4.9 Hydrology and Water Quality

This section presents a summary of the hydrology and water quality conditions in the Project vicinity and evaluates the potential for the proposed Project to result in significant impacts related to water quality and flooding. This section relies in part on the Civil Infrastructure Technical Report prepared by BKF Engineers (BKF, 2020) in support of the Project (see **Appendix HYD**), which was independently peer reviewed by ESA.

Comments received on the Notice of Preparation (NOP) included concerns with surface water and groundwater quality during construction and operation of the Project, and for the Project to meet federal, State, and local federal water quality policies and regulations. No other comments on hydrology or water quality were received on the NOP.

4.9.1 Environmental Setting

Regional Setting

Climate

The Project site is located in a region generally characterized as having a Mediterranean climate with moist, mild winters and hot, dry summers. However, the region's varied topography creates microclimates dependent upon elevation, proximity to the Bay or coast, and orientation. As a result, stark climatic differences reflected in temperature, rainfall amounts, and evapotranspiration can occur over relatively short distances. More than 90 percent of precipitation in the Bay Area falls between November and April.

Surface Water

The Project site lies along shoreline of the Oakland Inner Harbor, within the San Francisco Bay. The San Francisco Bay Region is approximately 4,600 square miles, and characterized by its dominant feature, the 1,600-square-mile San Francisco Bay (Bay), the largest estuary on the west coast of the United States, where fresh waters from California's Central Valley mix with the saline waters of the Pacific Ocean. The San Francisco Bay Region also includes coastal portions of Marin and San Mateo Counties, from Tomales Bay in the north to Pescadero and Butano Creeks in the south.

The Bay conveys the waters of the Sacramento and San Joaquin rivers into the Pacific Ocean. Located on the central coast of California, the Bay system functions as the only drainage outlet for waters of the Central Valley. It also marks a natural topographic separation between the northern and southern coastal mountain ranges. The San Francisco Bay Region's waterways, wetlands, and bays form the fourth-largest metropolitan region in the United States, including all or major portions of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

The Sacramento and San Joaquin rivers, which enter the Bay system through the Delta at the eastern end of Suisun Bay, contribute almost all the freshwater inflow to the Bay. Many small rivers and streams also convey fresh water to the Bay system. The rate and timing of these

freshwater flows are among the most important factors influencing physical, chemical, and biological conditions in the Bay. Much of the freshwater inflow, however, is trapped upstream by the dams, canals, and reservoirs of California's water diversion projects, which provide water to industries, farms, homes, and businesses throughout the state. Flows in the San Francisco Bay Region are highly seasonal, with more than 90 percent of the annual runoff occurring during the winter rainy season between October and April. Many streams go dry during the middle or late summer [Regional Water Quality Control Board (RWQCB), 2017].

The average annual rainfall within the City of Oakland is approximately 24 inches (U.S. Climate Data, 2019). The Oakland-Alameda Estuary (also known as the Inner Harbor or Estuary) is located along the eastern margin of the San Francisco Bay adjacent to the Project site. The Inner Harbor was once a tidal slough with a tidal marsh that stretched from Lake Merritt to Brooklyn Basin. At the turn of the last century, the tidal slough was dredged into a deeper channel through the marsh, separating Oakland from Alameda, and forming the harbor as it is today. Lake Merritt currently remains hydrologically connected to the Estuary through tidal gates at the 7th Street Pump Station. East of Brooklyn Basin, the dredged channel extends until it flows into San Leandro Bay.

Surface water in the Inner Harbor is influenced by both freshwater and marine water. It receives freshwater inflow from a combination of natural creeks, man-made storm water drainage facilities, and direct surface runoff [East Bay Municipal Utilities District (EBMUD), 2019]. It is also influenced by the marine waters of the Pacific Ocean via the San Francisco Bay and is subject to tidal currents. Sediment from Oakland's shoreline and creeks is carried by the tidal currents to shoals and sand bars, causing siltation of the channel. In the Oakland Inner Harbor, the shipping channel is periodically dredged by the Port of Oakland to maintain adequate depth for ships.

Water Quality

Water quality in the Bay and Oakland Estuary is strongly influenced by past and present urban uses in the region such as industrial waste discharges and urban storm water runoff. Pollutant sources include both point and non-point discharges into the Bay. Water quality of the Bay also affects the Estuary. State policy for water quality control in California is directed toward achieving the highest water quality consistent with maximum benefit to the people of the State. Aquatic ecosystems and underground aquifers provide many different benefits to the people of the state. The RWQCB (hereafter referred to as the Water Board) prepared the Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin (Region 2) to identify beneficial uses and define the resources, services, and qualities of the aquatic systems in the Bay for goals of protecting and achieving high water quality. The Water Board is charged with protecting all the beneficial uses from pollution and nuisance that may occur as a result of waste discharges in the region. Beneficial uses of surface waters, groundwaters, marshes, and wetlands presented in the Basin Plan serve as a basis for establishing water quality objectives and discharge prohibitions to attain water quality goals, including the control of point and non-point pollution sources. The Basin Plan identified key pollutants of concern to monitor and reduce in the Bay that include pesticides, diazinon, mercury, poly-chlorinated biphenyls (PCBs), selenium, bacteria, pathogens, and sediment (RWQCB, 2017).

A point source is any discernible, confined, and discrete conveyance (e.g., a pipe discharge) of pollutants to a water body from sources such as industrial facilities or wastewater treatment

plants. Non-point pollutant sources are those that do not have a single, identifiable discharge point but are rather a combination of many sources. For example, a non-point source can be storm water runoff from land that contains petroleum from parking lots, pesticides from farming operations, or sediment from soil erosion.

Point Sources

Point source discharges into the Estuary are regulated by the Water Board, San Francisco Bay Region, under the National Pollutant Discharge Elimination System program (NPDES), as discussed below under Regulatory Setting. These permitted discharges are subject to prohibitions, water quality requirements, periodic monitoring, annual reporting and other requirements designed to protect the overall water quality of the Estuary and San Francisco Bay.

Non-Point Sources

Non-point source pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. Non-point source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, depositing them into drainage ditches, lakes, rivers, wetlands, bays, and aquifers. Regionally, non-point source pollution from urban developed areas contribute more heavy metals to San Francisco Bay than direct municipal and industrial dischargers, from significant amounts of motor oil, paints, chemicals, debris, grease and detergents. In general, stormwater runoff from urbanized land uses also contain pesticides and herbicides from lawn and garden care products, and bacteria from human and animal waste. As point sources of pollution have been decreased through stricter regulation, the regulatory focus has shifted to non-point sources, particularly urban runoff (State Water Board, 2019a).

Other non-point sources include dredging activities, marine vessel waste, infiltration/inflow from sewage pipes, accidental spills or leaching of hazardous materials, and construction activities. These sources are also subject to regulation to protect water quality, through the federal, State and local regulations, and ongoing programs that are being implemented to improve and protect water quality of Oakland's waters, as discussed below.

