a ***less-than-significant impact*** on existing emergency response and evacuation plans for the city.

Cumulative Impacts. Because the Reduced Intensity Alternative would develop the project site similar to the proposed project and disturb approximately the same amount of soil, or slightly less, this alternative would have similar or slightly decreased cumulative impacts compared to the proposed project. Development of the project site and other cumulative development (similar to the proposed project under cumulative conditions) could expose people or the environment to residual contaminants in soil and/or groundwater if measures are not implemented to control unintentional or inadvertent releases. Development of the Reduced Intensity Alternative and other cumulative development could also expose people to hazardous

materials at the existing Pier 48 during rehabilitation of the structure if measures are not implemented to control unintentional or inadvertent releases. However, the Reduced Intensity Alternative and all other cumulative development within the city would be required to adhere to current regulatory standards, reducing the cumulative impacts to ***less than significant***.

VARIANTS COMPARED TO THE REDUCED INTENSITY ALTERNATIVE

As discussed in Chapter 6, *Variants*, there are four different project variations that could be implemented with the proposed project. If one of the alternatives presented in this chapter is adopted instead of the proposed project, a variant could also be implemented. In all cases, however, if a variant were implemented with the Reduced Intensity Alternative, resulting impacts would not be greater than what is already disclosed in Chapter 4 and Chapter 6 of this EIR. As indicated in Table 7-16, page 7-82, there are no topics under which an alternative would result in greater impacts than the proposed project. Additional impacts could result if Variant 1 (district-wide heating and cooling) were implemented, particularly related to biological resources. However, those additional impacts would result regardless if the underlying project were as proposed in Chapter 2, *Project Description*, or if it consisted of one of the alternatives. There would be no increase in the severity of impacts if Variant 1 were coupled with an alternative.

There is no possibility of Variant 3 (reconfigured parking) being implemented with the Reduced Intensity Alternative because both involve eliminating the Mission Rock Square garage.

If Variant 2 (entertainment venue) or Variant 4 (hotel) were implemented with the Reduced Intensity Alternative the land use mix would be altered compared to the Reduced Intensity Alternative but the severity of impacts would not increase. As discussed in Chapter 6, *Variants*, Variant 2 would result in a decrease in weekday a.m. peak hour trips but an increase in p.m. peak hour trips. Variant 4, however, would result in an increase in both weekday a.m. peak hour and weekday p.m. peak hour vehicle trips compared to the Reduced Intensity Alternative. It can reasonably be stated that this same shift in trip generation would occur if either Variant 2 or Variant 4 were coupled with the Reduced Intensity Alternative but that, due to the overall decrease in square footage as part of the Reduced Intensity Alternative compared to the proposed project, the increase in trips would not exceed the maximum (and, as a result, the severity) of trips associated with the proposed project. Thus, air quality and noise impacts are not expected to be greater than the proposed project when Variant 2 or Variant 4 is coupled with the Reduced Intensity Alternative. Since construction activities would not change under Variant 2 or 4, construction impacts would not increase in severity over the proposed project, when coupled with the Reduced Intensity Alternative.

D. ALTERNATIVE C: NO CHANGE TO PIER 48 ALTERNATIVE

DESCRIPTION

Under the No Change to Pier 48 Alternative, no new development or redevelopment would occur on Pier 48, and Pier 48 would remain in its existing condition. The existing sheds would not be rehabilitated, and no new uses or tenants would be introduced. The sheds would continue to be used on an interim basis for storage, exhibits, and event and AT&T Park patrons parking. No repairs would be made to the northern, eastern, or southern aprons. The existing maritime uses along the aprons would continue to operate, although the aprons would be rezoned for open space use. Seismic upgrades to the Pier 48 structure would not be implemented; therefore, no in-water construction activities would occur.

Development on the remaining portions of the project site under this alternative, including Seawall Lot 337, Parcel P20, China Basin Park, Channel Wharf, and Terry A. Francois Boulevard, would occur as proposed under the proposed project. Specifically, up to approximately 2.7 to 2.8 million gsf of residential, commercial, production, and active/retail uses would be developed on 11 proposed development blocks on Seawall Lot 337. New or expanded open space areas would include China Basin Park and a waterfront promenade, Mission Rock Square, Channel Lane, and Channel Wharf. Although aprons would not be rehabilitated as part of No Change to Pier 48 Alternative, they would be zoned for public access and open space uses. These areas would be connected by a network of pedestrian-oriented public streets; however, the pedestrian circulation network would not extend through Pier 48 as it would under the proposed project. Therefore, approximately 7.9 acres of open space areas would be provided under this alternative, which is the same as under the proposed project. Similar to the proposed project, the No Change to Pier 48 Alternative would require approval of an SUD with flexible zoning controls and Design Controls.

IMPACT ANALYSIS

As discussed above, the proposed project assumes development of either the High Commercial Assumption or High Residential Assumption on Seawall Lot 337. For purposes of impact analyses in Chapter 4, *Environmental Setting and Impacts*, the analysis is based on whichever land use assumption results in the greater level of impacts. As also discussed, the No Change to Pier 48 Alternative includes the same development at Seawall Lot 337 as the proposed project but no rehabilitation and reuse of Pier 48. Therefore, the analysis for the No Change to Pier 48 Alternative focuses on the differences between impacts for this alternative and the impacts discussed in Chapter 4 for the proposed project components at Pier 48. It is assumed that all impacts at Seawall Lot 337 that would occur with implementation of the proposed project would also occur with implementation of the No Change to Pier 48 Alternative.

LAND USE AND LAND USE PLANNING

Physically Divide an Established Community. The No Change to Pier 48 Alternative would develop the same types of land uses on the project site, with the exception of the industrial uses at Pier 48. Although the replacement of existing surface parking with mixed-use development under this alternative would increase building intensity on the project site compared to existing conditions, new buildings would not isolate areas or constitute a barrier to access because the majority of the project site presently serves as a parking facility rather than access between adjoining areas. As with the proposed project, the No Change to Pier 48 Alternative would retain and expand existing pedestrian access and connect the project site with surrounding neighborhoods, the proposed Blue Greenway, and the existing Bay Trail. The No Change to Pier 48 Alternative would, therefore, improve connectivity compared to existing conditions and would not divide an established community, resulting in ***less-than-significant*** impacts.

Conflicts with Applicable Land Use Plans, Policies, or Regulations. The same discretionary approvals required by the proposed project for Seawall Lot 337, including a request for an SUD and Design Controls, would be required for the No Change to Pier 48 Alternative. These approvals would bring this alternative into compliance with the development restrictions set forth for the project site in the Planning Code and other plans and policies that govern development on the project site. However, approvals would not be needed from the San Francisco Bay Conservation and Development Commission or Metropolitan Transportation Commission to remove the port priority use area designation from the portions of Pier 48 that would provide public access under the proposed project. Therefore, similar to the proposed project, the No Change to Pier 48 Alternative would result in a ***less-than-significant*** impact with regard to consistency with applicable land use plans, policies, and regulations.

Cumulative Impacts. As with the proposed project, none of the reasonably foreseeable projects would combine with the No Change to Pier 48 Alternative to physically divide an established community because none would be located immediately adjacent to the project site. As discussed above, the discretionary approvals that would be required for the proposed project and the No Change to Pier 48 Alternative would result in compliance with the land use plans and policies that govern development on the project site. Furthermore, each individual development project or plan would be evaluated for consistency with applicable land use policies and programs, and any physical impacts associated with policy conflicts would be identified and mitigated to the extent feasible. Similar to the proposed project, the mix of residential, commercial, active/retail, and production uses proposed under the No Change to Pier 48 Alternative would be consistent and compatible with the varied mix of land uses that are planned for the Mission Bay community, including the cumulative projects. Therefore, cumulative impacts would be ***less than significant***.

AESTHETICS

Scenic Vistas. As with the proposed project, the No Change to Pier 48 Alternative would result in the additional height, bulk, and massing from development of the proposed buildings at Seawall Lot 337, which would result in the same impacts on scenic vistas. The minor exterior changes to Pier 48 under the proposed project would not affect views as seen from scenic vistas. Therefore, similar to the proposed project, the No Change to Pier 48 Alternative would not block the majority of scenic views seen from scenic vistas, resulting in the same ***less-than-significant*** impact as the proposed project.

Scenic Resources. The scenic resources that exist at the project site include Pier 48 as a contributing resource to The Embarcadero Historic District. Unlike the proposed project, the No Change to Pier 48 Alternative would not result in any changes to Pier 48. Therefore, the No Change to Pier 48 Alternative would result in ***no impact*** on this contributing scenic resource compared to the less-than-significant impact under the proposed project.

Visual Character or Quality. The No Change to Pier 48 Alternative would increase onsite building heights and the density of development compared to existing conditions. However, as with the proposed project, this alternative would generally improve the current visual setting by adding maintained landscaping, bicycle/pedestrian connections and amenities, and modern buildings to the project site. This alternative would not affect the existing visual character or quality of the project site. As with the proposed project, the No Change to Pier 48 Alternative would adhere to the Design Controls, which guide physical development on the project site. Implementation of the Design Controls under this alternative would ensure that the proposed buildings would not be seen as visually intrusive but, rather, elements that would blend into the fabric of the existing neighborhood. Therefore, similar to the proposed project, the impact on onsite visual character or quality would be ***less than significant***.

Light and Glare. As with the proposed project, impacts resulting from light and glare from the No Change to Pier 48 Alternative would be most likely to occur at locations that would have immediate foreground views of the project site. Standard exterior lighting and LED lighting, if used, could affect sensitive receptors if not properly designed. Similarly, windows would be the most prominent source of daytime glare and could affect viewers in the mid- to upper-level stories of nearby existing buildings to the south and west as well as viewers who are outside or driving to the north of the project site. Because the No Change to Pier 48 Alternative would result in the same building heights and designs as the proposed project, the same impacts would occur. Nonetheless, as with the proposed project, the Design Controls, which would guide physical development on the project site, would ensure that the buildings would not result in substantial light and glare impacts on the surrounding community. The Design Controls (at page 180) specify that all exterior light must be suitable for a given "Lighting Zone," as defined by the USGBC and IESNA. Additionally, the proposed project would be required to adhere to Planning Code Section 139, which focuses on buildings

that create location-specific hazards and building-feature hazards, and City Planning Commission Resolution 9212, which prohibits projects from using mirrored or reflective glass on buildings. Therefore, the light and glare impacts of the No Change to Pier 48 Alternative would be ***less than significant***, similar to the proposed project.

Cumulative Impacts. The other reasonably foreseeable projects are likely to be consistent with the design requirements set forth in their respective design controls. Although the No Change to Pier 48 Alternative and other development would add height, bulk, massing, light, and glare to the project vicinity, this change would fit within the dense urban context and would not result in a significant impact on a scenic vista, scenic resource, or the overall visual character of the area. The increased development would represent a small portion of the overall vista and development pattern. Therefore, as with the proposed project, the cumulative impacts of the No Change to Pier 48 Alternative would be ***less than significant***.

POPULATION AND HOUSING

Population and Housing Growth. The No Change to Pier 48 Alternative would introduce the same number of onsite residents as the proposed project. However, the number of employees and employee-induced city residents would be less than that of the proposed project because of the elimination of the proposed industrial use (analyzed as a brewery facility) and other new uses on Pier 48. As shown in Table 4.C-9 and Table 4.C-10 in Section 4.C, *Population and Housing*, uses on Pier 48 would employ approximately 200 people under both the High Commercial Assumption or High Residential Assumption. Applying the same conversion factors used in the proposed project analysis, these employees could induce an additional 176 residents within the city.[9] Thus, the No Change to Pier 48 Alternative would generate 200 fewer employees and 176 fewer employee-induced city residents than the proposed project. As with the proposed project, impacts related to population and housing would be ***less than significant***.

Cumulative Impacts. This alternative, in combination with other projected growth in the city, would increase population, employment, and housing demand in the city. However, as with the proposed project, the contribution of the No Change to Pier 48 Alternative to any increase in population, employment, or housing demand would not be cumulatively considerable, and cumulative impacts related to population and housing would be ***less than significant***.

CULTURAL RESOURCES

Historical Resources. Unlike the proposed project, the No Change to Pier 48 Alternative would not physically alter Pier 48, which is a contributor to the National Register–listed Port of San Francisco Embarcadero Historic District and individually eligible for listing in the National

[9] With respect to the conversion factors, 200 employees x 0.504 = 101 employee-residents, 101/1.35 workers per household = 75 households, and 75 x 2.35 persons/household = 176 residents.

Register. Therefore, this alternative would result in no impact on this historic resource, compared to the less-than-significant impacts under the proposed project. However, the No Change to Pier 48 Alternative would still introduce new construction within the Port of San Francisco Embarcadero Historic District, which has the potential to alter the character of the district. However, similar to the proposed project, the new development would not impair the historical characteristics that qualify the Port of San Francisco Embarcadero Historic District as a historical resource for CEQA purposes, as discussed in more detail in Section 4.D, *Cultural Resources*. Development on Seawall Lot 337 also has the potential to change the historical setting of the resources identified as historical for CEQA purposes located in the project study area (in the Lefty O'Doul Bridge or the Pier 50 office buildings) but would not materially impair any qualities that qualify them as historical resources. Therefore, the No Change to Pier 48 Alternative, similar to the proposed project, would result in ***less-than-significant impacts*** on historic resources.

Archaeological Resources. There are no known archaeological resources in the project area. However, the project site is determined to be sensitive for deeply buried prehistoric resources. Construction activities for the No Change to Pier 48 Alternative would include pile driving for proposed building foundations and there is a possibility for construction activities associated with the alternative to encounter and adversely affect unknown archaeological resources, similar to the proposed project. Implementation of Mitigation Measure M-CP-2, as required for the proposed project, would reduce the potentially significant impacts on archaeological resources to ***less than significant with mitigation***.

Human Remains. Because of the location of the project site on previously submerged lands, the potential for encountering human remains is low. However, as with the proposed project, it is possible that human remains may be encountered during construction activities associated with the No Change to Pier 48 Alternative. Implementation of Mitigation Measure M-CP-3, as required for the proposed project, would reduce impacts on human remains to ***less than significant with mitigation***.

Tribal Cultural Resources. Based on the background research and Native American outreach, there are no known tribal cultural resources on the project site. However, based on the archeological sensitivity assessment, as with the proposed project, there is the potential for prehistoric archeological resources to be present on the project site under this alternative. Prehistoric archeological resources may also be considered tribal cultural resources. In the event that project activities disturb unknown archeological sites that are considered tribal cultural resources, any inadvertent damage would be considered a significant impact under this alternative, same as the proposed project. Implementation of Mitigation Measure M-CP-4, as required for the proposed project, would reduce impacts on tribal cultural resources to ***less than significant with mitigation***.

Cumulative Impacts. The No Change to Pier 48 Alternative, in combination with future development in the city, could result in cumulative impacts on historic resources, archaeological resources, and human remains. All projects, including the alternative, would be required to comply with the Secretary of the Interior's rehabilitation standards and, therefore, they would not result in significant adverse effects on the environment. Although the project area contains a stratigraphic interface with moderate archaeological sensitivity at great depth, there is low potential for projects in the study area to encounter human remains or tribal cultural resources, and implementation of Mitigation Measures M-CP-2, M-CP-3, and M-CP-4 would result in less-than-significant impacts. Thus, as with the proposed project, the No Change to Pier 48 Alternative's incremental contribution to these cumulative effects would not be cumulatively considerable. Cumulative impacts would be ***less than significant with mitigation***.

TRANSPORTATION AND CIRCULATION

The Pier 48 component of the proposed project would include person trips and vehicle trips associated with the brewery, brewery retail, brewery restaurant, mezzanine retail, and mezzanine office. These trips would be the same under both land use assumptions. Table 7-15, on the following page, shows the total number of auto trips, transit trips, vehicle trips, and other trips that would be generated by the No Change to Pier 48 Alternative. This table compares the number of trips generated by the High Commercial Assumption for the proposed project to the No Change to Pier 48 Alternative (High Commercial). As shown in Table 7-15, the No Change to Pier 48 Alternative would generate fewer weekday a.m. (2 percent) and p.m. (6 percent) peak-hour external person trips than the proposed project. Therefore, the No Change to Pier 48 Alternative would result in less travel demand than the High Commercial Assumption for the proposed project.

Table 7-16, page 7-82, provides a comparisons of trips generated by the High Residential Assumption for the proposed project to the No Change to Pier 48 Alternative (High Residential). As shown in Table 7-16, the No Change to Pier 48 Alternative would generate fewer weekday a.m. (2 percent) and p.m. (6 percent) peak-hour external person trips than the High Residential Assumption for the proposed project. Therefore, the No Change to Pier 48 Alternative would result in less travel demand than the High Residential Assumption for the proposed project.

TABLE 7-15. HIGH COMMERCIAL ASSUMPTION AND NO CHANGE TO PIER 48 ALTERNATIVE EXTERNAL TRIP GENERATION

Land Use	Proposed Project's High Commercial Assumption	No Change to Pier 48 Alternative (High Commercial)	Change from Proposed Project's High Commercial Assumption	
Weekday A.M. Peak Hour				
Total Person Trips	6,864	6,743	-121	-2%
Auto	*2,524 (37%)*	*2,480 (37%)*	*-44*	*-2%*
Transit	*2,635 (38%)*	*2,582 (38%)*	*-53*	*-2%*
Other[a]	*1,705 (25%)*	*1,681 (25%)*	*-24*	*-1%*
Total Vehicle Trips	1,449	1,423	-26	-2%
Weekday P.M. Peak Hour				
Total Person Trips	9,145	8,649	-496	-6%
Auto	*3,488 (38%)*	*3,282 (38%)*	*-206*	*-6%*
Transit	*2,841 (31%)*	*2,728 (32%)*	*-113*	*-4%*
Other[a]	*2,816 (31%)*	*2,639 (31%)*	*-177*	*-7%*
Total Vehicle Trips	1,755	1,652	-103	-6%

Source: Fehr & Peers, 2016.

Note:

a. "Other" includes bicycle, motorcycle, taxi, and additional modes, including walking.

TABLE 7-16. HIGH RESIDENTIAL ASSUMPTION AND NO CHANGE TO PIER 48 ALTERNATIVE EXTERNAL TRIP GENERATION

Land Use	Proposed Project's High Residential Assumption	No Change to Pier 48 Alternative (High Residential)	Change from Proposed Project's High Residential Assumption	
Weekday A.M. Peak Hour				
Total Person Trips	*6,354*	*6,233*	*-121*	*-2%*
Auto	2,331 (37%)	2,287 (37%)	-44	-2%
Transit	2,451 (38%)	2,398 (38%)	-53	-2%
Other[a]	1,572 (25%)	1,548 (25%)	-24	-2%
Total Vehicle Trips	*1,396*	*1,370*	*-26*	*-2%*
Weekday P.M. Peak Hour				
Total Person Trips	*8,791*	*8,295*	*-496*	*-6%*
Auto	3,345 (38%)	3,139 (38%)	-206	-7%
Transit	2,768 (32%)	2,655 (32%)	-113	-4%
Other[a]	2,678 (30%)	2,501 (31%)	-177	-7%
Total Vehicle Trips	*1,758*	*1,655*	*-103*	*-6%*

Source: Fehr & Peers, 2016.

Note:

a. "Other" includes bicycle, motorcycle, taxi, and additional modes, including walking.

CONSTRUCTION IMPACTS

The No Change to Pier 48 Alternative would have similar construction impacts as the proposed project because it would involve construction of fewer buildings and the same number of parking structures. The construction duration, both for the overall project and individual buildings, would be the same as the proposed project given a similar level of overall square footage on Seawall Lot 337 parcels. Construction of the proposed project would not result in significant impacts on the transportation and circulation network because any effects would be of limited duration and temporary.

Construction-related work for the No Change to Pier 48 Alternative would have a ***less-than-significant*** impact on transportation and no mitigation measures would be required. Improvement Measure I-TR-1 requires the applicant to prepare a Construction Traffic Control Plan for the proposed project. Improvement Measure I-TR-1 would also apply to the No Change to Pier 48 Alternative to further reduce less-than-significant impacts related to potential conflicts between construction activities and pedestrians, bicyclists, transit and vehicles, and between construction activities and nearby businesses and residents.

VMT IMPACTS

The No Change to Pier 48 Alternative would generate slightly less daily VMT than the proposed project, as it would generate approximately 14,450 daily vehicle trips or approximately five percent fewer daily vehicle trips than the High Commercial Assumption under the proposed project. Because the proposed project is located within a Traffic Analysis Zone that has existing average daily VMT per capita for residential, office, and retail uses that is more than 15 percent below the existing regional average daily VMT per capita, the proposed project and therefore the No Change to Pier 48 Alternative would not cause significant additional VMT. As with the proposed project, the No Change to Pier 48 Alternative would also not substantially induce automobile travel. As such, the No Change to Pier 48 Alternative would have a ***less-than-significant*** impact on VMT.