Groundwater

The Department of Water Resources (DWR) considers the East Bay Plain (DWR Groundwater Basin No. 2-9.01) an important and beneficial groundwater basin underlying the East Bay, extending from Richmond to Hayward. The alluvial materials that extend westward from the East Bay hills to the edge of the San Francisco Bay constitute the deep water-bearing strata for East Bay Plain groundwater basin (DWR, 2004). This deep basin provides municipal, industrial, and agricultural water supply. However, water supply for the proposed Project area is not provided by groundwater sources in this basin, but rather from surface water sources maintained by EBMUD. EBMUD and City of Hayward are currently working on the preparation of a Groundwater Management Plan for the East Bay Plain (EBMUD, 2018).

Local Setting

Surface Water

The Project site is completely covered by impervious hardscape (asphalt and concrete) and with the exception of the Peaker Power Plant, the majority of stormwater at the Project site currently flows into the Port's storm drainage facilities that discharge directly to the Inner Harbor. The Peaker Power Plant surface water flows into a containment pond where it is inspected, treated if necessary, and discharged to the Inner Harbor. The Port's stormwater system is separated into different drainage basins and the Project site is located within the Port of Oakland's stormwater drainage basin. Stormwater from this basin discharges at the Project site to the Inner Harbor through two stormwater outfalls. Some of the stormwater runoff from the Project site not collected by the storm drainage facilities discharges directly into the Inner Harbor by sheetflow.

Groundwater

Groundwater levels beneath the Project site have been recorded between 5 and 9 feet below the ground surface (ENGEO, 2019). Groundwater beneath the Project site is contaminated from previous historical uses on the Project site. Groundwater flow is diverted by the concrete quay wall toward the wood bulkhead, resulting in a general flow direction southwest toward two monitoring wells on the harbor side of the wood bulkhead, referred to as sentinel wells (see Figure 4.8-5). Recent ecological risk assessment and fate and transport modeling indicate that aquatic receptors in the Oakland Inner Harbor of San Francisco Bay are not being adversely affected by the contaminants identified in the groundwater currently underlying the Project site. In particular, contaminants in the downgradient sentinel groundwater monitoring wells just outside of the wood bulkhead near the Inner Harbor indicate that contaminants in groundwater inland of the concrete quay wall and wood bulkhead are not migrating to the Inner Harbor at detectable concentrations (Baseline, 2018). Details on the groundwater quality and management of contamination at the Project site are provided in Section 4.8, *Hazards and Hazardous Materials*.

Flooding Hazards

The City of Oakland *2016-2021 Local Hazard Mitigation Plan* states that flooding hazards include "storm-induced flooding, tsunamis, seiches, dam failure, and sea-level rise" (City of Oakland, 2016). This section considers these topics, excluding dam failure. The Project site is not mapped within a dam inundation zone.

Storm Induced Flooding

When heavy rains are coupled with higher-than-normal tides, tide levels can slow the drainage of runoff into San Francisco Bay, increasing the potential for urban stormwater flooding. Evidence of this coincidental precipitation and high-tide flooding can be seen at the low-lying Jack London Square, Oakland Coliseum Complex, and Lake Merritt on Grand and Lakeshore Avenues.

The Federal Emergency Management Agency (FEMA), through its Flood Insurance Rate Mapping (FIRM) program, designates areas where flooding could occur during 100-year and

500-year flood events.[1] According to the FEMA FIRM, the Inner Harbor adjacent to the Project site is within Zone AE coastal flood hazard area and has a base flood elevation (BFE) of 10 feet North American Vertical Datum (NAVD). This BFE comes from FEMA's Flood Insurance Study, which determined the 100-year water level in the Inner Harbor to be 9.7 feet NAVD (BKF, 2019), and then rounded to the nearest foot. When converted to the City of Oakland datum (COD),[2] the 100-year water level is 3.9 feet. The majority of the Project site is currently higher than this BFE, except a portion along the eastern boundary between Clay and Jefferson streets south of the Peaker Power Plant, so most of the site falls outside of the 100-year flood zone designated as Zone AE, but still within in Zone X (FEMA maps number 06001C0066H and 06001C0067H, effective date December 21, 2018). Zone X is an area of minimal flood hazard, defined as areas outside the 500-year flood zone. Small areas within portions of the eastern Project site are mapped as moderate flood hazard areas, or Zone X (shaded), which are the areas between the limits of the 100-year flood and the 0.2-percent-annual-chance (or 500-year) flood because these areas are lower than the base flood elevations for these events. (Moffat & Nichol, 2019)

Tsunami and Seiche

The Association of Bay Area Governments (ABAG) describes a tsunami as: "a series of waves generated in a body of water by a rapid disturbance that vertically displaces the water. These changes can be caused by an underwater fault rupture (that generates an earthquake) or underwater landslides (typically triggered by earthquakes)."

The City of Oakland General Plan Safety Element describes the tsunami hazard in Oakland as an uncommon occurrence on the California coast. Most often, tsunamis are generated by large offshore earthquakes in the Pacific Ocean, producing waves that reach the California coast many hours after the earthquake. Tsunamis can also be generated by local earthquakes, in which case the first waves could reach shore mere minutes after the ground stops shaking, giving authorities no time to issue a warning. The National Weather Service is responsible for issuing warnings about potential tsunamis along the West Coast of the United States. Warning times vary depending on the distance to the earthquake epicenter. For most tsunamis approaching the coast, several hours are available to evacuate residents and undertake other emergency preparations. Flooding from tsunamis would affect low-lying areas along San Francisco Bay and the Oakland Estuary, especially filled areas that are only a few feet above sea level.

Although the probability of a tsunami affecting Oakland is low, given the rarity and unpredictability of the hazard, the impact from a rare tsunami would be high. The maps in the City's *2016 – 2021 Local Hazard Mitigation Plan* estimate areas of Oakland which could experience inundation following a tsunami, showing the Port of Oakland's seaport, including the Project site; Jack London District; Bay Bridge landing; the entirety of the Oakland International

[1] A 100-year flood event has a 1percent probability of being exceeded in any given year. Because this event's probability resets each year, it is possible, although unlikely, for more than one 100-year flood to occur within any given period 100 years long. A 500-year flood event has a 0.2 percent probability of being exceeded in any given year.

[2] The conversion between NAVD and COD is: 0 feet COD = 5.77 feet NAVD (BKF, 2019).

Airport; and the San Leandro Bay shoreline, including the Oakland Coliseum complex as potential sites for flooding during a tsunami (City of Oakland, 2016).

Seiches are water level oscillations in an enclosed or semi-enclosed body of water such as a lake, reservoir, or harbor. Seiche risk at areas along Oakland's shoreline, including the Project site, is minimal because there are no large confined bodies of water with depths that would cause this hazard (City of Oakland, 2016).

Sea Level Rise

As discussed in Section 4.7, *Greenhouse Gas Emissions*, a rise in average global temperatures due largely to an increase in human-induced greenhouse gas (GHG) emissions will be accompanied by a rise in the global sea level. In fact, climate change is already affecting California and Bay Area communities. In the last century, San Francisco Bay water levels have risen nearly 8 inches (NOAA, 2018). As sea level rise increases further, it will increase the flooding hazard from San Francisco Bay, by increasing the frequency and depth of inundation, particularly during storm-induced flooding.

The State of California has provided and continues to update planning guidance for assessing and adapting to the impacts of sea level rise. The City's *2016-2021 Local Hazard Management Plan* (City of Oakland, 2016), and the *Preliminary Sea Level Rise Road Map* (City of Oakland, 2017), both consider impacts from sea-level rise based on this State guidance. At the time of these City publications, this guidance was the *State of California Sea-Level Rise Guidance Document 2013 Update* (CO-CAT, 2013), which incorporated the most recent scientific findings from the National Academy of Science National Research Council. For the San Francisco Bay Region, the National Research Council projected likely sea level rise of 11 inches by 2050 and 36 inches by 2100. These projections considered regional sea levels and vertical land motion.

To address existing and future development susceptible to this rise in water levels, the City's *Preliminary Sea Level Rise Road Map* identifies a process for the City to improve the resilience of infrastructure, residents and employees. This includes incorporating sea level rise considerations in Downtown Oakland Specific Plan (City of Oakland, 2017). Moreover, the City's *2016-2021 Local Hazard Management Plan* includes a mitigation measure to assess sea level rise impacts within the Port of Oakland, an area which includes the Project site. As part of the Management Plan and pursuant to AB 691, the Port of Oakland submitted a Sea Level Rise Assessment to the State Lands Commission July 1, 2019 meant as high-level analysis, providing different sea level rise impact scenarios, qualitative financial impacts, and potential protection/preservation strategies that the Port may consider and further evaluate in the future. The Port's analysis considered sea level rise projections through 2100 developed in accordance with the California Ocean Protection Council's (Cal OPC) 2018 guidance and San Francisco Bay Conservation and Development (BCDC)'s most recent mapping sea level rise flood hazards (e.g., BCDC's 2017 Adapting to Rising Tides [ART] Bay Area Sea Level Rise Analysis and Mapping Project, see below). Additional details about the framework of these policies are presented under Local Plans, Ordinances and Policies, below.

Subsequent to the State's 2013 guidance, in 2018 the OPC released updated State guidance. The *State of California Sea-Level Rise California 2018 Update* incorporates the most recent scientific

findings from Griggs et al. (Cal OPC, 2018). This latest guidance adopted a probabilistic[3] approach and produced estimates of the likely range of global sea level rise under different emission scenarios,[4] where the "likely range" covers the central 66 percent of the probability distribution (i.e., the sea levels that fall within the range created by the value that is 17 percent likely to occur and the value that is 83 percent likely to occur). To be precautionary in safeguarding the people and resources of California and inform the development of sufficient adaptation pathways and contingency plans, the 2018 OPC report provides a range of projections based on *low*, *medium-high*, and *extreme* levels of risk aversion.

The *low risk aversion* projection is best suited to fairly risk-tolerant elements; it represents an approximately 17 percent chance of being exceeded, and as such, provides an appropriate projection for adaptive, lower consequence decisions (e.g., unpaved coastal trail) but will not adequately address high impact, low probability events. The *medium-high risk* aversion projection, which represents a 0.5 percent chance of being exceeded, is useful for providing a precautionary projection that can be used for less adaptive, more vulnerable projects or populations that will experience medium to high consequences because of underestimating sea level rise (e.g., coastal housing development). The *extreme aversion* projection (also known as the H++ scenario) is applied primarily to high consequence projects with a design life beyond 2050 that have little to no adaptive capacity, would be irreversibly destroyed or significantly costly to relocate/repair, or would have considerable public health, public safety, or environmental impacts should this level of sea level rise occur. The probability of this scenario is currently unknown, as sea-level rise is not currently following the H++ scenario, but its consideration is important, particularly for high stakes, long-term decisions (California OPC, 2018).

Based on this updated 2018 OPC guidance, by 2050, the San Francisco Bay is expected to experience 1.1 feet of sea level rise under the low risk aversion projection, or up to 1.9 feet of rise under the medium-high risk aversion projection. By 2070, this increases to 1.5 to 1.9 feet of sea level rise under the low risk aversion projection, and to 3.1 to 3.5 feet under the medium-high risk aversion projection. The projections for 2100 sea level rise are 2.4 to 3.4 feet under the low risk aversion projection, and 5.7 to 6.9 feet under the medium-high risk aversion projection. These projected amounts of sea level rise are summarized in **Table 4.9-1** and are added to the present day BFE (even though the sea level rise projections were made relative to Year 2000 levels) to provide estimates of future BFEs.

The projections in Table 4.9-1 are similar to, though somewhat higher than, BCDC's most recent consideration of sea level rise (e.g., BCDC's 2017 ART Bay Area Sea Level Rise Analysis and Mapping Project), which is based upon the 2013 California State guidance for sea level rise projections described above. According to the 2013 study, the State's range for sea level rise relative to 2000 levels was for an increase of between 0.4 to 2.0 feet by 2050 and 1.4 to 5.5 feet

3 Probabilistic is defined as: based on or adapted to a theory of probability; subject to or involving chance variation.

4 The updated OPC Guidance considers the emissions scenarios used by the Intergovernmental Panel on Climate Change's Fifth Assessment Report (IPCC Fifth Assessment) called Representative Concentration Pathways or RCPs. There are four RCPs, named for the associated radiative heat forcing level, in watts per square meter, in 2100: RCP 2.6, 4.5, 6.0 and 8.5. Each RCP represents a family of possible underlying socioeconomic conditions, policy options and technological considerations, spanning from a low-end scenario (RCP 2.6) that requires significant emissions reductions to a high-end, "business-as-usual," fossil-fuel-intensive emission scenario (RCP 8.5).

by 2100 (BCDC, 2017). Although BCDC's ART analysis and mapping used the older sea level rise projections, BCDC acknowledges that the more recent 2018 OPC guidance will help local agencies update their analysis and decision-making (BCDC, 2019a).

TABLE 4.9-1
PROJECTED SEA LEVEL RISE AND FUTURE BASE FLOOD ELEVATIONS FOR OAKLAND INNER HARBOR

Year	Low Risk Aversion Projection (17% probability of exceedance)			Medium-High Risk Aversion Projection (0.5% probability of exceedance)			Extreme Risk Aversion (H++ Scenario)[a]		
	Projected SLR (feet)	Projected 100-yr BFE (feet COD)	Projected 100-yr BFE (feet NAVD)	Projected SLR (feet)	Projected 100-yr BFE (feet COD)	Projected 100-yr BFE (feet NAVD)	Projected SLR (feet)	Projected 100-yr BFE (feet COD)	Projected 100-yr BFE (feet NAVD)
2019	0.0	3.9	9.7	0.0	3.9	9.7	0.0	3.9	9.7
2040	0.8	4.7	10.5	1.3	5.2	11.0	1.8	5.7	11.5
2050	1.1	5.0	10.8	1.9	5.8	11.6	2.7	6.6	12.4
2070	1.5 – 1.9	5.4 – 5.8	11.2 – 11.6	3.1 – 3.5	7.0 – 7.4	12.8 – 13.2	5.2	9.1	14.9
2090	2.1-2.9	6.0 – 6.8	11.8 – 12.6	4.7 – 5.6	8.6 – 9.5	14.4 – 15.3	8.3	12.2	18.0
2100	2.4 – 3.4	6.3 – 7.3	12.1 – 13.1	5.7 – 6.9	9.6 – 10.8	15.4 – 16.6	10.2	14.1	19.9

NOTES:
BFE = Base Flood Elevation
SLR = Sea Level Rise
COD = City of Oakland datum.
NAVD = North American Vertical Datum
The conversion between North American Vertical Datum (NAVD) and COD is: 0 feet COD = 5.77 feet NAVD.

a The probability of this scenario is currently unknown.