TRAFFIC HAZARD IMPACTS

The No Change to Pier 48 Alternative would result in similar or slightly smaller queues at the Block D2 parking garage as the High Commercial Assumption version of the proposed project, as it would generate slightly fewer daily and peak hour vehicle trips. Westbound vehicles on Long Bridge Street waiting to turn left into the easternmost garage driveway would queue into the Long Bridge Street/Bridgeview Street intersection and impede the flow of pedestrian, bicycle and vehicle traffic. This would be a ***significant*** impact. The same mitigation measures identified for the proposed project would apply to the No Change to Pier 48 Alternative. With implementation of Mitigation Measure M-TR-3, the traffic hazard impact of the No Change to Pier 48 Alternative would be reduced to ***less-than-significant*** levels.

TRANSIT IMPACTS

As shown in Table 7-15, page 7-81, the number of transit trips generated by the No Change to Pier 48 Alternative would be 2 percent lower during the a.m. peak hour and 4 percent lower during the p.m. peak hour compared to the High Commercial Assumption and High Residential Assumption of the proposed project. Impacts on transit capacity utilization associated with the No Change to Pier 48 Alternative would be slightly less or similar to those of the proposed project. Impact TR-4 and impact TR-6 indicate that the proposed project would have a significant impact on two transit lines (10 Townsend and 30 Stockton) due to a substantial increase in transit demand that would not be accommodated by local transit capacity and an increase in transit delays due to queues at the proposed project's Block D2 parking garage. The No Change to Pier 48 Alternative would have similar significant transit impacts as the proposed project and the proposed project's Mitigation Measures M-TR-4.1, M-TR-4.2 and M-TR-6 would also apply to the No Change to Pier 48 Alternative.

Implementing Mitigation Measures M-TR-4.1 and M-TR-4.2 would allow Muni to maintain transit headways, and it would reduce the No Change to Pier 48 Alternative impact to less-than-significant levels. However, because the method and total cost of providing additional service and the SFMTA's ability to implement improvements is uncertain, the No Change to Pier 48 Alternative transit impacts would be ***significant and unavoidable with mitigation***.

Implementation of Mitigation Measure M-TR-6 would resolve transit delay impacts to being less than significant. However, at this time they may not be considered to fully resolve transit delay impacts because, and to the extent that, implementation of some components of the mitigation (i.e. approval of restriping on Third Street and entering into an Event Management Agreement with the project sponsor to allocate PCOs onsite), require SFMTA Board approval, and such approval is currently considered uncertain. Thus, based upon such current uncertainty of full implementation of Mitigation Measure M-TR-6, the transit delay impacts of the No Change to Pier 48 Alternative would remain ***significant and unavoidable with mitigation***, similar to under the proposed project.

The proposed project would have less-than-significant impacts on regional transit routes. Since the number of peak hour transit trips is lower for the No Change to Pier 48 Alternative compared to the proposed project, the No Change to Pier 48 Alternative would have a ***less-than-significant*** impact on regional transit routes, similar to the proposed project.

BICYCLE AND PEDESTRIAN IMPACTS

The No Change to Pier 48 Alternative would produce 1 to 2 percent fewer bicycle and pedestrian trips during the a.m. peak hour and 7 percent fewer during the p.m. peak hour compared to the proposed project, as shown in Table 7-15, page 7-81, and Table 7-16, page 7-82.

As with the proposed project, the No Change to Pier 48 Alternative would cause pedestrian and bicycle hazards due to queues at the proposed project garages as documented in Impact TR-3 and TR-6. Mitigation Measures M-TR-3 and M-TR-6 would also apply to the No Change to Pier 48 Alternative. With implementation of these measures, vehicle impacts on pedestrian and bicycles generated by trips to the projects' parking garage under the No Change to Pier 48 Alternative would be reduced to a less-than-significant level.

As documented in Impact TR-9, the proposed project would cause significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. The No Change to Pier 48 Alternative would have similar significant pedestrian impacts as the proposed project and Mitigation Measure M-TR-9 would also apply to the No Change to Pier 48 Alternative. Implementation of Mitigation Measure M-TR-9 would resolve pedestrian safety impacts and reduce them to less than significant. However, at this time, the approval of the signalization improvements is considered somewhat

uncertain, because they will require SFMTA Board approval. Thus, because implementation of Mitigation Measure M-TR-9 is uncertain to such extent, the No Change to Pier 48 Alternative's pedestrian safety impacts would continue to be considered ***significant and unavoidable with mitigation***, similar to the proposed project.

As documented in Impact TR-10, the proposed project would cause a significant impact at the bicycle-truck interface at Pier 48. Since there would be no development on Pier 48 with the No Change to Pier 48 Alternative, there would be no significant bicycle impact as a result of the No Change to Pier 48 Alternative at this location. Implementation of Mitigation Measure M-TR-10, which provides for active management of the Pier 48 driveway crossing and the provision of flaggers whenever a truck has to back into the valley of Pier 48 across the Blue Greenway, would not be required under the No Change to Pier 48 Alternative. The impact of No Change to Pier 48 Alternative on bicycle safety would be ***less-than-significant***.

LOADING IMPACTS

The No Change to Pier 48 Alternative would have lower peak loading demands compared to the High Commercial Assumption (45 versus 49 spaces) for the proposed project and the same peak loading demands compared to the High Residential Assumption (45 spaces)[10], which would not be fully accommodated by the proposed loading supply and therefore result in a significant impact. The No Change to Pier 48 Alternative has lower peak commercial loading demands, compared to the proposed project, because it does not include development on Pier 48. Mitigation Measures M-TR-11.1 and M-TR-11.2 would resolve the loading shortfall and the loading impacts would be ***less than significant with mitigation***.

EMERGENCY ACCESS IMPACTS

Emergency access to the project site for the No Change to Pier 48 Alternative would be similar to that of the proposed project. The proposed internal roadway network would accommodate emergency vehicles including fire trucks. The No Change to Pier 48 Alternative includes implementation of a "Keep Clear" zone on Mission Rock Street in front of the police and fire truck access to ensure that police vehicles and fire trucks are provided with clear access and egress to the Public Safety Building.

During events at AT&T Park, pre-event and post-event vehicular traffic destined for the proposed onsite garages would be managed as it is currently to minimize impacts on emergency-vehicle circulation and access as well as private vehicles destined for the UCSF emergency room and urgent care center. Before events at AT&T Park, up to 21 parking

[10] The delivery/service vehicle trips and loading demand is determined based on rates in SF Guidelines as well as truck count data collected for the existing Anchor Brewery in San Francisco and adjusted to reflect the proposed brewery on Pier 48 (as SF Guidelines do not provide loading data for brewery uses).

control officers (PCOs) are stationed at 17 locations. Post-events at AT&T Park, up to 19 PCOs are stationed at 14 locations. These locations include intersections along Third Street, Mission Rock Street, and Terry A. Francois Boulevard along the project site boundaries. During major events at AT&T Park, the north–south Shared Public Way within the project site would be closed to vehicles, with the exception of emergency vehicles. If necessary, emergency vehicles would be able to travel on Muni's light rail right-of-way in the median of Third Street.

To address the circumstance of simultaneous events at AT&T Park and the Mission Rock site, the Proposed Project has prepared detailed event management plans that include combinations of strategies as described in Chapter 5 of the Mission Rock Transportation Plan. These would apply to the No Change to Pier 48 Alternative as well. The Event Management measures identified in the Mission Rock Transportation Plan describe strategies for a primary event at AT&T Park (40,000+ attendees) or a secondary event at AT&T Park (15,000 to 25,000 attendees) and onsite events (2,000 to 5,000 attendees). Additionally, event traffic management systems at AT&T Park are reviewed and refined continuously to plan for such simultaneous events. Therefore, both AT&T Park and onsite events would develop refinements to their plans as needed to ensure emergency vehicle circulation is accommodated, both under the proposed project and the No Change to Pier 48 Alternative.

Roadway improvements adjacent to the UCSF facilities would facilitate emergency vehicle access. Before and after events, emergency vehicle access to the project site and UCSF Medical Center uses would be maintained under the proposed project and the No Change to Pier 48 Alternative, as would emergency access for persons traveling to the emergency room and urgent care center in their personal vehicles. For these reasons, the No Change to Pier 48 Alternative would not inhibit emergency vehicle access to the project site and nearby vicinity under the event scenario. Similar to the proposed project, the No Change to Pier 48 Alternative would be designed to provide access for Police and Fire department vehicles into the Public Safety Building across Mission Rock Street. However, until final street design is coordinated with the Police and Fire Department, this would conservatively be a significant impact. Mitigation Measure M-TR-12 would reduce this significant impact to a less-than-significant level. Improvement Measure I-TR-10 would also apply to the No Change to Pier 48 Alternative and would enhance emergency vehicle access.

PARKING IMPACTS

The midday peak parking demand would be 3,541 spaces for the No Change to Pier 48 Alternative. Parking demand outside of the midday peak period will be lower than during the midday peak. These levels are less than the midday peak parking demand of 3,846 spaces for the proposed project's High Residential Assumption or 3,655 spaces for the proposed project's

High Commercial Assumption.[11] As with the proposed project, the No Change to Pier 48 Alternative would have a ***less-than-significant*** parking impact.

CUMULATIVE IMPACTS

The effects of the proposed project on the transportation network under cumulative (2040) conditions are deemed to be ***less-than-significant*** for construction impacts, VMT impacts, regional transit impacts, loading impacts, emergency vehicle access impacts, and parking impacts. The No Change to Pier 48 Alternative would likewise not make a considerable cumulative contribution to construction impacts, VMT impacts, emergency vehicle access impacts, and parking impacts because as compared to the proposed project, it would have similar or less building square footage, generate four percent fewer daily vehicle trips, would not have commercial loading demands for Pier 48 uses and would have the same peak commercial loading demands for Seawall Lot 337 uses, and have lower peak parking demands when compared to the proposed project. Loading impacts are by their nature localized and site-specific. As under the proposed project, the shortfall of loading facilities on the project site under the No Change to Pier 48 Alternative would not be expected to contribute to any loading impacts from other development projects near the project site. Overall, because loading tends to occur as close to the delivery point as possible, particularly in cases where loading occurs via double-parking, as may be the case within the project site, it is not expected that unmet loading demand associated with the No Change to Pier 48 Alternative would be accommodated outside of the project site. Similarly, it is not likely that unmet loading demand from other parts of the study area would interfere with the project site. Therefore, similar to the proposed project, the No Change to Pier 48 Alternative would not make a considerable contribution to cumulative loading impacts. The impacts of the No Change to Pier 48 Alternative related to construction, VMT impacts, regional transit impacts, loading impacts, emergency vehicle access, and parking under cumulative conditions would thus be ***less-than-significant*** as with the proposed project.

The cumulative impacts of the proposed project on traffic hazard impacts, pedestrian impacts, and bicycle impacts would be ***less-than-significant with mitigation***. The cumulative contribution of the No Change to Pier 48 Alternative would be similar to the proposed project because it would have the same access design for the Parcel D2 parking garage, and would generate slightly fewer pedestrian and bicycle trips when compared to the proposed project under all scenarios. In addition, by their nature, pedestrian circulation impacts are site specific and generally do not contribute to impacts from other development projects. The No Change to Pier 48 Alternative would have a similar pedestrian safety impact at two intersections on Fourth Street as the proposed project, but the pedestrian impact at these intersections would not be

[11] The peak parking demand is based on SF Guidelines Appendix 4.E-4 and analysis conducted by Adavant Consulting, 2016.

expected to affect or be further affected by other development projects near the project site. The impacts of the No Change to Pier 48 Alternative related to traffic hazard impacts and pedestrian impacts under cumulative conditions would thus be ***less-than-significant with mitigation*** as with the proposed project. Since the No Change to Pier 48 Alternative does not include development on Pier 48 and would thus not create a bicycle-truck safety impact as with the proposed project, the impacts of the No Change to Pier 48 Alternative relative to bicycle impacts under cumulative conditions would be ***less-than-significant***. Implementation of Mitigation Measure M-TR-10, which provides for active management of the Pier 48 driveway crossing and the provision of flaggers whenever a truck has to back into the valley of Pier 48 across the Blue Greenway, would not be required under the No Change to Pier 48 Alternative.

The cumulative impacts of the proposed project on transit impacts would be ***significant and unavoidable with mitigation***. The cumulative transit impacts of the proposed project result from a substantial increase in transit demand on one individual Muni route that would not be accommodated by local transit capacity (Impact C-TR-4). The proposed project also contributes considerably to transit delays (impact C-TR-6). The No Change to Pier 48 Alternative would contribute fewer transit trips when compared to the proposed project under all scenarios and result in a ***significant*** cumulative transit impact. The cumulative transit mitigation measure described for the proposed project would be applicable to the No Change to Pier 48 Alternative. The impacts of the No Change to Pier 48 Alternative related to transit impacts under cumulative conditions would thus be ***significant and unavoidable with mitigation*** as with the proposed project.

NOISE

As with the proposed project, the No Change to Pier 48 Alternative would have no impacts related to adjacency to airports.

Exposure to Excessive Noise Levels. As described previously, implementation of the No Change to Pier 48 Alternative (instead of the proposed project) would result in Pier 48 remaining in its existing condition and not being redeveloped. Although this alternative would involve less overall development, it would result in noise impacts similar to those of the proposed project.

Construction. As with the proposed project, construction of the No Change to Pier 48 Alternative would require the use of heavy equipment, which would temporarily increase noise levels at properties near the project work sites. This alternative would result in less construction activity, and less overall noise (because of the elimination of Pier 48 piles) because Pier 48 would not be altered from its existing state. This could result in potentially shorter construction periods; however, noise levels at a given time during construction under this alternative would be similar to the levels expected under the proposed project.

Although the proposed project and this alternative would be in compliance with local construction noise standards, construction associated with both the proposed project and the No Change to Pier 48 Alternative would result in a substantial temporary increase in ambient noise (an increase of 10 dB or more over ambient) at sensitive receptors in the project area. Mitigation Measure M-NOI-1 would reduce this impact under this alternative, similar to the proposed project, but a substantial temporary increase in noise would still occur. Thus, and as with the proposed project, this impact is considered ***significant and unavoidable*** for the No Change to Pier 48 Alternative.

Traffic Noise Impacts on Offsite Uses. Similar to the proposed project, the No Change to Pier 48 Alternative would have the potential to increase noise on roadway segments in the vicinity of the project site. Project-specific traffic noise modeling was conducted for the proposed project's High Commercial Assumption, but given the small differences between traffic volumes under the two traffic assumptions (High Residential and High Commercial), the modeling results apply to both the proposed High Commercial Assumption and High Residential Assumption.

In order to determine the effects of the No Change to Pier 48 Alternative compared to the proposed project on traffic noise levels, the same scenario (p.m. peak hour, High Commercial) was assessed. According to the traffic impact assessment for the proposed project, Pier 48 uses account for approximately 6 percent of overall project vehicle trips. As such, removing Pier 48 from the project design, as would be done with the No Change to Pier 48 Alternative, would reduce overall project trips by approximately 6 percent for the weekday p.m. peak hour.

Decreasing the project-added volume on roadways in the project vicinity by 6 percent in the p.m. peak hour would result in an approximately 0.3 dB reduction in noise levels on any given roadway segment. As such, project-generated noise impacts would be essentially the same under the No Change to Pier 48 Alternative as they would be under the proposed project.

The three segments in the project vicinity that would have significant project-related traffic noise effects related to a substantially permanent increase in noise (under the proposed project would be similarly impacted under the No Change to Pier 48 Alternative. A substantial permanent increase in noise would mean an increase by 3 dB or more in areas where project noise levels would exceed 60 dBA L_{dn}, or an increase by 5 dB or more in areas where project noise would be 60 dBA L_{dn} or less. As such, both the proposed project and this alternative could result in sensitive receptors being exposed to excessive noise levels, and traffic noise impacts on offsite uses would be significant. As with the proposed project, there are no feasible mitigation measures that could reduce these traffic noise impacts to less-than-significant levels for the No Change to Pier 48 Alternative. Therefore, as with the proposed project, traffic-noise impacts on offsite uses for this alternative would be ***significant and unavoidable***.

Traffic Noise Impacts on Onsite Uses. As with the proposed project, implementation of the No Change to Pier 48 Alternative would introduce new noise-sensitive land uses (residential and commercial) to areas where a substantial permanent increase in traffic noise levels may result

from implementation of this alternative. As discussed above, the volume of traffic generated by the No Change to Pier 48 Alternative would be approximately 6 percent lower than that generated by the proposed project in the p.m. peak hour. This could result in an approximately 0.3 dB decrease in noise levels on any given roadway segment in the area. As such, project-generated noise impacts on onsite land uses would be essentially the same under the No Change to Pier 48 Alternative as they would be under the proposed project.

Under both the proposed project and the No Change to Pier 48 Alternative, one roadway segment adjacent to the project site may experience an increase in traffic noise levels greater than the allowable 3 dB if resulting noise levels are greater than 60 dBA $L_{dn.}$ Additionally, the project site may experience an increase in traffic noise levels greater than 5 dB if resulting noise levels are less than or equal to 60 dBA L_{dn}. As with the proposed project, this alternative's proposed residential uses along Mission Rock Street (from Terry A. Francois Boulevard to Third Street) are predicted to experience a substantial increase (12 dB) in noise levels. Although this alternative would have slightly lower overall volumes than that proposed project, which could result in an approximately 0.3 dB decrease in noise levels on any given roadway segment, traffic noise along this segment would still increase substantially from existing conditions.

The proposed project and the No Change to Pier 48 Alternative would be designed to ensure compliance with applicable noise standards (specifically, CCR Title 24), which would ensure that individual onsite residences would not experience excessive noise. However, even with implementation of Mitigation Measure M-NOI-2.3 – Design of Future Noise-Sensitive Uses, the increases in traffic associated with the proposed project and with this alternative would still result in a substantial permanent increase in ambient noise levels along this segment (the 12 dB increase that is expected to occur along Mission Rock Street from Terry A. Francois Boulevard to Third Street) that could affect onsite receptors. As such, traffic noise impacts on onsite residential land uses could be ***significant*** for this alternative, as with the proposed project. As with the proposed project, there are no additional feasible mitigation measures that could reduce this traffic noise impact to a less-than-significant level for the No Change to Pier 48 Alternative. Therefore, as with the proposed project, traffic-noise impacts for this alternative to onsite uses (related to a substantial permanent increase in noise) would be ***significant and unavoidable***.

Truck Pick-Ups and Deliveries. The offsite residential land uses closest to a potential loading dock locations, which are located in multiple locations on the site for both the proposed project and the No Change to Pier 48 Alternative would be the same (the loading docks located closest to offsite land uses would not go away under this alternative). The offsite residential land uses closest to a potential loading location would be the future residential development in Block 9A of the Mission Bay Redevelopment Plan area (see Figure 2-15, *Proposed Parking Plan*), immediately south of the project site along Mission Rock Street. The future Block 9A development would be more than 100 feet away from the nearest potential delivery location,

near the intersection of Terry A. Francois Boulevard and Mission Rock Street. Exterior noise levels from loading docks at this location would be a maximum of approximately 57 dBA L_{eq} (not considering intervening buildings). Exterior noise levels are generally reduced at interior locations by 20 dB (with standard construction materials) so interior noise levels at this closest potential receptor would be 35 dBA.

Interior noise levels at the potential residences (which are the nearest offsite residential land uses) would be less than the 45 dBA nighttime limit for the No Change to Pier 48 Alternative. Further, the No Change to Pier 48 Alternative would not involve rehabilitating and reusing Pier 48 as an industrial use. As such, the 38 truck trips per day anticipated for this facility under the proposed project would be avoided. This may result in a slightly lower level of noise related to truck deliveries than under the proposed project. Similar to the proposed project, this alternative would also be required to implement Mitigation Measure M-NOI-2.4, Design of Future Noise-Generative Uses near Residential Uses. As with the proposed project, impacts related to truck deliveries would be ***less than significant with mitigation*** under the No Change to Pier 48 Alternative.

HVAC Systems. As with the proposed project, the new buildings associated with the No Change to Pier 48 Alternative would require HVAC systems. The HVAC systems associated with the No Change to Pier 48 Alternative would result in the same noise effects as the proposed project on nearby noise sensitive land uses. The proposed project and the No Change to Pier 48 Alternative would both incorporate design measures that would limit noise from HVAC equipment to the applicable standard at the property line of nearby noise-sensitive receptors in accordance with Mitigation Measure M-NOI-2.2 – Stationary Equipment Noise Controls. These acoustical treatments may include, but are not limited to: provision of sound enclosures/barriers, addition of roof parapets to block noise, increasing setback distances from sensitive receptors, provision of louvered vent openings, and location of vent openings away from adjacent residential uses. With the inclusion of these design measures, impacts related to HVAC noise would be ***less than significant with mitigation*** under the No Change to Pier 48 Alternative, as with the proposed project.