SOURCE: Cal OPC (2018); and Moffat & Nichol (2019)

4.9.2 Regulatory Setting

Federal

Clean Water Act (CWA) and Associated Environmental Compliance

Several sections of the CWA pertain to regulating impacts on waters of the United States. 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 under Section 404 (Discharges of Dredge or Fill Material) of the act. Section 401 (Water Quality Certification) specifies additional requirements for permit review, particularly at the State level.

Section 303

Water quality objectives for all waters of the United States are established under applicable provisions of Section 303 of the federal CWA. The State of California adopts water quality standards to protect beneficial uses of State waters as required by Section 303 of the CWA and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne). Section 303(d) of the CWA established the Total Maximum Daily Load (TMDL) process to guide the application of State water quality standards (see discussion of State water quality standards below). To identify candidate water bodies for TMDL analysis, a list of water quality–limited streams and other water

bodies was generated. These water bodies are impaired by the presence of pollutants, including sediment, and are more sensitive to disturbance. Section 303(d) listing associated with water bodies in the East Bay are included in the Water Board's Water Quality Control Plan, described further under State regulations.

The CWA prohibits the discharge of pollutants to navigable waters from a point source unless authorized by a NPDES permit. Because implementation of these regulations has been delegated to the State, additional information regarding this permit is discussed under the State subheading, below.

Section 401

Section 401 of the CWA requires that an applicant pursuing a federal permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States obtain a water quality certification (or waiver). Water quality certifications are issued by the Water Boards in California. Under the CWA, the Water Boards must issue or waive Section 401 water quality certification for the project to be permitted under Section 404. Water quality certification requires the evaluation of water quality considerations associated with dredging or placement of fill materials into waters of the United States and imposes project-specific conditions on development. A Section 401 waiver establishes conditions that apply to any project that qualifies for a waiver.

Section 402

The 1972 amendments to the Federal Water Pollution Control Act established the NPDES permit program to control discharges of pollutants from point sources (Section 402). The 1987 amendments to the CWA created a new section of the CWA devoted to stormwater permitting (Section 402[p]). The U.S. Environmental Protection Agency (US EPA) has granted the State of California [the State Water Resources Control Board (SWRCB) primacy in administering and enforcing the provisions of CWA and NPDES. NPDES is the primary federal program that regulates point-source and non-point-source discharges to waters of the United States.

The SWRCB issues both general and individual permits for discharges to surface waters, including for both point-source and non-point-source discharges. In response to the 1987 amendments, the US EPA developed the Phase I NPDES Storm Water Program for cities with populations larger than 100,000, and Phase II for smaller cities. In California, the State Water Board has drafted the General Permit for Discharges of Storm Water from Municipal Separate Storm Sewer Systems (MS4 General Permit).

Section 404

Dredging and placement of fill materials into the waters of the United States is regulated by Section 404 of CWA, which is administered by the Corps. More information on this regulation is provided in Section 4.3, *Biological Resources*.

National Pollutant Discharge Elimination System (NPDES) Permit

The NPDES permit system was established in the CWA to regulate municipal and industrial point discharges to surface waters of the U.S. Each NPDES permit for point discharges contains limits

on allowable concentrations of pollutants contained in discharges. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits.

The CWA was amended in 1987 to require NPDES permits for non-point source (i.e., stormwater) pollutants in discharges. Stormwater sources are diffuse and originate over a wide area rather than from a definable point. The goal of NPDES stormwater regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of structural and non-structural Best Management Practices (BMPs). BMPs can include the development and implementation of various practices including educational measures (workshops informing public of what impacts results when household chemicals are dumped into storm drains), regulatory measures (local authority of drainage facility design), public policy measures, and structural measures (filter strips, grass swales and detention ponds). The NPDES permits that apply to activities in the City of Oakland and Port of Oakland are described under State and local regulations below.

Rivers and Harbors Act and Associated Environmental Compliance

The Rivers and Harbors Act regulates placement of fill and structures in navigable waterways. The permit program, regulated under Section 10 of the Act, is administered by the Corps. In practice, permitting is combined with CWA Section 404 permitting.

State

Porter-Cologne Water Quality Control Act Overview

Porter-Cologne, passed in 1969, articulates with the federal CWA (see Clean Water Act in previous subsection). It established the State Water Board and divided the state into nine regions, each overseen by a regional Water Board. The State Water Board is the primary State agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of its daily implementation authority is delegated to the nine regional Water Boards, which are responsible for implementing CWA Sections 402, and 303(d). In general, the State Water Board manages both water rights and statewide regulation of water quality, while the regional Water Boards focus exclusively on water quality in their regions.

Coverage under a Construction Stormwater General Permit (Construction General Permit) requires the preparation and implementation of a stormwater pollution prevention plan (SWPPP) and notice of intent (NOI). The SWPPP includes pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills), demonstration of compliance with all applicable local and regional erosion and sediment control standards, identification of responsible parties, a detailed construction timeline, and a BMP monitoring and maintenance schedule. The NOI includes site specific information and the certification of compliance with the terms of the Construction General Permit.

Surface Water Quality

The Water Boards are delegated authority from US EPA to implement portions of the CWA, and the State's water quality law, the Porter-Cologne Act. These agencies have established water quality standards that are required by section 303 of the CWA and the Porter-Cologne Act. The

Porter-Cologne Act states that basin plans will consist of beneficial uses, water quality objectives, and a program of implementation for achieving water quality objectives. A Water Quality Control Plan, or Basin Plan, prepared by each Water Board, establishes water quality numerical and narrative standards and objectives for Bay and tributaries within the area subject to the Basin Plan. In cases where the Basin Plan does not contain a standard for a particular pollutant, other criteria apply such as US EPA water quality criteria developed under section 304(a) of the CWA.

Dewatering Activities

Where groundwater levels tend to be shallow, dewatering during construction is sometimes necessary to keep trenches or excavations free of standing water when improvements or foundations/ footings are installed. Clean or relatively pollutant-free water that poses little or no risk to water quality may be discharged directly to surface water under certain conditions. The Water Board has conditions for short-term discharges of small volumes of groundwater from certain construction-related activities requiring dewatering of shallow uncontaminated groundwater. Conditions for the discharge of these types of wastewater to surface waters are specified in R2-2015-0049, NPDES Permit No. CAS612008, described in full below. Discharges may be covered provided discharge does not exceed 10,000 gallons per day and meet the effluent limitations provided the discharge shall meet water quality standards consistent with the existing effluent limitations or pollutant triggers in the Water Board's NPDES Groundwater General Permit, NPDES No. CAG912002. Construction dewatering, well development water, pump/well testing, and miscellaneous dewatering/low-threat discharges are among the types of discharges that may be covered by the Water Board's NPDES Groundwater General Permit. The permit also specifies standards for testing, monitoring, and reporting, receiving water limitations, and discharge prohibitions. Impacts associated with construction dewatering are addressed entirely within Section 4.8, *Hazards and Hazardous Materials.*

Stormwater Discharges

The Municipal Storm Water Program regulates storm water discharges from municipal separate storm sewer systems (MS4s) throughout California. An MS4 is a conveyance or system of conveyances that is: owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.; designed or used to collect or convey stormwater (e.g., storm drains, pipes, ditches); is not a combined sewer; and is not part of a sewage treatment plant, or publicly owned treatment works. Pursuant to the Federal Water Pollution Control Act (Clean Water Act) section 402(p), storm water permits are required for discharges from an MS4 serving a population of 100,000 or more. The Municipal Storm Water Program manages the Phase I Permit Program (serving municipalities over 100,000 people), the Phase II Permit Program (for municipalities less than 100,000), and the Statewide Storm Water Permit for the State of California Department of Transportation. The State Water Board and the individual Water Boards implement and enforce the Municipal Storm Water Program (SWRCB, 2019b).

The Water Board of the San Francisco Bay Region issued the MS4 NPDES Permit No. CAS000004 and Order No. 2013-0001-DWQ for small MS4 systems to reduce pollutants from municipal areas using BMPs to the maximum extent practicable. The Water Board also issued the Municipal Regional Stormwater NPDES Permit No. CAS612008 and Order No. R2-2015-0049 (MRP) on November 19, 2015 with an official commencement date of January 1, 2016. The MRP

governs discharges from municipal storm drains operated by 76 regional government entities joined together to form the Alameda Countywide Clean Water Program (ACCWP) under the MRP. The ACCWP was established as the local entity to assist MRP Permittees in implementing compliance with the federal CWA to control stormwater pollution in Alameda County under the conditions in the MRP for MS4s.

Both the Small MS4 Permit and the MRP contain comprehensive administrative and physical requirements (e.g., public outreach, education, post-construction water quality best management practices, water quality monitoring, etc.) to reduce the discharge of pollutants to the "maximum extent practicable". The Port is designated as a Non-Traditional Small MS4 in the MS4 Permit, as the Port is not a traditional municipality, which means the Permit provisions have some differences to reflect the nontraditional nature of activities. The MRP includes permit provisions that encompass a much larger array of potential pollutant sources from a much more diverse and densely developed land use area such as those in the City of Oakland's jurisdictional boundaries.

Construction Site Runoff Management

In accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the State requires that any construction activity affecting one acre or more obtain coverage under a Construction General Permit. The current Construction General Permit is the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ (as amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ), NPDES No. CAS000002, effective July 1, 2010, as amended on January 23, 2013. Construction General Permit applicants are required to prepare and implement a SWPPP which includes implementing BMPs to reduce construction effects on receiving water quality by implementing erosion and sediment control measures and reducing or eliminating non-stormwater discharges. Examples of typical construction BMPs included in SWPPPs include, but are not limited to using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment so as to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan; and installing sediment control devices such as gravel bags, inlet filters, fiber rolls, or silt fences to reduce or eliminate sediment and other pollutants from discharging to the City drainage system or receiving waters. The Construction General Permit and associated SWPPP and BMPs are discussed in more detail in the Regulatory Setting in Section 4.6, *Geology, Soils and Paleontological Resources*.

Cap and Land Use Covenant

The regulatory agency overseeing investigation and cleanup of the Project site is the California Department of Toxic Substances Control (DTSC). The entire Project site is covered with a 4- to 30-inch asphaltic concrete cap. To maintain and prevent disturbance of the cap, the DTSC recorded and enforces Land Use Covenants (LUCs) and associated plans (Risk Management Plans, O&M Agreements, and Soil and Groundwater Management Plans) for the Howard Terminal, Gas Load Center, and Peaker Power Plant, as described in the Regulatory Setting in Section 4.8, *Hazards and Hazardous Materials*. The LUCs and their associated plans require preservation of the cap and prohibit certain land uses on the Project without DTSC approval.

In compliance with the LUCs and their associated plans, all dewatered groundwater is to be contained in storage tanks. Disposal options for the dewatering effluent include (1) transportation to an offsite licensed disposal facility permitted to accept the waste or (2) discharge into the City of Oakland's sanitary sewer system under the City's existing permit requirements. Both groundwater effluent disposal options require the effluent be tested prior to disposal to determine the appropriate disposal option (DTSC, 2003; 2004).

San Francisco Bay Conservation and Development Commission

The San Francisco Bay Conservation and Development Commission (BCDC) has regulatory jurisdiction over the Bay shoreline. (See Section 4.10, *Land Use, Plans and Policies*, for a discussion and map of areas of the site in BCDC's jurisdiction, including the original 100-foot shoreline band and areas of fill permitted subsequent to creation of BCDC.) Sea level rise vulnerability and risk assessments are required when planning shoreline areas or designing larger shoreline projects in BCDC's jurisdiction. Risk assessments must be based on the best available estimates of future sea level rise. New projects on Bay fill, likely to be affected by future sea level rise and storm surge activity during the life of the project, must meet additional requirements, and when feasible, integrate hard shoreline protection structures with natural features that enhance the Bay ecosystem (e.g., including marsh and/or upland vegetation).

Within BCDC jurisdiction are the following reports that apply to the Project site: *Adapting to Rising Tides Alameda County Subregional Project* (BCDC, 2019b) and *Oakland/Alameda Resilience Study* (BCDC, 2016). The *Adapting to Rising Tides Alameda County Subregional Project* provides adaptation responses for vulnerabilities identified across five broad asset categories: overarching, community land use, transportation, utilities, shorelines. It includes possible planning mechanisms, governance structures, or collaborative approaches that could be used to implement actions. The *Oakland/Alameda Resilience Study* includes adaptation responses for vulnerabilities identified in four sectors: schools, childcare facilities, senior care facilities, and communities.