Emergency Generators. As with the proposed project, temporary increases in ambient noise levels from generator testing is considered a significant impact for the No Change to Pier 48 Alternative due to the fact that the buildings on Seawall Lot would require emergency generators similar to the proposed project. However, under this alternative, there would be two fewer generators than with the proposed project because of the elimination of the two generators at Pier 48. Further, Mitigation Measure M-NOI-2.2 would require that this alternative incorporate design measures that would limit noise from generators to the applicable standard at the property line of nearby noise-sensitive receptors. This alternative would also be required to limit the testing of emergency generators to daytime hours (8:00 a.m. to 6:00 p.m.) and limit the testing of emergency generators such that only one generator is tested at a given time to limit the effects of additive noise from the equipment.

With the inclusion of Mitigation Measure M-NOI-2.2, impacts related to noise from emergency generators would be ***less than significant with mitigation*** under the No Change to Pier 48 Alternative, as with the proposed project.

Noise from Onsite Outdoor Use areas to Offsite Land Uses. The No Change to Pier 48 Alternative, as with the proposed project, would include development of a number of public open spaces. The proximity of existing and proposed future residential uses to these types of open space uses would pose the potential for residents to be disturbed or annoyed by noise from outdoor space activities. It is not known at this time what specific events may occur and what the associated noise levels would be. However, promoters of any proposed outdoor events on the site's outdoor open space areas (for the proposed project or for this alternative) that would use amplified sound or music would be required to obtain a permit from the City prior to the event. Section 1060.1 of the Police Code requires a permit to conduct, operate, or maintain a place of entertainment, limited live performance locale or one-time event within the City and County of San Francisco.

Due to uncertainties as to the nature and extent of future outdoor events associated with the project site under the proposed project and the No Change to Pier 48 Alternative (including if amplified speech or music would occur at such events), the potential for the use of amplified sound equipment could result in significant noise impacts to nearby sensitive receptors in excess of standards established in the San Francisco General Plan or San Francisco Noise Ordinance. However, as with the proposed project, implementation of Mitigation Measure M-NOI-2.1, *Noise Control Plan for Outdoor Amplified Sound* with this alternative, would ensure that sound levels generated by amplified equipment would be consistent with Section 2909 of the City's Police Code to the extent reasonable and appropriate given the nature and context of the event, which establishes a not-to-exceed (except through a variance) noise standard for fixed sources of noise and from events subject to regulation by the Entertainment Commission. This alternative would also comply with the Port of San Francisco Good Neighbor Policy.

With implementation of Mitigation Measure M-NO-2.1, periodic and temporary noise increases associated with special events would be reduced but, because their frequency, duration and character are not known at this time (e.g., some events could seek waivers from Police Code provisions and/or continue later than 10:00 p.m.), this impact would remain ***significant and unavoidable*** under this alternative, similar to the proposed project.

Expose Persons to or Generate Excessive Ground-borne Vibration or Ground-borne Noise Levels. Under the No Change to Pier 48 Alternative, as with the proposed project, pile driving associated with construction activities would have the potential to damage fragile or historic buildings. Based on the PPV thresholds presented in Section 4.F, *Noise*, the proposed project is not expected to result in vibration-related impacts on surrounding fragile or historic buildings (with the closest sensitive building being the Pier 50 office building which is considered historic for CEQA purposes) because of the distance between these proposed activities and the offsite

fragile or historic buildings (vibration would attenuate to below the applicable thresholds at these distances). Since construction activities under the No Change to Pier 48 Alternative would be in the same construction footprint at Seawall Lot 337 as the proposed project, vibration associated with pile driving under the No Change to Pier 48 Alternative is anticipated to result in the same less-than-significant impacts on surrounding offsite buildings with respect to ground-borne noise and vibration damage as the proposed project.

With regard to vibration annoyance at offsite receptors, pile driving with this alternative could generate noise in excess of the "strongly perceptible" annoyance threshold at nearby residences, similar to under the proposed project. The nearest existing offsite land uses that could be considered sensitive to ground vibration are located approximately 100 feet west of the project site for both the proposed project and for this alternative (i.e., Mission Bay Block 1 residential uses located along Third and Fourth Streets between Channel and Long Bridge Streets). At a 100 foot distance, pile driving would result in a greater than "strongly perceptible" vibration level of 0.10 PPV (refer to Table 4.F-4). As such, vibration impacts from pile driving under this alternative and the associated annoyance it would cause offsite receptors would be significant under this alternative, as with the proposed project. Implementation of project Mitigation Measure M-NOI-3.1 for this alternative (as for the proposed project) would reduce potential vibration impacts on residences of the Mission Bay Block 1 residences for both the proposed project and for the No Change to Pier 48 Alternative by, to the extent practical. This alternative would require the use of "quiet" pile-driving technology where feasible and require that the construction contractor limit pile-driving activity so that the PPV vibration level at neighboring uses is less than the strongly perceptible level of 0.10 in/sec when possible. However, Mitigation Measure M-NOI-3.1 may not be feasible at all times because use of "quiet" pile-driving technology may not possible as a result of site-specific soil conditions, and because pile driving may need to occur within 100 feet of offsite residences. As no feasible mitigation actions are available to further reduce vibration impacts from pile-driving to these sensitive receptors, this impact is ***significant and unavoidable*** for both the proposed project and the No Change to Pier 48 Alternative.

Pile driving in proximity to Pier 48 would have the potential to result in adverse vibration effects related to building damage, as Pier 48 fits in the Caltrans vibration building category of "Historic and Some Old Buildings" (refer to Table 4.F-3). This type of building has a damage potential threshold of 0.25 in/sec PPV (based on the Caltrans criteria shown in Table 4.F-3), which was used in the proposed project analysis and also applies to the analysis of the No Change to Pier 48 Alternative. Vibration in excess of this 0.25 in/sec PPV threshold could occur if pile driving were to occur within about 85 feet of Pier 48. Because pile driving would need to occur close to the existing building structure at distance less than 85 feet, this impact could be significant. Implementation of project Mitigation Measure M-NOI-3.2, Pile-Driving Vibration Control Measures – Damage, for the No Change to Pier 48 Alternative (similar to the proposed project) would reduce potential damage-related vibration impacts to less-than-significant levels.

Given the measure's requirement for monitoring to ensure that vibration at potentially affected onsite buildings (Pier 48) would be limited to levels that have been recommended by an expert building evaluation team, building damage would not be expected to occur. Although vibration related to annoyance would be significant and unavoidable for the proposed project and for this alternative, as described above, the impact related to potential vibration-related damage would be reduced to ***less-than-significant*** levels with mitigation for both the proposed project and the No Change to Pier 48 Alternative.

Cumulative Impacts. As with the proposed project, the No Change to Pier 48 Alternative could combine with construction noise from other nearby cumulative projects to result in significant cumulative impact related to construction noise. Further, construction associated with the proposed project or with this alternative alone would result in an increase in ambient noise levels of more than 10 dB. As such, the contribution of construction noise from this alternative to that significant cumulative impact would be considered cumulatively considerable. As project construction for both the proposed project and for the No Change to Pier 48 Alternative would result in noise levels of more than 10 dB over ambient, this impact is considered ***significant and unavoidable*** for both the proposed project and this alternative.

Cumulative traffic noise impacts under the No Change to Pier 48 Alternative, which would add a similar number of daily trips to roadways in the area compared to the proposed project, would be comparable to the cumulative impacts discussed for the proposed project. As with the proposed project, cumulative impacts (from future with-project traffic) related to a substantial permanent increase in noise along 15 segments could be significant under this alternative. This occurs when there is an increase of 3 dB from existing conditions to cumulative plus-project conditions in areas where the resultant (2040 plus-project) noise level exceeds the applicable compatibility criteria or an increase of 5 dB where the land use compatibility criteria are not exceeded (refer to Appendix 5 for more details).

Further, this alternative would result in a cumulatively considerable contribution to the same one roadway segments as the proposed project based on a substantial permanent increase in noise that would be expected to occur. There are no feasible mitigation measures available to reduce these impacts, or the proposed project's contribution to the one cumulatively considerable impact, to less-than-significant levels. Therefore, similar to the proposed project, cumulative traffic noise impacts, as well as the proposed project (and Reduced Intensity Alternative) contribution to a cumulative impact, would be ***significant and unavoidable*** for the No Change to Pier 48 Alternative.

Operational noise impacts from stationary sources associated with other cumulative development could combine with noise sources resulting from development under the No Change to Pier 48 Alternative and result in increased noise levels from stationary noise sources (HVAC and other mechanical equipment) at nearby noise-sensitive land uses. However, because acoustical treatments to reduce impacts from mechanical equipment on offsite land uses would be included

in the designs for both the proposed project and the No Change to Pier 48 Alternative (e.g., installing construction enclosures or barriers around equipment, using quiet models of equipment, incorporating mufflers or silencers on exhaust fans, etc.), equipment noise levels would comply with Police Code Section 2909 requirements. This would further reduce the noise experienced by onsite land uses from this equipment. Therefore, similar to the proposed project, cumulative impacts resulting from noise levels from stationary equipment associated with the No Change to Pier 48 Alternative would be reduced to ***less-than-significant*** levels.

As with the proposed project, cumulative effects related to construction vibration could occur with implementation of the No Change to Pier 48 Alternative if construction activities for other projects in proximity to the project site involve impact equipment (e.g., pile drivers, impact hammers/hoe rams, jackhammers). Although vibration effects are highly localized, involving discrete single events such as pile strikes, several parcels immediately adjacent to the project site and south of the project site could undergo construction activities that would also involve pile driving. Given that construction of the proposed project and No Change to Pier 48 Alternative would take several years, it is possible that construction of foreseeable adjacent projects could occur simultaneously with the No Change to Pier 48 Alternative, which could include pile-driving activities. Implementation of Mitigation Measure M-NOI-3.1, Pile-Driving Control Measure – Annoyance, would help to reduce the severity of this significant impact; however, it may not reduce vibration to less than strongly perceptible (0.10 in/sec PPV) and, thus, less than significant levels. Because no other feasible mitigation actions are available to further reduce vibration annoyance from pile driving at nearby sensitive receptors, cumulative vibration impacts related to annoyance would be ***significant and unavoidable with mitigation***

As discussed above, the proposed project as well as the No Change to Pier 48 Alternative would result in a direct significant and unavoidable impact related to annoyance from ground-borne vibration; damage-related vibration impacts would be less than significant with mitigation. As other related projects in the vicinity are expected to be under construction simultaneously, it is likely that a cumulative impact could occur with regard to vibration damage and annoyance. Construction for the proposed project or the No Change to Pier 48 Alternative would make up a large proportion of potentially simultaneous pile driving occurring in the project vicinity. However, Mitigation Measure M-NOI-3.2 under this alternative (similar to the proposed project) would reduce vibration impacts related to potential building damage to less than significant levels. As such, and similar to the proposed project, cumulative impacts related to vibration damage are similarly considered to be less than significant with mitigation for the No Change to Pier 48 Alternative**.** With regard to potential vibration-related annoyance, however, it is not certain if Mitigation Measure M-NOI-3.1 would reduce direct vibration impacts related to annoyance to less-than-significant levels. As such, the contribution of the No Change to Pier 48 Alternative to cumulative vibration impacts related to annoyance would be cumulatively considerable, as is the case for the proposed project. Cumulative vibration impacts related to annoyance would be ***significant and unavoidable with mitigation.***

AIR QUALITY

Criteria pollutant and toxic air contaminant emissions under the No Change to Pier 48 Alternative were analyzed using same methodologies and assumptions as those used for the proposed project. The emissions modeling details for the No Change to Pier 48 Alternative are provided in Appendix 12. The modeling uses the same methodology contained Air Quality Technical Report.

Compared to the proposed project, the No Change to Pier 48 Alternative results in somewhat lower emissions of all criteria pollutants for both construction and operation. Specifically, daily construction emissions are approximately 16 to 43 percent lower than the proposed project and daily annual emissions are approximately 2 to 17 percent lower than the proposed project (depending on the pollutant). The impacts (and emissions) for construction, operation, and construction plus operation for the No Change to Pier 48 Alternative are discussed below.

Construction. Similar to the proposed project, construction air quality impacts of the No Change to Pier 48 Alternative would be significant and unavoidable with mitigation. As described in Section 4.G, *Air Quality*, estimated construction-related emissions of ROG would exceed the BAAQMD's significance thresholds for the year 2019 at 65.6 pounds per day and estimated construction-related emissions of NO_x would exceed the BAAQMD's significance thresholds for the years 2018 through 2021 at between 69 and 155 pounds per day. Even with implementation of Mitigation Measure M-AQ-1.1 through M-AQ-1.4, NOx levels would exceed the significance threshold from 2019 through 2020, at between 58 and 68 pounds per day. Similarly, as shown in Table 7-17 on the following page (also see Tables 34 and 35 in Appendix 12), the construction-related criteria air pollutant emissions for the No Change to Pier 48 Alternative would exceed the thresholds for emissions of ROG for the year 2019 and NOx for the years 2018 through 2021. As shown in Table 7-18, page 7-98, emissions of NOx under the No Change to Pier 48 Alternative would still be significant even with implementation of Mitigation Measure M-AQ-1.1 through M-AQ-1.4 for the years 2019 and 2020. Thus, similar to the proposed project, an offset emissions mitigation measure would be required to provide for reduction of levels of ozone precursors (NOx) exceeding the significance thresholds through implementation of pollution reduction programs elsewhere in the air basin. Accordingly, additional mitigation is identified to reduce the residual NOx emissions. Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated NO_x emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and would not be within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of construction emissions of NOx is conservatively considered ***significant and unavoidable with mitigation*** for the No Change to Pier 48 Alternative, same as for the proposed project.

TABLE 7-17. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR THE NO CHANGE TO PIER 48 ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	ROG	NO_x	PM10 Exhaust	PM2.5 Exhaust
2017	1.6	18.8	0.6	0.6
2018	26.3	**60.5**	2.3	2.2
2019	**55.0**	**96.0**	3.8	3.6
2020	46.4	**102.1**	3.6	3.5
2021	34.3	**69.5**	2.5	2.4
2022	17.8	23.6	0.9	0.9
2023	4.4	5.9	0.2	0.2
2024	0.0	0.0	0.0	0.0
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.2	2.4	<0.1	<0.1
2018	3.4	7.9	0.3	0.3
2019	7.2	**12.5**	0.5	0.5
2020	6.1	**13.3**	0.5	0.5
2021	4.5	9.0	0.3	0.3
2022	2.3	3.1	0.1	0.1
2023	0.6	0.8	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	*10*	*10*	*15*	*10*

Source:

ENVIRON International Corporation and the California Air Districts. 2013. CalEEMod User's Guide. Version 2013.2. Appendix A: Calculation Details for CalEEMod. Prepared for the California Air Pollution Control Officers Association. July. Available: http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixa.pdf?sfvrsn=2. Accessed: October 12, 2015.

Notes:

Emissions over threshold levels are in **bold**

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 7-18. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION EMISSIONS BY ANALYSIS YEAR FOR THE NO CHANGE TO PIER 48 ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.5	6.4	< 0.1	< 0.1
2018	7.3	30.9	0.4	0.4
2019	15.0	**57.9**	0.7	0.7
2020	13.2	**67.5**	0.8	0.8
2021	9.5	52.1	0.7	0.6
2022	4.6	19.5	0.3	0.2
2023	1.2	5.1	< 0.1	< 0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	<0.1	0.8	<0.1	<0.1
2018	0.9	4.0	<0.1	<0.1
2019	2.0	7.5	<0.1	<0.1
2020	1.8	8.8	0.1	0.1
2021	1.3	6.8	<0.1	<0.1
2022	0.6	2.5	<0.1	<0.1
2023	0.2	0.7	<0.1	<0.1
2024	0.0	0.0	0.0	0.0
Significance Threshold	*10*	*10*	*15*	*10*

Source:

Refer to Table 7-17.

Notes:

a. Emissions over threshold levels are in **bold**

b. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Measure M-AQ-1.1), all haul trucks are model year 2010 or newer (Measure M-AQ-1.2), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure M-AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Measure M-AQ-1.4). Does not include effect of Mitigation Measure M-AQ-1.5, which requires NOx offsets.

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

Operations. Similar to the proposed project, operational impacts of the No Change to Pier 48 Alternative would be significant and unavoidable with mitigation. As described in Section 4.G, *Air Quality*, estimated proposed project operational emissions of ROG under the proposed project for the High Commercial Assumption would exceed the BAAQMD's significance thresholds for the years 2021 through 2024 and all following operational years at between 66 and 123 pounds per day and emissions of NOx would exceed the threshold for the years 2023 through 2024 and all following operational years at between approximately 57 and 60 pounds per day. As shown in Table 7-19 on the following page (also see Tables 37 through 40 in Appendix 12), the No Change to Pier 48 Alternative would result in operational criteria air pollutant emissions of ROG slightly lower than those for the proposed project, and still at levels that would exceed the applicable significance thresholds; emissions of NOx would not exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to the No Change to Pier 48 Alternative, although the amount of emissions offset through Mitigation Measure M-AQ-1.5 would be adjusted to the emissions calculated for the No Change to Pier 48 Alternative. Even with implementation of Mitigation Measure M-AQ-1.1 through M-AQ-1.4 and M-AQ-2.1 through M-AQ-2.3, ROG levels would exceed the significance threshold from 2021 through 2024 and beyond, at between 76 and 104 pounds per day, as shown in Table 7-20, page 7-101 (also see Tables 39 and 40 in Appendix 12). Pursuant to Mitigation Measure M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee could be conducted by the BAAQMD and is outside the jurisdiction and control of the City and would not be fully within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of operational emissions of ROG is conservatively considered ***significant and unavoidable with mitigation*** for the No Change to Pier 48 Alternative, same as for the proposed project.

TABLE 7-19. SUMMARIZED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR THE NO CHANGE TO PIER 48 ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOX**	**PM10 Exhaust**	**PM2.5 Exhaust**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	46.9	16.2	8.8	3.0
2021	**84.2**	32.1	21.4	6.9
2022	**100.3**	40.3	25.8	8.4
2023	**116.3**	47.6	29.1	9.6
2024 (full buildout)	**116.3**	48.3	29.1	9.7
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	8.6	2.9	1.6	0.5
2021	**15.4**	5.9	3.9	1.3
2022	**18.3**	7.4	4.7	1.5
2023	**21.2**	8.7	5.3	1.8
2024 (full buildout)	**21.2**	8.8	5.3	1.8
Significance Threshold	*10*	*10*	*15*	*10*

Source:

1. California Air Resources Board. 2012. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California. Available: http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf.
2. Fehr & Peers. 2016. Screencheck Draft - Transportation Impact Study: Mission Rock (Seawall Lot 337/Pier 48). Prepared for the San Francisco Planning Department. July. San Francisco, CA.
3. United States Environmental Protection Agency. 1996. Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors. 9.12.1 Malt Beverages. Available: https://www3.epa.gov/ttnchie1/ap42/. Accessed: February 29, 2016.

Notes:

a. Emissions over threshold levels are in **bold**.

Abbreviations:

ROG: reactive organic gases
NOx.: nitrogen oxides
PM10: particulate matter less than or equal to 10 microns in diameter
PM2.5: particulate matter less than or equal to 2.5 microns in diameter
lbs: pounds

TABLE 7-20. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY CATEGORY FOR THE NO CHANGE TO PIER 48 ALTERNATIVE

	Average Daily Emissions (lbs/day)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	42.8	14.8	7.3	2.5
2021	**76.3**	28.9	17.6	5.7
2022	**90.4**	36.6	21.2	6.9
2023	**103.8**	43.5	23.9	7.9
2024 (full buildout)	**103.8**	44.1	23.9	7.8
Significance Threshold	*54*	*54*	*82*	*54*
	Annual Emissions (tons/year)			
Year	**ROG**	**NOx**	**PM10 Total[b]**	**PM2.5 Total[b]**
2017	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0
2020	7.8	2.7	1.3	0.4
2021	**13.9**	5.3	3.2	1.0
2022	**16.5**	6.7	3.9	1.3
2023	**18.9**	7.9	4.4	1.4
2024 (full buildout)	**18.9**	8.0	4.4	1.4
Significance Threshold	*10*	*10*	*15*	*10*

Source:

Refer to Table 7-19.

Notes:

a. Mitigated emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Measure M-AQ-2.1), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure M-AQ-2.2), and auto vehicle trips are reduced by 20 percent (Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG offsets.

b. PM10 and PM2.5 include both exhaust and dust emissions.