California State Lands Commission and AB 691

The California State Lands Commission has jurisdiction over tidelands and submerged lands along the entire coast, and within 3 nautical miles offshore from the ordinary high water mark. The California State Lands Commission requires sea level rise planning by Legislative Trust Grantees, such as the Port of Oakland; and requires grantees with average annual gross public trust revenues over $250,000 to prepare and submit a sea level rise plan to the California State Lands Commission no later than July 1, 2019. Additional details are addressed below, under *Local Plans, Ordinances and Policies.*

AB 1191

As further discussed in Section 4.10, *Land Use, Plans, and Policies*, AB 1191 (Stats. 2019, Chap. 752), also known as the Oakland Waterfront Sports and Mixed-Use Project, Waterfront Access, Environmental Justice, and Revitalization Act, was signed into law by Governor Gavin Newsom in 2019 and became effective on January 1, 2020. AB 1191 authorizes the California State Lands Commission to approve an exchange of areas subject to the public trust at the Howard Terminal

property, if the California State Lands Commission finds that the exchange meets certain conditions, including the following specific to sea-level rise:

- Development of the final trust lands is consistent with State policy and guidance regarding sea-level rise resiliency planning and adaptation, such as the OPC's 2018 State of California Sea-Level Rise Guidance.
- The Project uses the medium-high risk aversion for the high-risk emissions scenario through 2100, and plans for the Project account for 100-year storm events, wave run-ups, king tides, and other extreme high tides associated with those scenarios.
- Plans to address sea-level rise associated with the Project include enforceable strategies incorporating an adaptive management approach to sea-level rise for the duration of the ground lease term for the final trust lands. The plan must also include consideration of the H++ scenarios as defined by the OPC, for purposes of risk management, by outlining adaptation pathways that would be implemented as contingency plans to ensure resiliency if H++ scenarios occur.

Local Plans, Ordinances and Policies

Alameda County Municipal Codes

Stormwater Management

The Alameda County Flood Control and Water Conservation District administers Chapter 13.08 – Stormwater Management and Discharge Control Ordinances that govern: stormwater discharge regulations and requirements; inspections and enforcement; stormwater permits; the design, operation, and maintenance of permanent stormwater quality controls; collection of fees; and coordination with other regional water quality control programs.

City of Oakland General Plan

The *Open Space, Conservation, and Recreation Element* of the Oakland General Plan describes the following policies regarding water resources, adopted for the purpose of protecting water resources, and that apply to the Project.

> ***Policy CO-5.1*:** Encourage groundwater recharge by protecting large open space areas, maintaining setbacks along creeks and other recharge features, limiting impervious surfaces where appropriate, and retaining natural drainage patterns within newly developing areas.
>
> ***Policy CO-5.2*:** Support efforts to improve groundwater quality, including the use of non-toxic herbicides and fertilizers, the enforcement of anti-litter laws, the clean-up of sites contaminated by the Alameda County Flood Control and Water Conservation District.
>
> ***Policy CO-5.3*:** Employ a broad range of strategies, compatible with Alameda Countywide Clean Water Program, to: (a) reduce water pollution associated with stormwater runoff; (b) reduce water pollution associated with hazardous spills, runoff from hazardous material areas, improper disposal of household hazardous wastes, illicit dumping, and marina "live-aboards"; and (c) improve water quality in Lake Merritt to enhance the lake's aesthetic, recreational, and ecological functions.

> ***Policy CO-6.5*:** Protect the surface waters of the San Francisco Estuary system, including San Francisco Bay, San Leandro Bay, and the Oakland Estuary. Discourage shoreline activities which negatively impact marine life in the water and marshland areas.

The *Safety Element* (Adopted 2004, Amended 2012) of the Oakland General Plan (City of Oakland, 2012) describes the following policies regarding flooding hazards that apply to the Project.

> ***Policy FL-1:*** Enforce and update local ordinances, and comply with regional orders, that would reduce the risk of storm-induced flooding.
>
> > *Action FL-1.2:* Continue to require that subdivisions be designed to minimize flood damage by, among other things, having lots and rights-of-way be laid out for the provision of approved sewer and drainage facilities, providing on-site detention facilities whenever practicable and having utility facilities be constructed in ways that reduce or eliminate flood damage.

City of Oakland NPDES Permit

As described previously, the City of Oakland is covered by the NPDES MRP. This permit incorporates BMPs that include construction controls (such as a model grading ordinance), legal and regulatory approaches (such as stormwater ordinances), public education and industrial outreach (to encourage the reduction of pollutants at various sources), inspection activities, wet-weather monitoring, and special studies. In accordance with the MRP requirements, new development and redevelopment projects are required to incorporate treatment measures and other appropriate source control and site design features to reduce the pollutant load in stormwater discharges and manage runoff flows.

Among many other stormwater management requirements included in the MRP, Provision C.3 contains specific post-construction runoff requirements for new development and redevelopment. Provision C.3 governs storm drain systems and regulates post-construction stormwater runoff. The provision requires new development and redevelopment projects to incorporate treatment measures and other appropriate source control and site design features to reduce the pollutant load in stormwater discharges and to manage runoff flows. In addition, MRP Provision C.10 contains requirements of all MRP permittees to meet trash-related Receiving Water Limitations through implementation of control measures and other actions to prevent trash from entering receiving waters through the MS4s in accordance with the requirements in the MRP.

The Project site is within Port of Oakland jurisdiction and is currently subject to the Port's Statewide Phase II MS4 NPDES Permit requirements. If the Proposed Project is built, a new stormwater collection system would be constructed and stormwater would discharge to the Estuary via one existing and one relocated stormwater outfall. The City and the Port are cooperating to establish a shared regulatory framework under which the City will apply its MS4 NPDES permit requirements for design and enforcement.

City of Oakland Municipal Code

The City of Oakland Municipal Code (OMC) Chapter 13.16 – Creek Protection, Stormwater Management and Discharge Control codifies ordinances for the purpose of: eliminating non-

storm-water discharges to the municipal separate storm sewer; controlling the discharge to municipal separate storm sewers from spills, dumping or disposal of materials other than storm water; reducing pollutants in storm water discharges to the maximum extent practicable (including controls to prevent littering and trash from entering stormwater systems); preventing activities that would contribute significantly to flooding, erosion or sedimentation, or that would destroy riparian areas or would inhibit their restoration; controlling erosion and sedimentation; protecting drainage facilities; and protecting public health and safety, and public and private property. This ordinance is not applicable to lands under Port permitting authority.

Port of Oakland NPDES Permit

Phase II Small Municipal Separate Storm Sewer System (MS4) and Ordinance 4311

As discussed above under State Regulations, the MS4 permit for small MS4 systems requires permittees (in this case, the Port of Oakland) to reduce pollutants and runoff flows from new development and redevelopment using BMPs to the maximum extent practicable. The permit requires site design and development standards, also known as Low Impact Development (LID)/ post-construction design standards, a post-construction storm water management program, and an operation and maintenance of post-construction storm water measures.

The Port adopted Ordinance No. 4311, known as the Storm Water Ordinance on January 15, 2015, to provide legal authority to control discharges to its storm drainage system to meet its NPDES Phase II Small MS4 Permit conditions for water quality in stormwater discharged into the Estuary. Following the adoption of this ordinance, requirements for post-project stormwater design was detailed in the *Port of Oakland 2015 Post-Construction Stormwater Design Manual* (Larry Walker Associates, 2015). As stated previously, the City and the Port are cooperating to establish a shared regulatory framework under which the City will apply its MS4 NPDES permit requirements for design and enforcement.