Abbreviations:

ROG: reactive organic gases

NOx.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

VDECS: Verified Diesel Emissions Control Strategies

Combined Construction and Operations. Similar to the proposed project, combined construction and operational impacts of the No Change to Pier 48 Alternative would be significant and unavoidable with mitigation. As described in Section 4.G, *Air Quality*, estimated combined proposed project construction and operational emissions of ROG and NOx under the proposed project for the High Commercial Assumption would be between 66 and 123 and between 57 and 156 pounds per day, respectively, exceeding significance thresholds. As shown in Table 7-21 on the following page (also see Tables 41 and 42 in Appendix 12), the No Change to Pier 48 Alternative would result in combined construction and operational criteria air pollutant emissions of ROG and NOx lower than those for the proposed project, but still at levels that would exceed the applicable significance thresholds. The same mitigation measures identified for the proposed project would apply to the No Change to Pier 48 Alternative, although the amount of emissions offset through Mitigation Measure AQ-1.5 would be adjusted to the emissions calculated for this alternative. Even with implementation of Mitigation Measure M-AQ-1.1 through M-AQ-1.5 and M-AQ-2.1 through M-AQ-2.3, ROG levels would exceed the significance threshold from 2020 through 2024 and beyond at between 56 and 105 pounds per day, and NOx levels would exceed the significance threshold from 2019 through 2021 at between 58 and 82 pounds per day, as shown in Table 7-22, page 7-104 (also see Tables 41 and 42 in Appendix 12). Pursuant to Mitigation Measures M-AQ-1.5, the project sponsor would be required to pay an offset mitigation fee for all remaining unmitigated ROG and NOx emissions in excess of BAAQMD thresholds. Implementation of the emissions reduction project to be funded by the fee would be conducted by the BAAQMD and is outside the jurisdiction and control of the City and would not be within the control of the project sponsor. As an alternative to payment of the fee, Mitigation Measure M-AQ-1.5 also allows the project sponsor to directly fund or implement an offset project; however, no such project has yet been identified. Therefore, the residual impact of ROG and NOx emissions is conservatively considered ***significant and unavoidable with mitigation*** for the No Change to Pier 48 Alternative, same as the proposed project.

TABLE 7-21. SUMMARIZED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR THE NO CHANGE TO PIER 48 ALTERNATIVE

	Average Daily Emissions (lbs/day)							
Year	ROG	NO_x	PM10 Exhaust	PM10 Dust[b]	PM10 Total[c]	PM2.5 Exhaust	PM2.5 Dust[b]	PM2.5 Total[c]
2017	1.6	18.8	0.6	0.0	0.6	0.6	0.0	0.6
2018	26.3	**60.5**	2.3	0.0	2.3	2.2	0.0	2.2
2019	**55.0**	**96.0**	3.8	0.0	3.8	3.6	0.0	3.6
2020	**93.3**	**118.3**	4.3	8.1	12.5	4.1	2.3	6.5
2021	**118.5**	**101.6**	3.6	20.2	23.9	3.5	5.8	9.3
2022	**118.1**	**63.9**	2.4	24.3	26.7	2.4	7.0	9.3
2023	**120.7**	53.5	2.1	27.2	29.3	2.1	7.8	9.8
2024	**116.3**	48.3	1.9	27.2	29.1	1.9	7.8	9.7
Significance Threshold	*54*	*54*	*82*	*82*	*82*	*54*	*54*	*54*
	Annual Emissions (tons/year)							
Year	ROG	NO_x	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.2	2.4	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	3.4	7.9	0.3	0.0	0.3	0.3	0.0	0.3
2019	7.2	**12.5**	0.5	0.0	0.5	0.5	0.0	0.5
2020	**14.6**	**16.2**	0.6	1.5	2.1	0.6	0.4	1.0
2021	**19.8**	**14.9**	0.5	3.7	4.2	0.5	1.1	1.6
2022	**20.6**	**10.4**	0.4	4.4	4.8	0.4	1.3	1.7
2023	**21.8**	9.5	0.4	5.0	5.3	0.4	1.4	1.8
2024	**21.2**	8.8	0.4	5.0	5.3	0.3	1.4	1.8
Significance Threshold	*10*	*10*	*15*	*-*	*15*	*10*	*-*	*10*

Source:

Refer to Tables 7-17 and 7-19.

Notes:

(all table references below refer to tables in the memorandum Seawall Lot 337/Pier 48 (Mission Rock) Project Air Quality Technical Report: Modeling Data for Emission Results for Alternatives and Variants, October 28, 2016)

a. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

b. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included as it is addressed by Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008).

c. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:

ROG: reactive organic gases

NO_x.: nitrogen oxides

PM10: particulate matter less than or equal to 10 microns in diameter

PM2.5: particulate matter less than or equal to 2.5 microns in diameter

lbs: pounds

TABLE 7-22. SUMMARIZED MITIGATED AVERAGE DAILY AND ANNUAL CONSTRUCTION PLUS OPERATIONAL EMISSIONS FOR THE NO CHANGE TO PIER 48 ALTERNATIVE

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	0.5	6.4	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	7.3	30.9	0.4	0.0	0.4	0.4	0.0	0.4
2019	15.0	**57.9**	0.7	0.0	0.7	0.7	0.0	0.7
2020	**56.0**	**82.3**	1.4	6.7	8.1	1.3	1.9	3.3
2021	**85.8**	**81.0**	1.6	16.7	18.3	1.5	4.8	6.3
2022	**95.0**	**56.1**	1.4	20.1	21.5	1.4	5.8	7.1
2023	**105.0**	48.6	1.5	22.5	24.0	1.5	6.5	7.9
2024	**103.8**	44.1	1.4	22.5	23.9	1.4	6.5	7.8
Significance Threshold	*54*	*54*	*82*	*82*	*82*	*54*	*54*	*54*
	Annual Emissions (tons/year)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]
2017	<0.1	0.8	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2018	0.9	4.0	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2019	2.0	7.5	<0.1	0.0	<0.1	<0.1	0.0	<0.1
2020	9.6	**11.5**	0.2	1.2	1.4	0.2	0.4	0.6
2021	**15.2**	**12.1**	0.3	3.0	3.3	0.2	0.9	1.1
2022	**17.1**	9.2	0.2	3.7	3.9	0.2	1.1	1.3
2023	**19.1**	8.6	0.3	4.1	4.4	0.3	1.2	1.4
2024	**18.9**	8.0	0.3	4.1	4.4	0.2	1.2	1.4
Significance Threshold	*10*	*10*	*15*	-	*15*	*10*	-	*10*

Source:

Refer to Tables 7-18 and 7-20.

Notes: *(all table references below refer to tables in the memorandum Seawall Lot 337/Pier 48 (Mission Rock) Project Air Quality Technical Report: Modeling Data for Emission Results for Alternatives and Variants, October 28, 2016)*

a. Mitigated emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (Measure AQ-1.1), all haul trucks are model year 2010 or newer (Measure AQ-1.2), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure AQ-1.3), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Measure AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Measure M-AQ-2.1), 90 percent of all architectural coatings have a maximum of 10 grams of volatile organic compounds per liter (Measure M-AQ-2.2), and auto vehicle trips are reduced by 20 percent (Measure M-AQ-2.3). Does not include effect of Mitigation Measure M-AQ-1.5, which requires ROG and NOx offsets.

b. As shown in Tables 1 and 2 of the AQTR, construction of Area 1 would occur between 2017 and 2020. It was conservatively assumed that structures would be fully occupied immediately following construction and operational emissions associated with Area 1 would begin in 2021. Accordingly, concurrent construction and operational activities would occur between 2021 and 2023, resulting in higher daily emissions than either component when analyzed separately. This table presents emissions for overlapping construction and operational activities to analyze maximum air quality impacts during concurrent activities.

c. PM10 and PM2.5 dust only includes dust from operations; construction dust is not included.

	Average Daily Emissions (lbs/day)							
Year	ROG	NOx	PM10 Exhaust	PM10 Dust[c]	PM10 Total[d]	PM2.5 Exhaust	PM2.5 Dust[c]	PM2.5 Total[d]

d. PM10 and PM2.5 total includes exhaust from both construction and operations and dust from operations only.

Abbreviations:
ROG: reactive organic gases
NOx.: nitrogen oxides
PM10: particulate matter less than or equal to 10 microns in diameter
PM2.5: particulate matter less than or equal to 2.5 microns in diameter
lbs: pounds
VDECS: Verified Diesel Emissions Control Strategies

Toxic Air Contaminants. Similar to the proposed project, construction and operation of the No Change to Pier 48 Alternative would generate toxic air contaminants, including PM2.5 and DPM.

PM2.5 Analysis. Similar to the proposed project, the PM2.5 contribution at receptors under the No Change to Pier 48 Alternative would be less than significant with mitigation; the same mitigation measure would apply to this alternative. For the proposed project (see Table 4.G-22 in Section 4.G, *Air Quality*), the proposed project PM2.5 contribution would exceed the significance threshold but implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the PM2.5 concentration below the thresholds of significance at the onsite MIR that is in the study area that is not located in the APEZ under existing/future conditions, but would be placed in the APEZ under existing/future plus proposed project conditions.

For the No Change to Pier 48 Alternative, the maximum annual average PM2.5 concentration would not exceed the significance threshold of 0.2 μg/m^3 for the MIR that is currently located in the APEZ. It would not exceed the significance threshold of 0.3 μg/m^3 for the MIR not located in the APEZ but that would be placed in the APEZ with the contribution from the No Change to Pier 48 Alternative.

More specifically, the offsite MIR currently located in the APEZ could be exposed to a maximum annual average PM2.5 concentration from the No Change to Pier 48 Alternative of < 0.1 μg/m^3 (for construction plus operation conditions) (there are currently no onsite MIRs currently located in the APEZ). This does not exceed the project contribution threshold of 0.3 μg/m^3. This is considered a less than significant impact and mitigation is not required. Therefore, the maximum annual average PM2.5 concentration for receptors located in the APEZ would be ***less than significant*** for the No Change to Pier 48 Alternative, which is an improvement when compared to the proposed project.

Cancer Risk Analysis (DPM/TOG). The lifetime cancer risk at receptors under the No Change to Pier 48 Alternative would be less than significant with mitigation, the same as that identified for the proposed project, and the same mitigation measure would apply to this alternative. For the proposed project (see Tables 4.G-23 and 4.G-24 in Section 4.G, *Air Quality*), the cancer

risk would exceed the significance threshold and implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the risk below the thresholds of significance for the onsite MIR in the study area currently outside the APEZ under existing/future conditions, but that would be placed in the APEZ under existing/future plus proposed project conditions.

For the No Change to Pier 48 Alternative, as shown in Table 7-23 on the following page (also see Tables 43 and 44 in Appendix 12), the lifetime excess cancer risk would exceed the significance threshold of 7.0 in one million persons exposed for the MIR currently located in the APEZ. It would also exceed the significance threshold of 10.0 in one million persons exposed for the MIR currently outside the APEZ but that would be placed in the APEZ with the contribution from the No Change to Pier 48 Alternative.

More specifically, the offsite MIR currently located in the APEZ could be exposed to a lifetime excess cancer risk from the No Change to Pier 48 Alternative of up to 17.0 in one million under proposed project conditions (for construction plus operation) (see Table 7-23 on the following page). This exceeds the project contribution threshold of 10.0 in one million. This is considered a significant impact, similar to the proposed project. Therefore, mitigation is required to reduce this impact. The lifetime excess cancer risk at the onsite MIR currently located in the APEZ would be below the project contribution threshold of 10.0 in one million, a less than significant impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the lifetime excess cancer risk from the No Change to Pier 48 Alternative to 2.3 in one million for the offsite MIR currently located in the APEZ, below the threshold of 7.0 per million. The onsite and offsite MIRs currently outside the APEZ but that would be placed in the APEZ with the contribution from the No Change to Pier 48 Alternative could be exposed to a lifetime excess cancer risk from the No Change to Pier 48 Alternative of up to 140.3 in one million and 66.9 in one million, respectively, under proposed project conditions (for construction plus operation). This exceeds the project contribution threshold of 10.0 per million. This is considered a significant impact (Table 7-23), similar to the proposed project. Therefore, mitigation is required to reduce this impact. Implementation of Mitigation Measures M-AQ-1.1 through M-AQ-1.4, M-AQ-2.1, and M-AQ-2.3 would reduce the lifetime excess cancer risk from the No Change to Pier 48 Alternative for the onsite and offsite MIRs to 25.7 per million and 1.6 per million, respectively. Compared to the proposed project, this is slightly lower than the onsite MIR risk of 25.9 per million and lower than the offsite MIR risk of 8.8 per million. For the onsite MIR, the mitigated lifetime excess cancer risk of 25.7 per million combined with background cancer risk of 53.0 per million would equal 78.7 per million, which would not exceed the APEZ threshold of 100.0 per million. Therefore, under mitigated conditions, the onsite MIR would not be placed into the APEZ. For the offsite MIR, the mitigated lifetime excess cancer risks of 1.6 per million would not exceed the cumulative project contribution threshold of 10.0 per million. Consequently, this impact would be ***less than significant with mitigation*** for the No Change to Pier 48 Alternative, same as for the proposed project.

TABLE 7-23. MAXIMUM LIFETIME EXCESS CANCER RISK WITHIN STUDY AREA AT ONSITE AND OFFSITE RECEPTORS FOR CONSTRUCTION PLUS OPERATION FOR THE NO CHANGE TO PIER 48 ALTERNATIVE

	Lifetime Excess Cancer Risk (per million) [a, b]			
	Onsite Receptors		Offsite Receptors	
Receptor	No Change to Pier 48 Alternative	Mitigated [c]	No Change to Pier 48 Alternative	Mitigated [c]
Receptors Currently Located in the APEZ during Existing/Future Conditions				
Total (Background + Project)	124.2	109.5	124.2	109.5
Background	107.2	107.2	107.2	107.2
Construction Plus Operation Contribution	**17.0**	2.3	**17.0**	2.3
Significance Threshold for Project Contribution	7.0	7.0	7.0	7.0
Above Threshold?	**Yes**	No	**Yes**	No
Receptors Not Located in the APEZ during Existing/Future Conditions but Would Be Located in the APEZ During Existing/Future plus Proposed Project Conditions				
Total (Background + Project)	193.3	78.7	139.8	101.1
Background	53.0	53.0	73.0	99.5
Construction Plus Operation Contribution	**140.3**	25.7	**66.9**	1.6
Significance Threshold for Project Contribution	10.0	N/A[d]	10.0	10.0
Above Threshold?	**Yes**	N/A[d]	**Yes**	No

Sources:

CalEEMod modeling, AERMOD modeling, EMFAC2014 modeling, and other off-model calculations discussed in the AQTR and presented in AQTR Appendix B.

Notes:

e. Mitigated construction emissions assume all off-road equipment and all diesel generators have Tier 4 interim engines (MM AQ-1.1), all haul trucks are model year 2010 (Measure AQ-1.2), and all construction barge engines have Tier 3 engines and all construction work boat engines are model year 2005 or newer (Measure AQ-1.4). Mitigated operational emissions assume all emergency generators have model year 2008+ engines consistent with ARB ATCM emission rates that also meet Tier 2 standards with level 3 VDECS (Measure AQ-2.1) and auto vehicle trips are reduced by 20 percent (Measure AQ-2.3).

f. "-" means that a receptor does not meet the criteria for the table. For example, there may not be an onsite receptor that is currently in an APEZ or is placed into an APEZ with only the operational contribution from the proposed project.

g. The mitigated values may represent different receptor locations than the No Change to Pier 48 Alternative values because the highest mitigated values may occur at different locations due to the varying effectiveness of mitigation measures on each individual source of emissions.

h. Because this receptor is not placed into an APEZ with the mitigated project contribution (i.e., the total background plus project lifetime excess cancer risk is less than the APEZ threshold of 100), the project-level threshold does not apply.

Abbreviations:

APEZ: Air Pollutant Exposure Zone

VDECS: Verified Diesel Emissions Control Strategies

Emissions over threshold levels are in **bold**

Consistency with Clean Air Plan. Similar to the proposed project, impacts related to consistency with the 2010 CAP for the No Change to Pier 48 Alternative would be less than significant with mitigation. The No Change to Pier 48 Alternative would be consistent with the 2010 Clean Air Plan, particularly with implementation of the mitigation measures listed above, which include offsetting ozone precursor emissions of ROG and NOx to below significance thresholds, in addition to project-specific measures to reduce pollutant emissions. Additionally, the No Change to Pier 48 Alternative would be consistent with the 2010 Clean Air Plan by incorporating various Clean Air Plan control measures, such as land use and local impact measures, energy and climate measures, and TDM measures, all of which are also incorporated in the proposed project. The No Change to Pier 48 Alternative would also not hinder implementation of the 2010 Clean Air Plan. Therefore, similar to the proposed project, the No Change to Pier 48 Alternative would conflict with, or obstruct implementation of the 2010 CAP, and this impact would be ***less than significant with mitigation***.

GREENHOUSE GAS EMISSIONS

Generation of GHG Emissions. Similar to the proposed project, the No Change to Pier 48 Alternative would increase the intensity of use at the project site by introducing new residential, commercial, parking, and active/retail uses. However, this alternative would not include new industrial/production, office, retail, restaurant, or event-related operations at Pier 48. Therefore, direct and indirect GHG emissions associated with this component of the proposed project would not be emitted, and the alternative's contribution to annual long-term increases in GHG emissions would be reduced compared to those of the proposed project. Similar to the proposed project, the No Change to Pier 48 Alternative would be subject to regulations adopted to reduce GHG emissions and designed to be eligible for LEED certification for all commercial office/retail buildings and residential development onsite, as outlined in the SFGBO and other City codes. Furthermore, the No Change to Pier 48 Alternative would be consistent with San Francisco's GHG Reduction Strategy. Therefore, impacts related to GHG would be ***less than significant*** and slightly less than the GHG impacts of the proposed project because rehabilitation and operation of Pier 48 would not be included.

WIND AND SHADOW

Wind. Under the No Change to Pier 48 Alternative, Pier 48 would not be rehabilitated. However, because Pier 48 rehabilitation would not have an impact on wind, impacts under this alternative would be the same as under the proposed project. Because development at Seawall Lot 337 would be the same as under the proposed project, the same wind impacts would occur. Similar to the proposed project, wind hazard conditions would worsen overall with the addition of the proposed project, assuming initial setback conditions and no other identified improvement measures. To reduce wind hazard impacts as much as possible, Mitigation Measure M-WS-1.1, which requires additional testing to assess the effectiveness of wind

reduction measures, would be implemented. However, the effectiveness of measures, including landscaping, cannot be stated with certainty at this time. Therefore, as with the proposed project, wind impacts under No Change to Pier 48 Alternative would be ***significant and unavoidable***, same as under the proposed project.

Shadow. Similar to wind impacts, implementation of the No Change to Pier 48 Alternative would not change the shadow impacts analyzed for the proposed project. The No Change to Pier 48 Alternative would generate new net shadows on each of the open spaces analyzed. However, the new net shadows cast would represent a very small increase in shadows cast. Therefore, the new net shadows would not adversely affect use of Mission Creek Park South, Mission Creek Park Esplanade, China Basin Building Promenade, Kids' Park, AT&T Park Plaza, Dog Run Park, or China Basin Park under this alternative. In addition, with Mission Rock Square, Channel Lane, and Channel Wharf being located among tall structures, substantial shading would be inevitable, and coupled with the fact that the these areas would be created at the same time as the surrounding structures that would cast shadow on them, it is unlikely that users would have a specific expectation for greater access to sunlight. Therefore, as with the proposed project, shadow impacts would be ***less than significant*** under this alternative.

Cumulative. As stated above, the Pier 48 rehabilitation would not have an impact on wind or shadow under this alternative, compared to the proposed project. Therefore, cumulative wind and shadow impacts under the No Change to Pier 48 Alternative would be similar to the cumulative wind and shadow impacts under the proposed project. Accordingly, similar to the proposed project, cumulative wind impacts under the No Change to Pier 48 Alternative would be ***significant and unavoidable***, and cumulative shadow impacts under the No Change to Pier 48 Alternative would be ***less than significant***.

PUBLIC SERVICES AND RECREATION

Impacts on public services and recreation occur because of increased demand from the increased population in the service area. As discussed above, the No Change to Pier 48 Alternative would introduce the same number of onsite residents as the proposed project. However, because Pier 48 would remain as is, this alternative would generate 200 fewer employees and 176 fewer employee-induced city residents than the proposed project.

Fire Protection Services. The No Change to Pier 48 Alternative would result in an increase in the number of calls for service compared to existing conditions; however, it would be to a slightly lesser extent compared with the proposed project because there would be no additional employees at Pier 48. Response times from existing facilities to the project site would not be substantially affected, and the No Change to Pier 48 Alternative, as with the proposed project, would not result in a substantial adverse environment impact associated with the construction or alteration of fire and emergency service facilities to maintain acceptable service ratios,

response times, or other performance objectives. Similar to the proposed project, impacts related to fire protection services would be ***less than significant*** under the No Change to Pier 48 Alternative.

Police Services. Although the No Change to Pier 48 Alternative would increase the resident and daytime population at the project site, it would not result in unplanned population growth, which has already been factored into SFPD forecasts. The SFPD would increase its staff accordingly and continue to evaluate its performance, based on response times. When appropriate, it would reallocate resources to accommodate the need for services in specific parts of the city. Therefore, as with the proposed project, the No Change to Pier 48 Alternative would not result in substantial adverse environmental impacts associated with the construction or alteration of police service facilities to maintain acceptable service ratios, response times, or other performance objectives, resulting in ***less-than-significant*** impacts.

Public Schools. The No Change to Pier 48 Alternative would include the same amount of new residential development as the proposed project, which could generate students who would attend local public schools. Per Government Code Section 65996, SFUSD collects developer fees to provide for the construction or reconstruction of school facilities, including site acquisition, construction of permanent school facilities, and acquisition of interim school facilities. The proposed project would be required to pay these fees, as would new residential development that may indirectly result from the increase in employment and generation of students. Therefore, the No Change to Pier 48 Alternative would not result in substantial adverse impacts associated with the construction or alteration of school facilities, resulting in a ***less-than-significant*** impact, similar to the proposed project.

Parks and Recreational Facilities. Because of the increase in residential and commercial development under the No Change to Pier 48 Alternative, there would be an increased demand for parks and open spaces. However, to accommodate this demand, approximately 7.9 acres of open space would be provided at the project site, as under the proposed project. Although the Pier 48 aprons (1.1 acres) would not be rehabilitated and open to the public as part of the No Change to Pier 48 Alternative, they would be rezoned for public access and open space uses, and the remaining 6.8 acres of open space would still accommodate the demand from the No Change to Pier 48 Alternative. The No Change to Pier 48 Alternative would not result in substantial adverse environmental impacts associated with the construction or alteration of park or open space facilities, beyond those impacts associated with construction of the No Change to Pier 48 Alternative, as analyzed throughout this chapter. In addition, given the wide variety and number of nearby public parks, plazas, and recreational opportunities, the anticipated increase in demand generated by the No Change to Pier 48 Alternative would not increase the use of adjacent or nearby recreational facilities such that substantial physical deterioration of existing facilities would occur or be accelerated. Therefore, impacts related to the use of adjacent or nearby recreational facilities as result of the No Change to Pier 48 Alternative would be ***less than significant***, similar to the proposed project.

Library Services. It is anticipated that the existing libraries in the city would be able to accommodate the increase in the number of residents and workers at the project site. As such, similar to the proposed project, the No Change to Pier 48 Alternative would not result in substantial adverse environmental impacts associated with the construction or alteration of library facilities in order to maintain acceptable service ratios or other performance objectives. Library service impacts would be ***less than significant***, same as under the proposed project.

Cumulative Impacts. As discussed in Section 4.J, *Public Services and Recreation*, cumulative impacts with respect to fire, police, schools, recreational facilities, and libraries would be less than significant. Because the No Change to Pier 48 Alternative would involve slightly fewer employees than the proposed project, cumulative impacts would also be ***less than significant***.

UTILITIES AND SERVICE SYSTEMS

Water Supplies and Facilities. Implementation of the proposed project would incrementally increase the demand for water in San Francisco. The No Change to Pier 48 Alternative would also increase the demand because of an increase in the number of residents and employees at the project site, although to a lesser extent because Pier 48 would not be used for industrial purposes. New connections would not be installed to connect the new 12-inch main within Terry A. Francois Boulevard to Pier 48. As with the proposed project, this alternative would install a recycled water main for landscaping and a new graywater treatment system and include LEED certification in order to reduce water use. Regardless, the SFPUC would meet the estimated increase in demand from its anticipated water supply. The WSA prepared for the proposed project accounted for a higher water demand than what would occur under this alternative. This is because Pier 48 would not be used for industrial purposes under this alternative compared to the proposed project. New or expanded water supply resources or entitlements, or construction of new water treatment facilities, would not be required to serve the No Change to Pier 48 Alternative. Similar to the proposed project, this impact would be ***less than significant.***

Stormwater, Wastewater, and Facilities. As with the proposed project, stormwater and wastewater flows from the No Change to Pier 48 Alternative would be directed to separate stormwater and sewer systems. Wastewater flows from this alternative would be less than those of the proposed project because the industrial uses at Pier 48 would not be operational. However, similar to the proposed project, the No Change to Pier 48 Alternative would not cause collection treatment capacity of the sewer system in the city to be exceeded.

The No Change to Pier 48 Alternative would result in the same amount of open space being identified as under the proposed project (7.9 acres). Therefore, stormwater flows would be the same as those of the proposed project. In addition, as with the proposed project, the alternative would include stormwater management measures, such as bio-retention areas, rain gardens,

and flow-through planter areas, and install sanitary sewer laterals and new storm drainage pipe infrastructure. The construction of new stormwater and wastewater facilities at the project site would not result in environmental impacts beyond the impacts analyzed for the No Change to Pier 48 Alternative and are discussed in detail in the appropriate topical sections of this Draft EIR (e.g., Sections 4.E, *Transportation and Circulation*; 4.F, *Noise*; and 4.G, *Air Quality*) as part of the assessment of overall proposed project impacts. Therefore, because wastewater flows would not exceed the existing system and stormwater flows would be less than existing, impacts from the No Change to Pier 48 Alternative associated with construction or expansion of wastewater and stormwater facilities would be ***less than significant,*** similar to the proposed project.

Solid Waste Facilities. Construction debris would be similar to that of the proposed project. The No Change to Pier 48 Alternative would meet construction waste recycling requirements for parking lot demolition and/or recycled construction waste. However, the No Change to Pier 48 Alternative would most likely result in less material off-haul and disposal than the proposed project because rehabilitation of Pier 48 would not be included. Operation of the No Change to Pier 48 Alternative would increase the generation of solid waste at the project site because of the increase in the number of residents and employees but to a slightly lesser extent compared with the proposed project because the industrial uses at Pier 48 would not be developed. The No Change to Pier 48 Alternative would be subject to the City's Mandatory Recycling and Composting Ordinance, which requires all residents and commercial landlords to separate their refuse into recyclables, compostables, and trash, which would minimize solid waste disposal. The No Change to Pier 48 Alternative, similar to the proposed project, would be served by a landfill with sufficient permitted capacity to accommodate the solid waste disposal needs and comply with federal, state, and local statutes and regulations related to solid waste, resulting in a ***less-than-significant*** impact.

Energy Supplies. The project site would be designated as a Type 1 Eco-District under both the proposed project and the No Change to Pier 48 Alternative to help meet the proposed project's environmental goals. The goal for the overall development includes LEED certification for all commercial office/retail buildings and residential development onsite. As with the proposed project, a Sustainability Strategy would be implemented under this alternative that would include strategies for achieving LEED certifications, along with other sustainability-related goals. Nonetheless, energy would be used for both construction and operation of the No Change to Pier 48 Alternative. Slightly less energy would be used as a result of this alternative compared to the proposed project because Pier 48 would not operate as an industrial use. Because energy use would be required for ongoing operation of the project site and because various energy-saving measures would be implemented, the energy use of the proposed project and the No Change to Pier 48 Alternative would not be wasteful, inefficient, or unnecessary, resulting in ***less-than-significant*** impacts.

Cumulative Impacts. As discussed in Section 4.K, *Utilities and Service Systems*, the City's water supplies, wastewater infrastructure, stormwater drainage, solid waste facilities, and energy supplies would be able to serve the cumulative development of the city. The City and its service providers would have adequate supplies for meeting customer demands, including demand from the proposed project combined with existing and planned future uses. Because the No Change to Pier 48 Alternative would use less water and energy and generate less wastewater and solid waste than the proposed project, and generate less stormwater than existing conditions, impacts would not be cumulatively considerable and would be ***less than significant***, similar to the proposed project.

BIOLOGICAL RESOURCES

The project site is almost entirely paved and located within an urban setting. Therefore, impacts pertaining to riparian habitat, sensitive natural communities, and federally protected wetlands are not evaluated further. In addition, there are no adopted habitat conservation or natural community conservation plans within the city.

Decrease in Water Quality, Affecting Candidate, Sensitive, or Special-Status Species. The No Change to Pier 48 Alternative would result in construction impacts similar to those of the proposed project at Seawall Lot 337; however, no construction would occur for the rehabilitation of Pier 48 and the aprons, including the seismic upgrade of Pier 48. Therefore, construction of the No Change to Pier 48 Alternative would have less potential than the proposed project to contribute contaminants to or increase the turbidity of San Francisco Bay, potentially affecting fish. Impacts on water quality during construction would be ***less than significant***, similar to the proposed project, but to a lesser extent because there would be less in-water construction at Pier 48.

Runoff associated with operation of the No Change to Pier 48 Alternative would be handled through compliance with the City's Stormwater Management Ordinance which utilizes features such as self-contained treatment facilities and large-feature rain gardens which minimize pollutant discharges. Therefore, impacts on special-status fish species from a decrease in water quality during operation of the proposed project or the No Change to Pier 48 Alternative would be ***less than significant***.

Changes in Shading and Habitat at Pier 48, Affecting Candidate, Sensitive, or Special-Status Species Habitat. The No Change to Pier 48 Alternative would not include Pier 48 seismic upgrades and, therefore, would not affect habitat for candidate, sensitive, or special-status species. The project site is currently developed with the Pier 48 structure, which already casts a permanent shadow on the waters below. Therefore, compared to existing conditions, the No Change to Pier 48 Alternative would result in ***no impacts*** on habitat for special-status species as a result of Pier 48 seismic upgrades, compared to the less-than-significant impacts under the proposed project.

Pier 48 Pile Driving and Construction, Affecting Fish and Marine Mammal Species. No underwater construction activities associated with seismic upgrades at Pier 48 would occur under the No Change to Pier 48 Alternative. As such, this alternative would have no potential to generate underwater noise and vibration from pile driving. Therefore, the No Change to Pier 48 Alternative would avoid the significant impacts on fish and marine mammal species that would result from underwater construction activities under the proposed project. Because this alternative would result in ***no impact*** compared to existing conditions, unlike the proposed project, implementation of Mitigation Measures M-BI-3.1, M-BI-3.2, and M-BI-3.3 would not be required.

Interference with the Movement of Native Resident or Migratory Fish or Wildlife Species. Because no underwater construction activities would occur under this alternative, no impacts on migratory fish would occur. On land, reflective and transparent glass used in project buildings, which mirrors the surrounding environment during daylight hours, could cause birds to collide with the new buildings. Further, during nighttime, new lighting could misdirect or confuse birds, resulting in disruption of natural behavioral patterns and navigational cues, similarly resulting in injury or death from exhaustion or collisions with buildings under both this alternative and the proposed project. Because of the project site's proximity to the San Francisco Bay and location within the Pacific Flyway, these impacts could adversely affect migratory birds. Building heights under the No Change to Pier 48 Alternative would be the same as under the proposed project; however, less lighting would be present at Pier 48 because it would not be operational. Both the proposed project and the No Change to Pier 48 Alternative would be required to adhere to Planning Code Section 139 (Standards for Bird-Safe Buildings), which would reduce the reflectivity of the buildings. Therefore, through compliance with the mandatory requirements of Planning Code Section 139, this impact would be considered ***less than significant*** for both the proposed project and the No Change to Pier 48 Alternative.

Migratory Nesting Birds. The existing vegetation and structures on the project site could provide nesting habitat for a variety of protected migratory birds. Because Pier 48 would not be rehabilitated with implementation of the No Change to Pier 48 Alternative, potential nesting birds within this structure would not be affected. However, as with the proposed project, if construction of the No Change to Pier 48 Alternative were to occur during the nesting season (February 1 to August 31), then the removal of shrubs and trees could result in the direct mortality of adult or young birds, destruction of active nests, and/or disturbance of nesting adults, causing nest abandonment and/or loss of reproductive effort. Under the No Change to Pier 48 Alternative, implementation of Mitigation Measure M-BI-5, as required for the proposed project, would reduce impacts on protected nesting migratory bird species from the removal of shrubs and trees to ***less than significant with mitigation***.

Conflicts with Local Policies or Ordinances. All trees at the project site would be removed with implementation of either the proposed project or the No Change to Pier 48 Alternative. However, none of the trees at the project site, all of which are located in China Basin Park on

Port property, are regulated by the Urban Forestry Ordinance. Removal of the trees at China Basin Park and replacement of those trees in the reconfigured park would occur under both the proposed project and the No Change to Pier 48 Alternative. Neither the proposed project nor the No Change to Pier 48 Alternative would conflict with the local tree protection ordinance. Therefore, the impact would be ***less than significant***.

Cumulative Impacts. The No Change to Pier 48 Alternative would not contribute to significant cumulative impacts on candidate, sensitive, or special-status species associated with decreased water quality and noise and vibration generation from underwater construction activities. However, the No Change to Pier 48 Alternative's contribution to impacts on nesting migratory birds and the movement of species would similar to the ***less-than-cumulatively considerable*** impacts of the proposed project with implementation of Mitigation Measures M-BI-5 and M-BI-6.1.

GEOLOGY AND SOILS

As with the proposed project, the No Change to Pier 48 Alternative would not result in impacts related to landslides, septic tanks, or substantial change to topography or unique geologic or physical features. In addition, as discussed in Section 4.M, *Geology and Soils*, as a result of the *CBIA v. BAAQMD* decision, certain topics are not addressed in this alternatives analysis because they have been shown in Section 4.M, *Geology and Soils*, not to exacerbate existing conditions with respect to those impacts. The focus of the alternatives analysis is a comparison of the significant impacts of the proposed project to the significant impacts of the alternatives.

Seismically Related Ground Failure. The project site is subject to liquefaction, lateral spreading, and earthquake-induced settlement hazards. Loads, such as buildings or utilities, constructed on the project site would exacerbate soil displacement as a result of strong ground shaking during an earthquake. Construction of the No Change to Pier 48 Alternative would result in similar earthquake-induced settlement effects. The magnitude of the difference in building scope is not great enough to result in substantial differences in ground failure hazards. The risk of liquefaction and lateral spreading effects would remain at the currently greater level because ground improvement would not be implemented for Pier 48 under the No Change to Pier 48 Alternative. All construction would be required to comply with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC and prepare and implement the recommendations of a design-level geotechnical report, which would minimize ground failure associated with strong ground shaking during an earthquake. As with the proposed project, with compliance with the SHMA, CGS Special Publication 117A, the 2016 Port Building Code, and 2016 CBC as required by Port building code of this alternative, impacts related to seismically related ground failure would be ***less than significant***.

Soil Erosion or Loss of Topsoil. Because soils at the project site are not native soils, there would be no loss of topsoil. However, construction activities associated with the No Change to Pier 48 Alternative, such as building construction, paving, cut-and-fill activities, and grading and excavation, could increase erosion, similar to the proposed project but to a slightly lesser extent because there would be no construction at Pier 48. However, all project construction activities would be subject to existing regulatory requirements, such as development of a SWPPP. Because land disturbance associated with the proposed project and this alternative involve more than 1 acre, coverage under the Construction General Permit would be required, including development of and compliance with a SWPPP. As with the proposed project, with implementation of a SWPPP, as required by law, impacts related to soil erosion would be ***less than significant***.

Location on a Geologic Unit or Soil Unit that Could Become Unstable, Potentially Resulting in liquefaction and lateral spreading. The project site is vulnerable to seismically induced liquefaction. Because the liquefiable layers are discontinuous and random across the site, there would be variability in the magnitude of potential liquefaction-induced settlement across the project site if a load were to be placed on the soil. In locations where there is a liquefiable layer between the surface soil and underlying soil on a slope, the surface soil may be transported downslope, initiated by either seismic or gravitational forces, leading to a progressive failure that could affect an area as far away as 110 feet west of the seawall at Pier 48. Construction of the No Change to Pier 48 Alternative would result in a similar magnitude of effect in across most of the project site because the magnitude of the building scope is similar. However, at Pier 48, the risk of liquefaction and lateral spreading effects would remain at the currently greater level as the proposed project because ground improvement would not be implemented for Pier 48. All construction would be required to comply with the 2016 CBC and prepare and implement the recommendations of a design-level geotechnical report, which would minimize effects of ground failure. As with the proposed project, with compliance with the 2016 CBC as required by Port building code, impacts related to seismically related ground failure would be ***less than significant***.

Paleontological Resources or Unique Geologic Features. The Colma Formation, which underlies the project site, has high paleontological sensitivity and could contain vertebrate fossils at the project site. Although construction of Mission Rock Square Garage would not occur under the No Change to Pier 48 Alternative, resulting in less excavation than the proposed project, drilling and pile driving for proposed buildings and streets would occur at depths where paleontological resources could potentially occur. Therefore, as with the proposed project, drilling and pile driving associated with construction of the No Change to Pier 48 Alternative at Seawall Lot 337 could affect geologic units that could contain significant paleontological remains or traces of paleontological remains. However, Mitigation Measure M-GE-5, as required for the proposed project, would reduce impacts on paleontological resources to ***less than significant with mitigation*** under the No Change to Pier 48 Alternative.

Cumulative Impacts. The No Change to Pier 48 Alternative would result in cumulative impacts similar to those of the proposed project. The alternative, in combination with other development within the city, would not substantially increase ground failure potential. The alternative, in combination with other development within the city, would not substantially increase soil erosion potential.

Cumulative impacts on paleontological resources could be significant under this alternative and the proposed project; however, Mitigation Measure M-GE-5 would reduce the potential for this alternative to make a cumulatively considerable contribution to such an impact to a ***less-than-significant*** level, similar to the proposed project. Therefore, although cumulative development impacts related to paleontological resources would be considered potentially significant, the incremental effects of the No Change to Pier 48 Alternative, after mitigation, would not be cumulatively considerable.

HYDROLOGY AND WATER QUALITY

Violation of Water Quality Standards or Waste Discharge Requirements. In-water activities included in the proposed project at Pier 48 would not be implemented under the No Change to Pier 48 Alternative. Therefore, water quality impacts from rehabilitation of Pier 48 would not occur, compared to the less-than-significant impact under the proposed project. However, land-disturbing activities during construction of Seawall Lot 337 and the placement of stockpiles in proximity to storm drain inlets or nearby surface waters may result in a temporary increase in sediment loads in San Francisco Bay. However, all construction activities would be subject to existing regulatory requirements, such as the Construction General Permit. Should dewatering occur, the No Change to Pier 48 Alternative, similar to the proposed project, would comply with San Francisco Bay Regional Water Quality Control Board dewatering requirements or the City's batch wastewater discharges permit, depending on the location of discharge, to prevent potential water quality impacts on surface waters. Therefore, because the No Change to Pier 48 Alternative would be required to comply with the regulatory controls described above to ensure that water quality standards and objectives designated by the Basin Plan are achieved, potential water quality impacts associated with construction activities at Seawall Lot 337 and the degradation of stormwater runoff would be ***less than significant***, same as under the proposed project.

Operation and maintenance activities under the proposed project would generate pollutants of concern from landscape maintenance, building maintenance, the storage of materials and substances, maritime operations, and vehicle use. The No Change to Pier 48 Alternative would result in slightly fewer operational and maintenance activities because Pier 48 would not be operational. Compliance with both the SMR would allow the No Change to Pier 48 Alternative to achieve its long-term sustainable approach to planning and design as well as comply with stormwater requirements established by the City and the Port's NPDES

MS4 requirements. Therefore, potential surface water quality impacts from operation of the No Change to Pier 48 Alternative, similar to the proposed project, would be ***less than significant***.

Depletion of Groundwater Supplies or Recharge. Construction dewatering in areas of shallow groundwater may be required during excavation activities under this alternative, which could result in a temporary reduction in groundwater volumes. Implementation of the No Change to Pier 48 Alternative would include approximately 6.8 acres of open space, which is approximately 4.6 acres more than existing conditions.[12] Although not all of this open space area would be pervious, the increase in open space would allow for an increase in groundwater recharge potential, similar to the proposed project. Groundwater within the downtown San Francisco groundwater basin is not used for water supply. Therefore, construction and operation of the No Change to Pier 48 Alternative would not utilize or affect groundwater supplies, resulting in ***less-than-significant impacts***, similar to the proposed project.

Alteration of Existing Drainage Patterns. As with the proposed project, the No Change to Pier 48 Alternative would implement BMPs, described in the SWPPP, to minimize the potential for erosion and sedimentation in nearby storm drains during construction. In addition, an ESCP would be submitted, further reducing the potential for substantial erosion or siltation onsite and offsite. For construction at Seawall Lot 337, the No Change to Pier 48 Alternative would also be required to comply with existing NPDES Construction General Permit requirements, the City's Construction Site Runoff Ordinance, and SFPUC Stormwater Management Requirements, similar to the proposed project. Soil management and the need to accommodate SLR by raising the site are expected to result in the majority of soil excavated onsite for cut-and-fill operations being maintained, with a limited amount of soil import required for landscaping. Soil would be stockpiled on the site for use where fill is required. The amount of fill coming on the site or exported because of construction would be same as the amount under the proposed project. Because rehabilitation of Pier 48 would not occur under the No Change to Pier 48 Alternative, no impacts would occur in this area. Operation of the No Change to Pier 48 Alternative, as with the proposed project, would require soil stabilization (e.g., vegetation or other protective cover, stabilized slopes and fills), in accordance with San Francisco stormwater requirements. With implementation of LID features, such as bio-retention areas, and additional open space, the potential for erosion and siltation at the project site would be reduced. Therefore, impacts of the No Change to Pier 48 Alternative related to altering existing drainage patterns or substantially increasing the rate or amount of runoff would be ***less than significant***, similar to the proposed project.