City of Oakland Preliminary Sea Level Rise Road Map

The City of Oakland *Preliminary Sea Level Rise Road Map* states that the forecasted sea level rise by the year 2100 could, without action, substantially impact shoreline areas along the Inner Harbor, Port of Oakland seaport, the former Oakland Army Base and low lying coastal residences. To address existing and future development susceptible to this rise in water levels, the road map identifies a process for the City to improve the resilience of infrastructure, residents and employees. Within the identified "implementation actions," the road map identifies the need to incorporate sea level rise considerations in the General Plan Land Use Transportation + Element, and in the Plan for Downtown Oakland, "the Downtown Specific Plan and all future Specific Plans and Oakland General Plan updates [will] include recognition of projected sea level rise and other natural hazards; and will also include policies and goals that encourage future development projects to adapt to the effects of climate change" (City of Oakland, 2017). Following publication of the *Preliminary Sea Level Rise Road Map*, the Project site was removed from the boundaries of the Downtown Specific Plan, and will be addressed in future General Plan updates.

City of Oakland Hazard Mitigation Plan

The *Hazard Mitigation Plan* includes 21 high-priority strategies for hazard mitigation. Four strategies for the Port of Oakland and four for the City of Oakland specifically address flooding and the effects of future sea level rise. One of the strategies for the Port of Oakland is a mitigation measure to assess sea level rise impacts within the port (including the Inner Harbor), "[the] Port of Oakland's Sea Level Rise Vulnerability and Assessment Improvement Plan will assess the potential effects of Sea Level Rise on Maritime Facilities. The study will assess facilities Port-wide for sea level rise vulnerability and develop an implementation plan for near-term and long-term strategies to address the potential impacts. The Study will analyze the need for infrastructure such as sea walls, wharf improvements, and changes in port operations. In addition, the study will help to establish design standards" (City of Oakland, 2016). The Port has completed this analysis, as discussed below.

Port of Oakland Sea Level Rise Assessment

To comply with Assembly Bill 691, the Port of Oakland has completed a sea level rise analysis to prepare Port property and assets for impacts from sea level rise. This analysis applies the California Coastal Commission's Sea Level Rise Policy Guidance and the OPC's Sea-Level Rise Guidance to map flood exposure to characterize financial impacts and to identify potential protection strategies that the Port may consider and further evaluate in the future. Potential strategies that are relevant to the Project site and vicinity include construction of a seawall between Clay and Jefferson Streets to prevent a flood pathway for large areas of the Maritime area and Jack London Square and temporary flood protection around the fire station during storm events (Port of Oakland, 2019).

4.9.3 Significance Criteria

The City of Oakland has established thresholds of significance for CEQA impacts which incorporate those in Appendix G of the State CEQA Guidelines (City of Oakland, 2016). The Project would have a significant adverse impact related to hydrology and water quality if it would:

1. Violate any water quality standards or waste discharge requirements;
2. 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 which would not support existing land uses or proposed uses for which permits have been granted);
3. Result in substantial erosion or siltation on- or off-site that would affect the quality of receiving waters;
4. Result in substantial flooding on- or off-site;
5. Create or contribute substantial runoff which would exceed the capacity of existing or planned stormwater drainage systems;
6. Create or contribute substantial runoff which would be an additional source of polluted runoff;

7. Otherwise substantially degrade water quality;
8. 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, that would impede or redirect flood flows;
9. Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
10. Expose people or structures to a substantial risk of loss, injury, or death involving flooding;
11. Expose people or structures to a substantial risk of loss, injury, or death as a result of inundation by seiche, tsunami, or mudflow;
12. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course, or increasing the rate or amount of flow, of a creek, river, or stream in a manner that would result in substantial erosion, siltation, or flooding, both on- or offsite; or
13. Fundamentally conflict with the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16) intended to protect hydrologic resources.[5]

The changes to Appendix G of the State CEQA Guidelines effective in December 2018 were intended to reflect recent changes to the CEQA statutes and court decisions. Many of these recent changes and decisions are already reflected in the City's adopted significance thresholds, which have been used to determine the significance of potential impacts. To the extent that the topics or questions in Appendix G are not reflected in the City's thresholds, these topics and questions have been taken into consideration in the impact analysis below, even though the determination of significance relies on the City's thresholds. Specifically, as revised in 2018, Appendix G of the State CEQA Guidelines considers the direct, indirect, or cumulative effects on impeding or redirecting flood flows, rather than the previous criteria of the effects of flooding *on* the project or occupants that are located within the 100-year flood zone. In addition, Appendix G no longer includes the criterion of the effect of seiche, tsunami, or mudflows *on* a project. Instead, Appendix G now asks if the project would risk release of pollutants in flood hazard, tsunami, or seiche zones.

Approach to Analysis

The analysis in this section is based on the pre- and post-Project conditions described in the Draft Civil Infrastructure Technical Report prepared for the Project (BKF, 2020). The analysis is also based on publicly available published reports and on the information provided previously in the environmental and regulatory settings in this section. City CEQA Criteria 5 and 6 are analyzed in Section 4.16, *Utilities and Service Systems*.

This section also utilizes information contained in the Tidal Datums and Sea Level Rise Design Basis Memorandum prepared for the Project, including sea level rise adaptation strategies

[5] Note: Although there are no specific, numeric/quantitative criteria to assess impacts, factors to be considered in determining significance include whether there is substantial degradation of water quality through (a) discharging a substantial amount of pollutants into a creek, (b) significantly modifying the natural flow of the water or capacity, (c) depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability, or (d) substantially endangering public or private property or threatening public health or safety.

proposed for the medium-high risk aversion and extreme risk aversion scenarios (Moffat & Nichol, 2019).

The Project would be regulated by the various laws, regulations, and policies summarized in Section 4.9.2, *Regulatory Setting*. Compliance by the Project with applicable federal, State, and local laws and regulations is assumed in this analysis, and local and State agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the laws and regulations is a condition of permit approval.

If, after considering the features described in the Chapter 3, *Project Description*, the required compliance with regulatory requirements does not reduce impacts to less-than-significant levels, a significant impact would occur without mitigation, and for those impacts, mitigation measures are proposed to reduce the impacts to less than significant with mitigation.

Topics Considered and Determined to Have No Impact

The following topics are considered to have no impact based on the proposed Project characteristics, its geographical location, and underlying site conditions. Therefore, these topics are not addressed further in this document for the following reasons:

- ***Seiche and mudflow*** (Criterion 11). The Project site is not located next to an enclosed body of water subject to seiche, or downhill from exposed hillsides susceptible to mudflows.