[12] Includes existing China Basin Park, not the existing Pier 48 aprons, as open space because the Pier 48 aprons do not currently include pervious surfaces.

Creation of Runoff. During construction, the proposed project or this alternative would not create or contribute runoff water that would exceed the capacity of the existing stormwater drainage systems or result in flooding onsite or offsite. New facilities that would be constructed for the No Change to Pier 48 Alternative (similar to the proposed project) would be drained by a combination of new and existing storm drains. To serve the proposed development parcels, storm drain lateral connections would be installed. The majority of the existing project site is paved. Because the No Change to Pier 48 Alternative would include more open space than existing conditions (although to a slightly lesser extent than the proposed project), the new impervious surfaces would not increase stormwater runoff rates and volumes. In addition, the project design under this alternative and the proposed project would include stormwater management measures that would reduce the volume of runoff entering the storm sewer system. BMPs to control construction site runoff and reduce the discharge of pollution to the storm drain system would be implemented to ensure that water quality standards and objectives, as designated by the Basin Plan, are achieved. Through compliance with SFGBO requirements and compliance with the San Francisco Stormwater Management Requirements, runoff water from the project site would not exceed the capacity of existing or planned stormwater drainage systems, and this impact for the No Change to Pier 48 Alternative would be ***less than significant.*** The proposed project would result in similar impacts related to runoff.

Place Housing within a 100-Year Flood Hazard Area. No housing is proposed at Pier 48. As a result, any housing-related impacts of the alternative would be the same as those of the proposed project. The proposed project is not currently within a 100-year floodplain or subject to tidal flooding. Therefore, no housing or structures would be placed within a 100-year flood hazard area. The project site, however, could be subject to inundation from future SLR under both the proposed project and the No Change to Pier 48 Alternative. Only the immediate waterfront portions of the project site along Mission Creek and Lower San Francisco Bay would be inundated (i.e., with 12 and 36 inches of SLR under the 2050 and 2100 SLR scenarios, respectively). When the effects of 100-year storm surge are considered, over half of the site west of Pier 48 would be vulnerable to flooding at both the projected mid-century level and end-of-century SLR scenarios. The storm drain system, street section, and street grading would convey stormwater runoff for the 100-year storm event and for overland release to San Francisco Bay. China Basin Park would maintain shoreline elevations close to its existing grade. The project sponsor would review adaptive management strategies in the future and determine the feasibility of solutions if and when the need for such strategies arises. Because the final shape of the shoreline along the waterfront portion of the project site would be substantially the same as existing conditions and the No Change to Pier 48 Alternative would not include the construction of any new in-water structures, the patterns of flood flows at the project site or in the vicinity would not be substantially affected. Therefore, this alternative's impacts related to placing housing within a 100-year flood hazard area that could be inundated by flooding due to SLR would be ***less than significant***, similar to the proposed project.

Flooding from Tsunami or Seiche Inundation. The project area is adjacent to Lower San Francisco Bay and, therefore, not subject to inundation by seiche. However, with the exception of the southwest corner of the site, the project area would be subject to flooding from tsunami inundation under the No Change to Pier 48 Alternative, similar to the proposed project. To protect people and structures from a significant risk of loss or injury due to tsunami, the proposed project's and the No Change to Pier 48 Alternative's grading elevations would consider SLR and be designed to exceed minimum requirements. Flood protection planning for the site is governed by the extreme high tides rather than tsunamis; therefore, the estimate for the 100-year tsunami event, which produces a minimum site grade of 8.2 feet NAVD88, would be considered. Therefore, this alternative's impacts related to related to flood risks due to tsunami or seiche inundation would be ***less than significant***, similar to the proposed project.

Cumulative Impacts. The No Change to Pier 48 Alternative would result in the same, or slightly fewer, cumulative hydrology impacts compared with the proposed project. Cumulative water quality, groundwater supply and recharge, drainage, and runoff impacts would result in less-than-cumulatively considerable impacts. As such, the No Change to Pier 48 Alternative would result in the same ***less-than-cumulatively considerable*** impacts as the proposed project.

HAZARDS AND HAZARDOUS MATERIALS

As with the proposed project, the No Change to Pier 48 Alternative would result in no impacts related to public-use airports and private airstrips and, therefore, these topics are not discussed further.

Routine Transport, Use, or Disposal of Hazardous Materials. Construction and operational activities of both the proposed project and the No Change to Pier 48 Alternative are expected to involve the routine use of hazardous materials (e.g., motor fuels, solvents, and lubricants). However, the No Change to Pier 48 Alternative would result in slightly less transport or use of these materials because Pier 48 would not be rehabilitated. Regulations require all hazardous waste transporters to have identification numbers and a hazardous waste manifest, which documents the legal transport and disposal of the waste and is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations require specific cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill, and for the safe packing and transport of hazardous waste. For construction at Seawall Lot 337, because compliance with existing regulations would be mandatory, construction of the No Change to Pier 48 Alternative, similar to the proposed project, would not create a significant hazard for the public or the environment through the routine transport, use, or disposal of hazardous materials, and this impact would be ***less than significant***.

During operation, it is anticipated that the No Change to Pier 48 Alternative (similar to the proposed project) would require the use of hazardous materials that are typical of residential, commercial, and active/retail uses as well as parking facilities and open space areas. For these

uses, programs are in place in San Francisco to provide opportunities for residents to dispose of household hazardous waste. Under Articles 21 and 22 of the San Francisco Health Code, implemented by SFDPH, businesses are required by law to ensure employee safety by identifying hazardous materials in the workplace, providing safety information to workers who handle hazardous materials, and adequately training workers. The industrial/manufacturing and maritime uses proposed at Pier 48 under the proposed project that could involve the use of larger quantities of hazardous materials would not be operational under the No Change to Pier 48 Alternative. Because compliance with existing regulations would be mandatory, operation of the No Change to Pier 48 Alternative (similar to the proposed project) would not create a significant hazard for the public or the environment through the routine transport, use, or disposal of hazardous materials, and this impact would result in the similar, although slightly fewer, ***less-than-significant impacts*** compared with the proposed project.

Accidental Release of Hazardous Materials. Unlike the proposed project, construction activities associated with the rehabilitation of sheds and removal of wood pilings at Pier 48, which could release hazardous building materials into the environment, would not occur under the No Change to Pier 48 Alternative. Previous environmental investigations indicate that the potential exists for residual soil and/or groundwater contamination to be present on the project site from documented releases of hazardous materials and historical land uses that were associated with hazardous materials. Specific construction activities at Seawall Lot 337 that could disturb contaminated subsurface soil and/or groundwater include earthwork activities and construction dewatering. The permits required for construction activities (Section 10 permit from the U.S. Army Corps of Engineers, water quality certification from the Regional Water Quality Control Board, a Major Permit from the Bay Conservation and Development Commission, and formal consultations with the National Marine Fisheries Service and California Department of Fish and Wildlife) would specify BMPs and the preparation and implementation of plans for the protection of water quality, such as: a Debris Management Plan; a Spill Resource and Countermeasure Plan; equipment fueling requirements to require proper fuel transfer procedures; equipment maintenance requirements to minimize leaks and spills; a Materials Management Disposal Plan; barge mooring requirements to capture construction debris; measures to avoid cement, concrete, and saw water from entering the San Francisco Bay; and measures to assure proper disposal of construction material. For example, the Bay Conservation and Development Commission's typical permit conditions include requirements to construct, guarantee, and maintain public access to the Bay, specified construction methods to ensure safety or to protect water quality, plan review requirements that must be met before construction can begin, and mitigation requirements to offset adverse environmental impacts.

Through the Maher process, SFDPH would require preparation and implementation of an approved Site Mitigation Report for this alternative and the proposed project. The Site Mitigation Report must present recommended measures to mitigate potential risks to the environment and to protect construction workers, nearby residents, workers and/or pedestrians

from potential exposure to hazardous substances and underground structures that may be encountered during soil excavation and grading activities. In addition, the Site Mitigation Report must include measures to protect future users of the site from any residual contaminants that remain on the site after construction is completed. The Site Mitigation Report must identify procedures to identify unanticipated conditions such as underground storage tanks, sumps or pipelines that may be identified during excavation activities. Any such USTs would be required to be closed pursuant to Article 21 of the San Francisco Health Code. Article 21 provides that all closures and removals of USTs shall require approval of SFDPH, compliance with Article 21 and its implementing regulations, and compliance with applicable provisions of Chapter 6.7 and 6.75 of the California Health and Safety Code (commencing with Section 25280) and its implementing regulations for this alternative and the proposed project. The closure of any UST must also be conducted in accordance with a permit from the San Francisco Fire Department.

Further, as discussed above, existing OSHA and Cal/OSHA requirements provide for protective clothing and worker training; medical examinations and monitoring of employees engaged in activities that could disturb asbestos-containing building materials; precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; a maximum safe exposure level for construction work where lead exposure may occur; and protective measures, monitoring requirements, and compliance standards to ensure the safety of construction workers exposed to lead-based paint.

Finally, the Site Mitigation Report will include an Operations and Maintenance (O&M) Plan to provide for long-term management of the site. Future site users, utility maintenance workers, or other workers who may handle contaminated soils during project operations would need to comply with the site's O&M Plan. In accordance with any land use restrictions recorded on the project site, the site's O&M Plan would include measures that would need to be followed during any work that may disturb underlying soils. The O&M Plan would include maintenance logs, cap inspection reports, and annual inspection reports.

Because the project sponsor would be required to demonstrate compliance with the performance standards outlined in the Maher Ordinance, including preparation of a site-specific Site Mitigation Plan, the No Change to Pier 48 Alternative would not create a significant hazard for construction workers, future site users, and/or the environment from contaminated soil and/or groundwater, resulting in a ***less-than-significant*** impact, similar to the proposed project.

Hazardous Materials Pursuant to Government Code Section 65962.5. One hazardous materials release site identified on the list compiled pursuant to Government Code Section 65962.5 was formerly located on the project site. The SFDPH issued a Remedial Action Completion Certification for the release site in 2008; however, SFDPH has determined that low levels of residual soil and/or groundwater contamination could be present at the project site. Hazardous materials releases were also reported at the H&H Ship Service Company, which was formerly

located on the project site. Although this site is not included on a list compiled pursuant to Section 65962.5 of the Government Code, low levels of residual soil and/or groundwater contamination could remain at the site. Construction and operation of both the proposed project and the No Change to Pier 48 Alternative could disturb potential contamination in the soil and/or groundwater. Such work would be subject to OSHA and Cal/OSHA requirements and Construction Dust Control Ordinance requirements that would protect workers and members of the public, and hazardous materials would be required to be transported to and from the project site in accordance with RCRA and USDOT regulations and disposed of in accordance with the RCRA and the California Code of Regulations at a facility that is permitted to accept the waste. Because the project sponsor would be required to demonstrate compliance with the performance standards established by the regulations described above, the No Change to Pier 48 Alternative, similar to the proposed project, would result in a ***less-than-significant*** impact related to the development of a hazardous materials site included in a list compiled pursuant to Government Code Section 65962.5.

Hazards to Nearby Schools. There are no existing public or private schools within a 0.25-mile radius of the project site: however, a 500-student public school has been proposed in the Mission Bay neighborhood. Hazardous materials used during construction and operation of both the proposed project and the No Change to Pier 48 Alternative would be managed in accordance with applicable laws and regulations. In addition, as discussed in Section 4.G, *Air Quality*, sources of hazardous emissions during project construction and operation include diesel particulate matter from vehicle exhaust and emergency generators. A Site Mitigation Report and dust control measures must be implemented to ensure that residual soil contamination is properly managed, and the site's O&M Plan will included measures that would need to be followed for any work that may disturb the underlying soils. The O&M Plan will include maintenance logs, cap inspection reports, and annual inspection reports. With mitigation, these emission sources would have a less-than-significant impact on nearby sensitive receptors (which include schools). Therefore, as with the proposed project, the handing or emission of hazardous or acutely hazardous materials during construction and operation of the No Change to Pier 48 Alternative would result in a ***less-than-significant impact*** on nearby schools.

Interference with an Adopted Emergency Response or Evacuation Plan. The proposed project would increase traffic in the vicinity of the project site. The No Change to Pier 48 Alternative would also increase traffic but to a lesser extent than the proposed project because of the reduction in the number of daily trips. Implementation of the No Change to Pier 48 Alternative would not impede emergency access routes or alter adjacent roadways. Therefore, the No Change to Pier 48 Alternative, similar to the proposed project, would have a ***less-than-significant impact*** on existing emergency response and evacuation plans for the city.

Cumulative Impacts. The No Change to Pier 48 Alternative would develop the project site similar to the proposed project, except that no rehabilitation of Pier 48 would occur and industrial uses at Pier 48 would not be operational. However, the No Change to Pier 48 Alternative would disturb the same amount of soil at Seawall Lot 337; therefore, this alternative would have similar or slightly decreased cumulative impacts compared to the proposed project. Development of the project site and other cumulative development (similar to the proposed project under cumulative conditions) could expose people or the environment to residual contaminants in soil and/or groundwater if measures are not implemented to control unintentional or inadvertent releases. However, the No Change to Pier 48 Alternative and all other cumulative development within the city would be required to adhere to current regulatory standards, thereby reducing the cumulative impacts to ***less than significant***.

VARIANTS COMPARED TO THE NO CHANGE TO PIER 48 ALTERNATIVE

As discussed in Chapter 6, *Variants*, there are four different project variations that could be implemented with the proposed project. If one of the alternatives presented in this chapter is adopted instead of the proposed project, a variant could also be implemented. In all cases, however, if a variant were implemented with the No Change to Pier 48 Alternative, resulting impacts would not be greater than what is already disclosed in Chapter 4 and Chapter 6 of this EIR. There are no topics under which an alternative would result in greater impacts than the proposed project. Additional impacts could result if Variant 1 (district-wide heating and cooling) were implemented, particularly related to biological resources. However, those additional impacts would result regardless if the underlying project were as proposed in Chapter 2, *Project Description*, or if it consisted of one of the alternatives. There would be no increase in the severity of impacts if Variant 1 were coupled with an alternative. Under the No Change to Pier 48 Alternative, Variant 1 would not locate facilitates at Pier 48 and planned components of the District Energy/Bay-Source Energy Capture system would be sited on Seawall Lot 337. Thus, no upgrades to Pier 48 would be required to implement this variant under the No Change to Pier 48 Alternative.

Under Variant 3, a decrease in construction activity would occur due to the elimination of the Mission Rock Square garage. This would result in a slight decrease in construction-related impacts but not to an extent that the conclusions reached under the proposed project would change. Variant 3 would not change trip generation and no new air quality or noise impacts would result. This analysis can be applied to a scenario where the No Change to Pier 48 Alternative were coupled with Variant 3. Overall, due to the less intense land use at the site under this alternative, there would be no expected increase in the severity of impacts if Variant 3 were coupled with this alternative.

If Variant 2 (entertainment venue)[13] or Variant 4 (hotel) were implemented with the No Change to Pier 48 Alternative the land use mix would be altered but the severity of impacts would not increase. Under the No Change to Pier 48 Alternative, the entertainment venue would not be located at Pier 48 and no upgrades to the pier would be required to implement the variant. As discussed in Chapter 6, *Variants*, Variant 2 would result in a decrease in weekday a.m. peak hour trips but an increase in p.m. peak hour trips over the proposed project. Variant 4, however, would result in an increase in both weekday a.m. peak hour and weekday p.m. peak hour vehicle trips over the proposed project. It can reasonably be stated that this same shift in trip generation would occur if either Variant 2 or Variant 4 were coupled with the No Change to Pier 48 Alternative but that, due to the overall decrease in square footage as part of the No Change to Pier 48 Alternative, the increase in trips would not exceed the maximum (and, as a result, the severity) of trips associated with the proposed project. Thus, air quality and noise impacts are not expected to be greater than the proposed project when Variant 2 or Variant 4 is coupled with the No Change to Pier 48 Alternative. Since construction activities would not change under Variant 2 or 4, construction impacts would not increase in severity over the proposed project when coupled with the No Change to Pier 48 Alternative.

E. ABILITY TO MEET PROJECT OBJECTIVES

Table 7-24 on the following page summarizes the ability of the three alternatives to meet the project objectives. The No Project Alternative is included, as required by CEQA Guidelines Section 15126.6(e), even though it would not meet the basic project objectives. The Reduced Intensity Alternative would likely (at least partially) meet most but not all of the proposed project objectives. The No Change to Pier 48 Alternative would meet some, but not all, of the objectives.

[13] Option A of Variant 2, under which the entertainment venue would be located at Pier 48, could not occur under the No Change to Pier 48 Alternative; however, it would be possible for Option B of Variant 2, under which the venue would be located at Block E, to be implemented.

TABLE 7-24. SUMMARY OF ABILITY OF ALTERNATIVES TO MEET PROJECT OBJECTIVES

Objectives	Project	Alternative A	Alternative B[a]	Alternative C
Project-Wide Objectives				
Create a new waterfront neighborhood to serve Mission Bay and the Central Waterfront, inviting diverse public use and access to the bay and creating lively streets and parks, a distinctive design for living and working, preserve and rehabilitate Pier 48 and retain an authentic waterfront character.	Yes	No	Partially due to reduction of development square footage and elimination of central Mission Rock Square	Partially due to elimination of Pier 48 rehabilitation
Set high standards for site-wide environmental sustainability, preparing for long-term site resiliency and requiring environmental performance for the new buildings.	Yes	No	Yes	Partially due to lack of seismic improvement to Pier 48
Provide sufficient density and intensity for development and programmatic uses to achieve a vibrant all-day, all-season destination and, at the same time, meet the financial requirements of site preparation and the construction of affordable housing, streets, sidewalks, plazas, parks, sewers, water systems, and other utility and infrastructure systems.	Yes	No	Partially due to reduction of development square footage, and to a limited extent due to elimination of central Mission Rock Square	Partially due to elimination of Pier 48
Develop parks and open spaces in a manner that complements and adds variety to the adjacent Mission Bay neighborhood, with multiple spaces that are usable and welcoming in all seasons. This includes maximizing the number of buildings fronting on open spaces or parks by developing the project around waterfront parks and a central open space square that (1) can accommodate assembly and special-event uses, (2) is connected to other open space areas by a network of pedestrian-oriented streets, and (3) is surrounded by interactive ground-floor spaces that maximize circulation between active/retail ground-floor uses and exterior spaces.	Yes	No	Partially due to revised site plan configuration, and to a limited extent due to elimination of central Mission Rock Square	Yes, Seawall Lot 337 site plan would remain unchanged

Objectives	Project	Alternative A	Alternative B[a]	Alternative C
Develop and provide access for area residents and visitors to an inviting waterfront promenade segment of the Bay Trail/Blue Greenway through design of a bicycle, pedestrian, and transit-oriented community with well-designed parks, pedestrian-friendly streets, walkable blocks, and links to open spaces, taking advantage of the project site's unique proximity to Mission Creek, AT&T Park, and the Bay Bridge and the opportunity to expand and enhance the existing China Basin Park, while also preserving access from Terry Francois Boulevard for industrial uses in Pier 48 and adjacent piers.	Yes	No	Yes	Partially due to the elimination of future industrial uses in Pier 48
Provide amenities to a wide variety of people, such as Mission Bay residents/families, project residents, ballpark patrons, and employees of and visitors to UCSF and other area facilities and employment centers. The amenities would include, but are not limited to, parks, open spaces, recreation and entertainment opportunities, and a variety of retail and restaurant uses as well as a neighborhood focal point that provides appropriate amenities and active and vibrant public gathering spaces.	Yes	No	Partially due to reduction of development square footage	Partially due to the elimination of entertainment, retail, and restaurant uses at Pier 48
Develop buildings and a pattern of blocks that add variety to the adjacent Mission Bay neighborhood, with varied form, scale, design character, and site-wide activity at ground-floor levels.	Yes	No	Partially due to the revised site plan	Partially, because Pier 48 would not be rehabilitated and reused, but Seawall Lot 337 site plan would remain unchanged
Offer a mix of residential unit types, sizes, and levels of affordability to serve a diverse pool of potential residents.	Yes	No	Partially due the reduction in residential units (compared to High Residential Assumptions)	Yes, residential units would remain unchanged.

Objectives	Project	Alternative A	Alternative B[a]	Alternative C
Add to the job-producing capacity of this site with diverse commercial/office building offerings, retail and service tenant spaces, and maker spaces for local artisans and entrepreneurs.	Yes	No	Partially due to the reduction in employees (compared to High Commercial Assumptions)	Partially due to the reduction of 200 employees at Pier 48
Generate substantial incremental revenue to the Port for waterfront needs, which include preserving historic piers and other historic structures, constructing and maintaining waterfront plazas, and establishing open space consistent with Public Trust requirements.	Yes	No	Partially due to the reduction in development square footage	Partially due to reduction in revenue because of Pier 48 elimination
Address the ongoing need for parking to serve AT&T Park patrons by replacing the existing Seawall Lot 337 surface parking with visitor and site-serving parking structures that address parking demand by ballpark patrons, working in combination with area street parking and other area structured parking resources.	Yes	Yes	Partially, due to reduction of 700 parking spaces	Yes, existing parking would be replaced
Optimize opportunities for sustainable transportation by encouraging walking, bicycling, and transit use and discouraging single-occupancy drivers and automobile use while ensuring minimum parking needs are met for site users and ballpark visitors.	Yes	No	Yes	Yes
Specific Objectives – Seawall Lot 337				
Develop a mixed-used project on Seawall Lot 337, including sufficient residential density and commercial, parking, retail, open space, and related programmatic uses that will attract a diverse mix of workers, visitors, and residents and create a vibrant place that is active throughout the day, in the evenings, and on weekends.	Yes	No	Partially due to reduction of development square footage and the elimination of central Mission Rock Square	Yes, Seawall Lot 337 site plan would remain unchanged

Objectives	Project	Alternative A	Alternative B[a]	Alternative C
Provide sufficient flexibility and balance in the development program and a variety of building types, urban forms, heights, and floor-plate sizes within the framework of an overall development plan to create an active mixed-use neighborhood.	Yes	No	Partially due to reduction of development square footage and change in Seawall Lot 337 site plan	Yes, Seawall Lot 337 site plan would remain unchanged
Design parking structures, to the extent feasible, to minimize conflicts between vehicles entering or exiting structures and area circulation, including bicyclists, pedestrians, or transit.	Yes	No	Yes	Yes, Seawall Lot 337 site plan would remain unchanged
Ensure that parking facilities and management strategies, in addition to serving onsite uses and AT&T Park patrons, support city-wide transportation plan strategies and goals to capture vehicle traffic coming into the city and transition the user to sustainable transportation modes, including Muni, Central and Subway, and the T Line.	Yes	No	Partially, due to the elimination of the Mission Rock Square parking garage	Yes
Encourage building forms that contribute to the beauty and variety of the city skyline, are placed to protect and promote public views of the bay from various San Francisco neighborhoods, provide a transition in building heights by stepping down from Third Street toward the waterfront, and mark key destinations along the waterfront.	Yes	No	Yes	Yes
Program lower floors of buildings with engaging retail and other active uses that serve and complement adjacent public spaces, meet the needs of the neighborhood, and accommodate artisan and other local business opportunities.	Yes	No	Partially due to the reduction in retail and commercial uses and the elimination of Mission Rock Square	Yes
Phase the construction of public infrastructure and facilities onsite to coordinate with the development of buildings.	Yes	No	Yes	Yes

Objectives	Project	Alternative A	Alternative B[a]	Alternative C
Implement a multi-faceted, coordinated resiliency strategy for Seawall Lot 337 that is responsive to the growing knowledge of sea-level rise, climate events, and the benefits of coordinated, sustainable utility systems.	Yes	No	Yes	Yes
Pier 48 Objectives				
Reuse and rehabilitate Pier 48, a contributing resource in the Embarcadero Historic District, with a mix of uses, such as industrial, commercial, visitor-oriented restaurant, retail, tour, exhibit, meeting space, entertainment, parking, and recreational uses, while preserving its historic fabric.	Yes	No	Yes	No
Provide opportunity for both maritime and public access on the pier's aprons, to the extent feasible, in a manner that complements and enhances public use and enjoyment of the proposed China Basin Park and is consistent with public trust requirements.	Yes	No	Yes	No
Comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties.	Yes	No	Yes	No

Notes:

a. Although Alternative B, the Reduced Intensity Alternative, meets all of the proposed project objectives, the alternative's ability to meet the objectives is to a lesser extent than that of the proposed project due to the reduction of square footage.

F. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Section 21002 of the State CEQA Guidelines requires lead agencies to adopt feasible mitigation measures or feasible environmentally superior alternatives in order to substantially lessen or avoid otherwise significant adverse environmental effects, unless specific social or other conditions make such mitigation measures or alternatives infeasible. CEQA also requires that an environmentally superior alternative be identified among the alternatives analyzed. In general, the environmentally superior alternative is the alternative that avoids or substantially lessens some or all of the significant and unavoidable impacts of the proposed project (CEQA Guidelines Section 15126.6). Table 7-25, below, compares the significant impacts of the proposed project, No Project Alternative, Reduced Intensity Alternative, and the No Change to Pier 48 Alternative.

The table compares the significance of impacts in two ways. One, for each impact studied, it identifies the level of impact for the proposed project and each alternative (e.g., no impact, less-than-significant impact, less-than-significant impact with mitigation, significant and unavoidable impact, or significant and unavoidable impact with mitigation). Two, for each alternative, it indicates for each impact whether the resulting degree of impact would be equal to, less than, or greater than the proposed project impact. In some cases, although both the proposed project and alternative would result in the same level of impact, the degree of that impact with the alternative might be less than or greater than the proposed project.

TABLE 7-25. COMPARISON OF SIGNIFICANT IMPACTS OF PROPOSED PROJECT TO IMPACTS OF ALTERNATIVES

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Land Use			
All impacts would be less than significant.	NI <	LS =/<	LS =/<
Aesthetics			
All impacts would be less than significant.	NI <	LS =/<	LS =/<
Population and Housing			
All impacts would be less than significant.	NI <	LS <	LS <
Cultural Resources			

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact CP-1. The proposed project, including rehabilitation and reuse of the existing historic Pier 48 structures, in accordance with applicable Secretary of the Interior's Rehabilitation Standards, as well as new construction on Seawall Lot 337, would not have a substantial adverse effect on a historical or potential historical resource. Impacts on historical resources would be less than significant.	NI <	LS =/<	LS =/<
Impact CP-2: The proposed project could cause a substantial adverse change in the significance of an archaeological resource. Identified mitigation would reduce this impact to less than significant with mitigation.	NI <	LSM =/<	LSM =/<
Impact CP-3: The proposed project could disturb human remains, including those interred outside of formal cemeteries. Identified mitigation would reduce this impact to less than significant with mitigation.	NI <	LSM =/<	LSM =/<
Impact CP-4: The proposed project could result in a substantial adverse change in the significance of a tribal cultural resource. Identified mitigation would reduce this impact to less than significant with mitigation.	NI <	LSM =/<	LSM =/<
Impact C-CP-1. The proposed project, in combination with past, present, and reasonably foreseeable projects in the city, could result in a significant cumulative impact on historic resources. However, the proposed project's contribution would not be cumulatively considerable. Impacts would be less than significant.	NI <	LS =/<	LS =/<
Impact C-CP-2: The proposed project, in combination with future development in the city, would not result in a significant cumulative impact on archaeological resources, tribal cultural resources, and human remains. As such, the proposed project's contribution would not be cumulatively considerable.	NI <	LSM =/<	LSM =/<
Transportation			
Impact TR-1: Construction of the proposed project would not result in significant impacts on the transportation and circulation network. Impacts would be less than significant.	NI <	LS <	LS <

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact TR-2: The proposed project would not cause substantial additional VMT or substantially induce automobile travel. Impacts would be less than significant.	NI <	LS =	LS =
Impact TR-3: The proposed project would result in queues that would create traffic hazards. This impact would be less than significant with mitigation.	NI <	LSM =	LSM =
Impact TR-4: The proposed project would result in an adverse impact by increasing ridership by more than 5 percent on two individual Muni routes that exceed 85 percent capacity utilization under baseline conditions. This impact would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =
Impact TR-5. The proposed project would not cause significant impacts on regional transit routes. This impact would be less than significant.	NI <	LS =	LS =
Impact TR-6. The project would result in an adverse impact related to a substantial increase in transit delays on Third Street between Channel Street and Mission Rock Street. This impact would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =
Impact TR-7: The proposed project would have a substantial adverse effect on pedestrian travel by creating potentially hazardous conditions for pedestrians adjacent to the Block D2 parking structure. This impact would be less than significant with mitigation.	NI <	LSM =	LSM <
Impact TR-8: Existing pedestrian facilities on the Third Street Bridge, the Fourth Street Bridge, and the Fourth Street/King Street intersection are sized adequately to accommodate pedestrian traffic generated by the proposed project. This impact would be less than significant.	NI <	LS =	LS =
Impact TR-9: The proposed project would have significant impacts on pedestrian safety at the unsignalized intersections of Fourth Street/Mission Rock Street and Fourth Street/Long Bridge Street. This impact is significant and unavoidable with mitigation.	NI <	SUM =	SUM <

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact TR-10: The proposed project would create potentially hazardous conditions for bicyclists and would interfere with bicycle accessibility to the project site or adjoining areas. This impact would be less than significant with mitigation.	NI <	LSM =	LS <
Impact TR-11: The proposed project's loading demand during the peak loading hour would not be adequately accommodated by the proposed onsite/off-street loading supply or in proposed on-street loading zones, which may create hazardous conditions or significant delays for transit, bicycles, or pedestrians. This impact is less than significant with mitigation.	NI <	LSM =	LSM =
Impact TR-12: The proposed project could result in significant impacts on emergency access to the project site or adjacent locations. This impact would be less than significant with mitigation.	NI <	LSM =	LSM =
Impact TR-13: The proposed project would not result in a substantial parking deficit that would create hazardous conditions or significant delays affecting transit, bicycles, or pedestrians, and particular characteristics of the proposed project would not render the use of other modes infeasible. This impact would be less than significant.	NI <	LS =	LS =
Impact C-TR-1, Impact C-TR-2, Impact C-TR-5, Impact C-TR-10, and Impact C-TR-11: Cumulative impacts related to construction, VMT, regional transit routes, emergency vehicle access, and parking would be less than significant.	NI <	LS =	LS =
Impact C-TR-3. The proposed project would not contribute to a major traffic hazards. Impacts would be less than significant with mitigation.	NI <	LSM =	LSM =
Impact C-TR-4. The proposed project would contribute considerably to a significant cumulative transit impact because it would increase ridership by more than 5 percent on one individual Muni route that would exceed 85 percent capacity utilization. Impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =
Impact C-TR-6. The proposed project would contribute considerably to significant cumulative impacts related to transit delay. Impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact C-TR-7. The proposed project would contribute considerably to significant cumulative pedestrian impacts. Impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =
Impact C-TR-8. The proposed project would not contribute considerably to a significant cumulative bicycle impact. Impacts would be less than significant with mitigation.	NI <	LSM =	LTS =
Impact C-TR-9. The proposed project could contribute to a significant cumulative loading impact. Impacts would be less than significant with mitigation.	NI <	LSM =	LSM =
Noise			
Impact NOI-1: Construction of the proposed project would generate noise levels in excess of standards and result in substantial temporary increases in ambient noise levels, resulting in significant and unavoidable impacts.	NI <	SUM =	SUM =
Impact NOI-2: Operation of the proposed project could result in the exposure of persons to or generation of noise levels in excess of the San Francisco Noise Ordinance or a substantial permanent, temporary, periodic or increase in ambient noise levels in the project vicinity, above levels existing without the project. Impacts would be significant and unavoidable.	NI <	SU =	SU =
Impact NOI-3: The project would expose persons to or generate excessive ground-borne vibration or ground-borne noise levels, and impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =
Impact C-NOI-1: Construction activities for the proposed project, in combination with other past, present, and reasonable future projects in the city, would result in a substantial temporary increase in noise or noise levels in excess of the applicable local standards. Cumulative impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact C-NOI-2: Construction activities associated with project-related development, in combination with other past, present, and reasonable future projects in the city, would expose sensitive receptors to excessive ground-borne vibration. The proposed project's contribution to a cumulative impact would be considerable. Impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =
Impact C-NOI-3: Operation of the proposed project, in combination with other past, present, and reasonable future projects in the city, would result in the exposure of persons to noise in excess of the applicable local standards or a substantial permanent ambient noise level increase in the project vicinity. Impacts would be significant and unavoidable.	NI <	SU =	SU =
Air Quality			
Impact AQ-1: Construction of the proposed project would generate fugitive dust and criteria air pollutants, which for criteria air pollutants but not fugitive dust, would violate an air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. Impacts would be significant and unavoidable with mitigation for criteria air pollutants.	NI <	SUM =	SUM =/<
Impact AQ-2: During project operations, the proposed project would result in emissions of criteria air pollutants but not at levels that would violate an air quality standard, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. Impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =/<
Impact AQ-3: During combined project construction and operations, the proposed project would result in emissions of criteria air pollutants but not at levels that would violate an air quality standard, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. Impacts would be significant and unavoidable with mitigation.	NI <	SUM =	SUM =/<

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact AQ-4: Construction and operation of the proposed project would generate toxic air contaminants, including diesel particulate matter, which would expose sensitive receptors to substantial pollutant concentrations. This impact would be less than significant with mitigation.	NI <	LSM =/<	LSM =/<
Impact AQ-5: The proposed project would not conflict with, or obstruct implementation of, the 2010 Clean Air Plan. This impact would be less than significant with mitigation.	NI <	LSM =	LSM =
Impact AQ-6: The project would not result in significant exposure of sensitive receptors to asbestos during demolition activities. This impact would be less than significant.	NI <	LS =/<	LS =/<
Impact AQ-7: The proposed project would not create objectionable odors that would affect a substantial number of people. This impact would be less than significant.	NI <	LS =/<	LS =/<
Impact C-AQ-1: The proposed project's construction and operation, in combination with other past, present, and reasonable future projects, would contribute to cumulative regional air quality impacts. This impact would be significant and unavoidable with mitigation.	NI <	SUM =/<	SUM =/<
Impact C-AQ-2: The proposed project's construction and operation, in combination with other past, present, and reasonable future projects, could generate toxic air contaminants, including diesel particulate matter, but would not expose sensitive receptors to substantial pollutant concentrations. This impact would be less than significant with mitigation.	NI <	LSM =/<	LSM =/<
Impact C-AQ-3: The proposed project's construction and operation, in combination with other past, present, and reasonable future projects, would not conflict with, or obstruct implementation of, the 2010 Clean Air Plan. This impact would be less than significant with mitigation.	NI <	LSM =/<	LSM =/<
Impact C-AQ-4: The proposed project's construction, in combination with other past, present, and reasonable future projects, would not expose sensitive receptors to asbestos during demolition activities This impact would be less than significant.	NI <	LS =/<	LS =/<

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact C-AQ-5. The proposed project's construction, in combination with other past, present and reasonable future projects, would not create objectionable odors that would affect a substantial number of people. This impact would be less than significant.	NI <	LS =/<	LS =/<
Greenhouse Gas Emissions			
Impact GG-1. The proposed project would generate GHG emissions but not at levels that would result in a significant impact on the environment or conflict with any policy, plan, or regulation adopted for the purpose of reducing GHG emissions. Impacts would be less than significant.	NI <	LS =/<	LS =/<
Wind and Shadow			
Impact WS-1: The project would alter wind in a manner that would substantially affect public areas, and impacts would be significant and unavoidable with mitigation.	NI <	SUM =/<	SUM =
Impact WS-2: The project would not create new shadow in a manner that would substantially affect outdoor recreation facilities or public areas and impacts would be less than significant.	NI <	LS =/<	LS =
Impact C-WS-1: The project, in combination with past, present, and reasonably foreseeable future project, would alter wind in a manner that would substantially affect public areas, and impacts would be significant and unavoidable with mitigation.	NI <	SUM =/<	SUM =
Impact C-WS-2: The project, in combination with past, present, and reasonably foreseeable future project, would not create new shadow in a manner that would substantially affect outdoor recreational facilities of public areas, and impacts would be less than significant.	NI <	LS =/<	LS =
Public Services and Recreation			
All impacts would be less than significant.	NI <	LS =/<	LS =/<
Utilities and Service Systems			
All impacts would be less than significant	NI <	LS =/<	LS =/<
Biological Resources			

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact BI-1 and Impact BI-4: Water quality impacts on candidate, sensitive, or special-status species; Pier 48 seismic upgrade impacts on candidate, sensitive, or special-status species; and impacts related to the movement of any native resident or migratory fish or wildlife species, or established native resident or migratory wildlife corridors, would be less than significant.	NI <	LS =/<	LS =/<
Impact BI-2. Changes in shading and habitat at Pier 48 would not result in a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or USFWS. Impacts would be less than significant.	NI <	LS =/<	NI <
Impact BI-3: Pile driving and associated noise from construction of the Pier 48 seismic upgrades could have a substantial adverse effect on fish and marine mammal species that have been identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS, or U.S. Fish and Wildlife Service (USFWS). Impacts would be less than significant with mitigation.	NI <	LSM =	NI <
Impact BI-5: Construction of the proposed project could affect migratory nesting birds, and impacts would be less than significant with mitigation.	NI <	LSM =	LSM =
Impact BI-6: The proposed project would not conflict with any local policies or ordinances for protecting biological resources, such as a tree preservation policy or ordinance; impacts would be less than significant.	NI <	LS =	LS =
Impact C-BI-1, Impact C-BI-2, and Impact C-BI-4: Cumulative water quality impacts on candidate, sensitive, or special-status species and impacts related to the movement of any native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridors, or future development in the city may result in shading would be less than significant.	NI <	LS =	LS =

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact C-BI-3: The proposed project, in combination with future development in the city, would not result in permanent noise from pile driving and have a substantial adverse effect on a fish species that has been identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, NMFS or USFWS; impacts would be less than significant with mitigation.	NI <	LSM =	NI <
Impact C-BI-5: Construction of the proposed project, in combination with future development in the city and county, could affect nesting birds; impacts would be less than significant with mitigation.	NI <	LSM =	LSM =
Impact C-BI-6: The proposed project, in combination with future development in the city, would not result in a considerable contribution to significant cumulative impacts on local policies or ordinances to protect biological resources, such as a tree preservation policy or ordinance. Impacts would be less than significant with mitigation.	NI <	LSM =	LSM =
Geology and Soils			
Impact GE-1a, Impact GE-1b, Impact GE-1c, Impact GE-2, Impact GE-3, and Impact GE-4: Impacts related to rupture of a known earthquake fault, strong seismic ground shaking, ground failure or liquefaction, soil erosion, expansive soils, lateral spreading, or the loss of topsoil would be less than significant.	NI <	LS =/<	LS =/<
Impact GE-5: Implementation of the proposed project could directly or indirectly destroy a unique paleontological resource or site or a unique geologic feature with implementation of mitigation.	NI <	LSM =/<	LSM =
Impact C-GE-1, Impact CE-2, Impact C-GE-3: Cumulative impacts related to rupture of a known earthquake fault, strong seismic ground shaking, ground failure or liquefaction, soil erosion, expansive soils, lateral spreading, or the loss of topsoil would be less than significant.	NI <	LS =/<	LS =/<

Proposed Project	No-Project Alternative	Alternative A: Reduced Intensity Alternative	Alternative B: No Change to Pier 48 Alternative
Impact C-GE-4: The proposed project, in combination with other development within the city, could result in impacts to paleontological resources. However, the project's contribution would be less than cumulatively considerable. Impacts would be less than significant with mitigation.	NI <	LSM =/<	LSM =
Hydrology and Water Quality			
All impacts would be less than significant.	NI <	LS =/<	LS =/<
Hazards/Hazardous Materials			
All impacts would be less than significant.	NI <	LS =/<	LS =/<

NI (no impact); LS (less than significant); LSM (less than significant with mitigation); SUM (significant and unavoidable with mitigation); = (equal to); < (less than); > (greater than)

On the basis of comparing the extent to which the alternatives reduce or avoid the significant impacts of the proposed project, the No Project Alternative would be the environmentally superior alternative because it would result in no impacts to all resources. However, if the No Project Alternative is the environmentally superior alternative, then the EIR must also specify which of the other build alternatives (including the proposed project) would be environmentally superior.

Both the Reduced Intensity Alternative and the No Change to Pier 48 Alternative would result in smaller overall gross square footage of development compared to the proposed project. Under the Reduced Intensity Alternative, in addition to less development, building heights would be lower at on two Blocks, and the underground Mission Rock Square Garage would not be constructed; instead, Building K would be moved from next to China Basin Park to the Mission Rock Square site. Some building heights would be decreased, Building K would be moved and the location of the tower on Block D would be shifted, reducing wind impacts. Although the significant and unavoidable wind impacts would be reduced, impacts would remain significant and unavoidable even with mitigation, given uncertainty about the effectiveness of the mitigation. In addition, reducing total development square footage and eliminating the underground parking garage would slightly decrease overall impacts related to land use, aesthetics, population/housing, cultural resources, transportation, greenhouse gas emissions, shadow, public services, utilities, geology, hydrology and water quality, and hazards and hazardous materials. Although these impacts would also be lower in degree under this alternative, the Reduced Intensity Alternative would not serve to decrease any significant and unavoidable impacts or impacts requiring mitigation to less-than-significant levels.

The No Change to Pier 48 Alternative would not develop Pier 48, which would reduce all of the impacts on fish and marine mammal species from pile driving at Pier 48 seismic upgrades. The proposed project would require Mitigation Measures M-BI-3.1, M-BI-3.2, and M-BI-3.3 to reduce project and cumulative impacts to less-than-significant levels. However, since no in-water pile driving would be required under the No Change to Pier 48 Alternative, no impacts would occur and no mitigation measures would be needed.

The No Change to Pier 48 Alternative would also reduce the potentially hazardous conditions for bicyclist at Pier 48 by reducing conflicts between bicyclist and truck deliveries to Pier 48.

The No Change to Pier 48 Alternative also would result in a slight reduction of impacts to land use, aesthetics, population/housing, cultural resources, transportation, air quality, greenhouse gas emissions, public services, utilities, geology, hydrology and water quality, and hazards and hazardous materials.

As discussed above under *Variants Compared to the No Change to Pier 48 Alternative*, if any of the variants identified in Chapter 6, *Variants*, were implemented with the No Change to Pier 48 Alternative, resulting impacts would not be greater than what is already disclosed in this EIR. Variants 2 (entertainment venue) and 4 (hotel), which would only affect development on Seawall Lot 337 under this combined variant/alternative scenario[14], have nearly identical impacts when compared to the proposed project. Thus, coupling these variants with the No Change to Pier 48 Alternative would not result in a reduction of impacts because development under this alternative does not affect development at Seawall Lot 337. For this reason, combining either Variant 2 or Variant 4 with the No Change to Pier 48 Alternative would not result in an environmentally superior alternative.

Variant 1 (district energy/bay-source energy capture) would result in nearly identical impacts as the proposed project with the exception of additional impacts on biological resources that would result from construction activities in the San Francisco Bay not currently contemplated as part of the proposed project or the No Change to Pier 48 Alternative. Combining Variant 1 with the No Change to Pier 48 Alternative would not result in an environmentally superior alternative.

Variant 3 (reconfigured parking) would result in slightly less intense construction-related impacts due to the elimination of the Mission Rock Square parking garage. Operational impacts would not change, however, with inclusion of this variant. Due to this slight reduction in impacts from construction, the No Change to Pier 48 Alternative coupled with Variant 3 is considered the environmentally superior alternative because it would: reduce the severity of

[14] Option A of Variant 2, under which the entertainment venue would be located at Pier 48, could not occur under the No Change to Pier 48 Alternative; however, it would be possible for Option B of Variant 2, under which the venue would be located at Block E, to be implemented.

adverse environmental effects across a broad range of environmental resources, eliminate impacts to fish and marine mammal species from pile driving at Pier 48, and not result in any new significant environmental impacts.

G. ALTERNATIVES CONSIDERED BUT REJECTED

Several alternative strategies were considered as part of the alternatives screening and selection process for this Draft EIR. As stated in State CEQA Guidelines Section 15126.6(f)(1), factors that may be considered when a lead agency is assessing the feasibility include:

> site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (or the site is already owned by the proponent).

Therefore, several alternatives have been considered but rejected from further analysis because of infeasibility and/or because they would address similar issues as the Reduced Development Scenario above while meeting fewer project objectives.

MISSION ROCK SQUARE ON WATERFRONT ALTERNATIVE

The Mission Rock Square on Waterfront Alternative would locate Mission Rock Square on Terry A. Francois Boulevard, in the location for the proposed Channel Wharf and portions of proposed Blocks I and J. The footprints of the buildings on Blocks I and J would be smaller than they would be under the proposed project; the footprints of the buildings on Blocks E and F would be larger.

The Mission Rock Square on Waterfront Alternative was considered as an alternative site planning exercise that would provide additional waterfront open space and potentially reduce some of the less-than-significant impacts of the proposed project regarding shadow on open space. It was rejected from further consideration because locating Mission Rock Square on the perimeter rather than the center of the project site would not be consistent with the project objectives related to (1) maximizing the number of buildings fronting on open spaces or parks or (2) developing the project around a central open space square that can accommodate assembly and special-event uses and is connected to other open space areas and surrounded by interactive ground-floor spaces that maximize circulation between active/retail ground-floor uses and exterior spaces. It was also determined that wind impacts from this alternative would very likely increase because, without buildings on all four sides, it would be subject to additional wind from the east.

LARGER FLOOR PLATE RESIDENTIAL TOWERS ALTERNATIVE

The Larger Floor Plate Residential Towers Alternative would maintain larger floor plates (e.g., 18,000 gsf per floor) throughout all floors in the residential towers on Blocks A, D1, and F. This alternative was considered as an alternative site planning exercise that might either allow for additional residential units (and associated inclusionary housing) or for the increase in floor area on these blocks to be offset with reduction in density elsewhere on the site. Depending on the location and nature of a density decrease, it could have provided additional opportunities for reducing some wind impacts and/or less-than-significant shadow impacts.

The Larger Floor Plate Residential Towers Alternative was rejected from further consideration because of the potential for increased shadow impacts and increased wind impacts in the vicinity of Blocks A, D1 and F due to larger building faces bringing more wind to the ground. Large facades of tall buildings exposed to the prevailing winds would have a greater downwashing impact on winds compared to narrower facades. Thus, the proposed large and tall facades in this potential alternative would increase wind impacts at ground level by intensifying the wind activity along the north and west of the development in comparison to the Proposed Building design. This potential alternative also would not be consistent with the project objectives of ensuring that building forms contribute to the beauty and variety of the city skyline and are placed to protect and promote public views of the Bay from various San Francisco neighborhoods.

MISSION BAY MASSING/BLOCK SIZES ALTERNATIVE

The Mission Bay Massing/Block Sizes Alternative would include larger blocks, approximately 530 by 190 feet along Third Street and 530 by 140 feet along Terry A. Francois Boulevard, with heights similar to those in Mission Bay (e.g., 90-foot podiums with 160-foot towers). Mission Rock Square would be replaced with residential building development, with an open space/park area included on a rooftop deck of a building in the center of the site. Channel Street would no longer be constructed because building footprints would extend into the area where it was proposed. Block E would very likely be developed with residential uses. The underground, 700-space Mission Rock Square Garage would not be constructed. This alternative was considered as a potential reduced density alternative that could reduce but not eliminate the significant, unavoidable construction-related impacts of the proposed project; reduce or eliminate certain significant, unavoidable wind impacts; and potentially reduce other impacts of the proposed project that are less than significant with mitigation. It was rejected from further consideration because, with its longer blocks and reduced connectivity, including the elimination of Channel Street, it would not be consistent with many key project objectives related to creating a walkable neighborhood with a central outdoor feature that can be linked to waterfront open space.

For example, (1) it would provide fewer opportunities to invite area residents and visitors to the waterfront and access the Blue Greenway; (2) it would limit the ability to create a bicycle, pedestrian, and transit-oriented environment with well-designed parks, pedestrian-friendly streets, walkable blocks, and links to open spaces; (3) it would not develop buildings and a pattern of blocks that would add variety to the adjacent Mission Bay neighborhood, with varied form, scale, and design character; and (4) it would not develop an outdoor neighborhood focal point with appropriate amenities that provide active and vibrant public gathering spaces that can accommodate a variety of events and programs, including an inviting waterfront promenade segment of the Blue Greenway.

Because the centralized open space/park would be located on a rooftop rather than at ground level, the Mission Bay Massing/Block Sizes Alternative would not be consistent with the project objectives related to maximizing at-grade open space, maximizing the number of buildings fronting onto open spaces or parks, or developing the project around a central open space square that can accommodate assembly and special-event uses and be connected to other open space areas and surrounded by interactive ground-floor spaces that maximize circulation between active/retail ground-floor uses and exterior spaces. In addition, views down Channel Street would be eliminated.

The Reduced Intensity Alternative addresses similar issues and does so in a way that is more consistent with the project objectives, including avoiding the less overall reduction in density and associated revenue to support project-serving infrastructure, as well as the reduction in residential uses on the site. The Reduced Intensity Alternative also takes a more direct approach to reducing or eliminating certain wind-related impacts of the proposed project by eliminating Building K along China Basin Park and moving the Block D1 Building to the east.

CENTRALIZED PARKING ALTERNATIVE

The Centralized Parking Alternative would locate a structured parking garage in the center of the site where Mission Rock Square is proposed. For the reasons discussed below, this alternative was not pursued in detail, but it would have required locating the Block D garage on a combination of other development blocks and relocating all or a portion of the uses proposed for Block D on those blocks. Among other things, this alternative would have provided an alternate configuration for assessing potential reduction or elimination of significant wind impacts and less-than-significant shadow impacts.

This alternative was rejected from further consideration. By locating the parking garage in the center of the project site rather than the southern edge of the project site, adjacent to Mission Rock Street, which would not be heavily used, a greater likelihood of vehicle conflicts with bicyclists and pedestrians would occur. Therefore, the Centralized Parking Alternative would not be consistent with the project objective to design parking structures, to the extent feasible, that minimize conflicts between vehicles while entering or exiting structures and bicyclists,

pedestrians, or transit. If the garage were relocated to Blocks B/F or A/G, pedestrian connections and access to the waterfront would be limited, and the garage would be close to a park edge, thereby affecting views and limiting the ability to put active uses adjacent to the park. Because of the footprint size and nonporous nature of the parking structure, through-site pedestrian connectivity would be impaired.

In addition, because Mission Rock Square would be on the perimeter rather than at the center of the project site, it would not be consistent with project objectives related to maximizing the number of buildings fronting on open spaces or parks. The Centralized Parking Alternative would also not be consist with the objective of developing the project around a central open space square that can accommodate assembly and special-event uses and be connected to other open space areas and surrounded by interactive ground-floor spaces that maximize circulation between active/retail ground-floor uses and exterior spaces. The relocation of additional density on Block D would have also posed the likelihood of additional hazardous winds at this location.

UNIFORM HEIGHT REDUCTION ALTERNATIVE

The Uniform Height Reduction Alternative would reduce the height of all new buildings by 30 feet, compared to the proposed project. The underground, 700-space Mission Rock Square Garage would not be constructed. This alternative was considered as a potential reduced density alternative that could reduce but not eliminate the significant, unavoidable construction-related impacts of the proposed project; reduce or eliminate certain significant, unavoidable wind impacts; and potentially reduce other impacts of the proposed project that are less than significant with mitigation. It was rejected from further consideration because it was determined that it would not substantially reduce any of the wind impacts of the proposed project. The majority of the areas where the potential for significant wind impacts have been determined in the proposed project design are influenced by their exposure to the prevailing westerly winds, as well as downwashing of winds by buildings along the north and west of the development and channeling flows between towers. It is anticipated that even with the proposed height reduction by 30 feet the buildings would be tall enough to result in similar wind impacts as the proposed project design.

In addition, the Uniform Height Reduction Alternative would not be consistent with project objectives related to providing an adequate density and intensity of development as well as programmatic uses to realize a truly vibrant, all-day, all-season destination while, at the same time, meeting the financial demands of site preparation and constructing streets, sidewalks, plazas, parks, sewers, water systems, and other utility and infrastructure systems. The alternative would also not be as consistent as the proposed project with respect to objectives related to generating substantial incremental revenue for the Port for waterfront needs, including the preservation of historic piers and other historic structures, construction and maintenance of waterfront plazas, and the establishment of open space consistent with Public

Trust requirements, and adding to the job-producing capacity of this site through diverse commercial/office building offerings, retail and service tenant spaces, and maker spaces for local artisans and entrepreneurs. It would also not meet the project objective of ensuring that building forms contribute to the beauty and variety of the city skyline.

The Reduced Development Alternative addresses similar issues in a way that is more consistent with the project objectives, avoiding the less overall reduction in density and associated revenue to support project-serving infrastructure as well as the reduction in residential uses on the site. The Reduced Development Alternative also takes a more direct approach to reducing or eliminating certain wind-related impacts of the proposed project by eliminating Building K along China Basin Park and moving the Block D1 Building to the east.

UNIFORM 90-FOOT HEIGHTS ALTERNATIVE

The Uniform 90-Foot Heights Alternative is similar to the Uniform Height Reduction Alternative, but would further reduce building heights by limiting the heights of all buildings to 90 feet. Mission Rock Square would remain in its proposed location, but the underground garage under Mission Rock Square would not be built. This alternative was considered as a potential reduced density alternative that could reduce but not eliminate the significant, unavoidable construction-related impacts of the proposed project; reduce or eliminate certain significant, unavoidable wind impacts; and potentially reduce other impacts of the proposed project that are less than significant with mitigation. It was rejected from further study because it was deemed to be infeasible. The scheme would eliminate all of the proposed towers, resulting in an approximately 28 percent reduction in development intensity, and would not generate sufficient revenue to support the development of project-serving infrastructure. Total square footage would be reduced by about 435,000 gsf under the Uniform 90-Foot Heights Alternative (a 20 percent reduction) compared to the proposed project. Therefore, each square foot of reduction also reduces assessed property value and, therefore, tax increment, which is needed to finance infrastructure.

In addition, the reduction in heights would not be expected to substantially reduce or eliminate significant impacts of the proposed project, including wind impacts. The majority of the areas where the potential for significant wind impacts have been determined in the proposed project design are influenced by their exposure to the prevailing westerly winds, as well as downwashing of winds by buildings along the north and west of the development and channeling flows between towers and podiums. It is anticipated that even with the proposed height reduction to 90 feet for all blocks, the buildings would be tall enough to result in similar wind impacts as the proposed project design. It would also not meet the project objective of ensuring that building forms contribute to the beauty and variety of the city skyline.

The Reduced Intensity Alternative addresses similar issues in a way that is more consistent with the project objectives, avoiding the less overall reduction in density and associated revenue to

support project-serving infrastructure as well as the reduction in residential uses on the site. The Reduced Development Alternative also takes a more direct approach to reducing or eliminating certain wind-related impacts of the proposed project by eliminating Building K along China Basin Park and moving the Block D1 Building to the east.

TWO TOWERS ALTERNATIVE

The Two Towers Alternative would result in one less residential tower than the proposed project; the Block D1 residential tower would no longer be constructed. In addition, the heights on Blocks H, I, J, and K along Terry A. Francois Boulevard would be reduced by 30 feet to a maximum of 90 feet if developed with residential uses or 60 feet if developed with commercial uses. The proposed building on Block E would be developed with residential uses rather than commercial uses, as under the proposed project. The underground, 700-space Mission Rock Square Garage would not be constructed.

This alternative was considered as a potential reduced density alternative that could reduce but not eliminate the significant, unavoidable construction-related impacts of the proposed project; reduce or eliminate certain significant, unavoidable wind impacts associated with the Block D1 residential tower; and potentially reduce other impacts of the proposed project that are less than significant with mitigation. The Two Tower Alternative was rejected from further consideration because it would not be consistent with project objectives related to providing adequate development for realizing a truly vibrant, all-day, all-season destination while, at the same time, meeting the financial demands of site preparation and constructing streets, sidewalks, plazas, parks, sewers, water systems, and other utility and infrastructure systems.

The Two Towers Alternative would also not be as consistent as the proposed project with respect to the project objectives related to generating substantial incremental revenue for the Port for waterfront needs and would limit the Port's ability to meet the project's residential affordability objective. This objective includes the preservation of historic piers and other historic structures, construction and maintenance of waterfront plazas, and establishment of open space consistent with Public Trust requirements. It also involves adding to the job-producing capacity of this site, with diverse commercial/office building offerings, retail and service tenant spaces, and maker spaces for local artisans and entrepreneurs. The Two Towers Alternative would result in a development square footage reduction of approximately 333,384 gsf (excluding parking garage square footage, which would also be reduced) compared to a development square footage of approximately 2.7 to 2.8 million gsf for the proposed project. This reduction would also reduce assess property tax value and, therefore, tax increment, which is needed to finance infrastructure and generate revenue for the Port. The Two Towers Alternative would reduce residential square footage by approximately 126,445 gsf, representing about 115 to 125 fewer units, and the number of affordable housing units that could be provided and subsidized.

The Reduced Intensity Alternative addresses similar issues in a way that is more consistent with the project objectives, avoiding the reduction in residential uses on the site by moving rather than eliminating the Block D1 tower.

8. REPORT PREPARERS

A. EIR AUTHORS

Planning Department, City and County of San Francisco
1650 Mission Street, Suite 400
San Francisco, CA 94103

Acting Environmental Review Officer:	Lisa M. Gibson
EIR Coordinator:	Tania Sheyner, AICP, LEED AP
Environmental Planner:	Jenny Delumo
Senior Environmental Planner:	Devyani Jain
Transportation Planners:	Lana Russell-Hurd
	Manoj Madhavan
Air Quality Planner:	Wade Wietgrefe
Noise Planner:	Christopher Thomas
Wind/Shadow Planner:	Michael Li
Historic Preservation Planner:	Rich Sucre
Archaeologist:	Allison Vanderslice
Sea Level Rise:	Chris Kern

Office of the City Attorney, City and County of San Francisco
City Hall, Room 234
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

City Attorney:	Elaine Warren

B. EIR CONSULTANTS

ICF
620 Folsom Street, 2nd Floor
San Francisco, CA 94107

Project Director:	Rich Walter
Project Manager:	Erin Efner
Deputy Project Manager:	Kirsten Chapman
Deputy Project Manager:	Jennifer Andersen, AICP

ICF Project Team:

Anthony Ha	Jessie Shen
Ashley McBride	Jillian Burns
Belle Guelden	John Mathias
Bill Mitchell	Katrina Sukola
Bill Parker	Liz Scott
Cory Matsui	Rusty Whisman
Darrin Trageser	Shannon Hatcher
Dave Buehler	Susan Lassell
David Ernst	Susan Swift
Donna Maniscalco	Tait Elder
Gretchen Hilyard	Terry Rivasplata
Heidi Mekkelson	Tim Messick
Jennifer Padilla Rogers	Torrey Edell
Jennifer Stock	Yi Hua Wei
Jessica Viramontes	

Square One Productions *(Visual Simulations)*
1736 Stockton Street # 7
San Francisco, CA 94133 Angela Lin

VerPlanck Historic Preservation Consulting *(Cultural Resources)*
57 Post Street
San Francisco, CA 94104 Chris VerPlanck

Fehr & Peers *(Transportation)*
332 Pine Street, 4th Floor
San Francisco, CA 94104 Chris Mitchell
Bob Grandy

Prevision Design *(Wind)*
995 Market Street, Second Floor
San Francisco, CA 94103 — Adam Phillips

RWDI *(Shadow Modeling)*
650 Woodlawn Road West
Guelph, Ontario N1K 1B8 — Dan Bacon, Neetha Vassan, Kyla Rowntree

Baseline Environmental Consulting *(Hazards and Hazardous Materials)*
5900 Hollis Street, Suite D
Emeryville, CA 94608 — Bruce Abelli-Amen, Patrick Sutton

C. PROJECT SPONSORS

Port of San Francisco
Pier 1, The Embarcadero
San Francisco, CA 94111 — Phil Williamson, Diane Oshima

Seawall Lot 337 LLC
24 Willie Mays Plaza
San Francisco, CA 94107 — Jack Bair

D. PROJECT SPONSOR ATTORNEYS

Coblentz Patch Duffy & Bass LLP
One Montgomery Street, Suite 3000
San Francisco, CA 94104 — Joshua Steinhauer, Robert Hodil

E. PROJECT SPONSOR CONSULTANTS

Adavant Consulting *(Transportation)*
200 Francisco Street
San Francisco, CA 94133

BKF *(Civil Engineer)*
150 California Street, Suite 650
San Francisco, CA 94111

Perkins + Will (*Designers, Architects*)
2 Bryant Street, #300
San Francisco, CA 94105

Atelier Ten (*Sustainability*)
443 Tehama Street, 1st Flood
San Francisco, CA 94103

F. ORGANIZATIONS AND PERSONS CONSULTED

San Francisco Office of Economic and Workforce Development
1 South Van Ness
San Francisco, CA 94103 — Michael Martin

San Francisco Municipal Transportation Agency
11 South Van Ness Avenue
San Francisco, CA 94103 — James Shahamiri, Carli Paine

San Francisco Public Utilities Commission
3801 Third Street, Suite 600
San Francisco, CA 94124 — Angela Yu, Craig Freeman, Fan Lau