4.9.4 Impacts of the Project

Surface Water and Groundwater Quality

Impact HYD-1: The Project could violate surface water and groundwater quality standards, result in erosion or siltation on- or offsite that could affect receiving water quality, and/or substantially degrade surface water and groundwater quality, conflict with implementation of a water quality control plan, or fundamentally conflict with the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16). (Criteria 1, 3, 7, 12, and 13) (*Less than Significant with Mitigation*)

Construction Impacts

Phase 1 and Buildout – Construction

Construction of the proposed Project would include earthmoving activities such as excavation, trenching, grading, importation of fill, and in-water activities. The latter could include work related to relocation and construction of stormwater and drainage facilities (including the necessary installation of a sandbag berm or steel cofferdam around the proposed outfall opening), as needed, and the possible limited addition of in-water piles required for the reinforcement of waterfront areas to support retention of the wharf and cranes in overwater areas (wharf). As discussed in Section 4.6, *Geology, Soils and Paleontological Resources*, and in Section 4.9.2, *Regulatory Setting*, of this section, construction contractors would be required to notify the Regional Water Quality Control Board (RWQCB) with a Notice of Intent and prepare and submit a stormwater pollution prevention plan (SWPPP) for construction activities under the Construction General Permit. The SWPPP would list the hazardous materials (including petroleum products) proposed for use during construction; describe spill prevention measures,

equipment inspections, equipment and fuel storage; protocols for responding immediately to spills; and describe best management practices (BMPs) for controlling site run-on and runoff of these materials and onsite exposed soil. The RWQCB would provide a National Pollutant Discharge Elimination System program (NPDES) Construction General Permit with specific requirements prior to issuance of a construction permit for the Project site. In addition, permit requirements described in Section 4.3, *Biological Resources*, require monitoring of water quality in the Inner Harbor during the relocation and construction of the stormwater and drainage facilities (outfalls) and the possible limited addition of in-water piles to prevent water quality impacts on biological resources.

Aside from the Estuary, which is considered a waterway under the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16), no traditional creeks occur on the Project site or in the larger Project study area. The City's ordinance is intended to address potential water quality impacts from stormwater and other discharges into identified waterways. This ordinance is not applicable to lands under Port permitting authority; however, the City and the Port are cooperating to establish a shared regulatory framework under which the City will apply all relevant provisions of the Oakland Municipal Code. **Mitigation Measure HYD-1a: Creek Protection Plan**, would require the Project to comply with the provisions of the Creek Protection Ordinance, and prepare a Creek Protection Plan. With incorporation of Mitigation Measure HYD-1, the Project would not fundamentally conflict with the City's Creek Protection Ordinance during construction.

As discussed in Section 4.8, *Hazards and Hazardous Materials*, Impact HAZ-1, compliance with the numerous laws and regulations and City ordinances discussed in that section that govern the transportation, use, handling, and disposal of hazardous materials would limit the potential for creation of hazardous conditions due to the accidental release of hazardous materials that could enter stormwater runoff and degrade surface or groundwater water quality.

As discussed in Section 4.8, *Hazards and Hazardous Materials*, in the section on Impact HAZ-2 and in compliance with the anticipated new LUCs and their associated plans, the durable cover would be replaced with a new hardscape (asphalt or concrete) cover or an equivalent protective measure subject to DTSC approval. Concrete foundations of buildings and other structures would serve as hardscape cap with DTSC approval. For areas without hardscape, the cover would be replaced with an equivalent measure that would prevent exposure of the public or the environment to the underlying contaminated materials, again with DTSC approval. Equivalent measures would consist of fill and a drainage system. This equivalent measure would prevent public exposure to the contaminated materials by adding fill, preventing rainfall and landscape water from infiltrating into the underlying materials and mobilizing contaminants through the installation of a drainage system. If areas are identified that have no underlying contaminated materials, the DTSC may not require installing a cover or equivalent measure in those areas. Note that all changes would require DTSC approval. If changes are approved by the DTSC, the LUCs and their associated plans would be amended to incorporate the changes, as needed and as approved by the DTSC.

Prior to construction, the proposed Project's plans to maintain the durable cover integrity would be required to be submitted to the DTSC for their review and approval in accordance with the anticipated new LUCs and associated plans described in Section 4.8. *Hazards and Hazardous Materials* as a condition of Project approval. **Mitigation Measure HAZ-1a, Preparation and Approval of Consolidated RAW, LUCs and Associated Plans,** summarizes contents of the updated RAW that are required to address potential impacts related to hazardous materials during construction of the Project. This measure, along with **Mitigation Measure HAZ-1b, Compliance with Approved RAW, LUCs and Associated Plans; Mitigation Measure HAZ-1c, Health and Safety Plan;** Mitigation Measure HYD-1a, Creek Protection Plan; and required compliance with the numerous laws and regulations and City ordinances discussed previously that govern the water quality would limit the potential impacts from construction to less than significant.

Operational Impacts

Phase 1 and Buildout – Operations

Operation of the Project would include urban uses of pesticides, cleaners, and other common household products that could enter stormwater runoff. In addition, the use of vehicles on the Project site could result in the release of minor amounts of oil, grease, and other mechanical compounds that could enter stormwater runoff. The proposed Project would be designed to meet the City's MRP NPDES Permit for post-project requirements of reducing pollutant load from the site into the stormwater system and receiving waters. **Mitigation Measure HYD-1b: NPDES Stormwater Requirements**, would ensure that the Project would comply with the requirements of the City's MRP Permit for post-construction stormwater management on the Project site. The MRP includes standards of design for low-impact development BMPs and post-project compliance monitoring for new development or redevelopment projects. The proposed Project may include bioretention swales, mechanical treatment, trash management (e.g., establishing controls such as street sweeping and trash collection), full trash capture installation within the on-site stormwater system, and other stormwater quality control measures pursuant to requirements of the City's Municipal Ordinance Chapter 13.16. In addition, as discussed above, the cap or an engineered equivalent would prevent rainwater and landscape water from infiltrating into contaminated materials, where present. As required by the previously-described LUCs and associated plans, the cap would be periodically inspected, maintenance conducted as needed, and any other alterations to the Cap would require prior DTSC approval.

In addition, as introduced in Chapter 3, *Project Description*, a drainage system would be installed beneath the ballpark to drain off stormwater. Seasonal rainwater would be collected in this shallow drainage system that would route the water to the stormwater system. A cutoff wall would likely also be installed around the boundaries of the ballpark to control groundwater inflow into the ballpark area. While the cutoff wall would largely isolate groundwater beneath the ballpark, it is anticipated that some groundwater may seep through or under the cutoff wall. The groundwater that infiltrates the wall will be collected in a drain system separate from the precipitation and irrigation shallow drain system (i.e., the "cutoff wall drain"). The cutoff wall drain will be a drainage system where water is pumped out by sump pumps on an as-needed basis. The cutoff wall drain water collection system will likely be located below the baseball playing field and may incorporate an impermeable liner to separate water that seeps through the cutoff wall from the irrigation and precipitation collected in the baseball field underdrain system so the two water

sources are not mixed. The pumped groundwater collected in the cutoff wall drain would be tested to assess the appropriate treatment and disposal method, which could include discharge to the stormwater drainage system, while the underdrain collecting precipitation and irrigation water beneath the baseball playing field will not need to be treated and is proposed to be recycled for subsequent use.

Monitoring, testing, and discharge of any groundwater that seeps behind the cutoff wall would be required in compliance with the numerous laws and regulations previously discussed, and in particular with the requirements of the Remedial Action Workplan (RAW), LUCs, and associated plans and agreements described in Section 4.8, *Hazards and Hazardous Materials* (see Mitigation Measures HAZ-1a, 1b, and 1c). Because these plans and agreements have not been drafted yet, mitigation is provided to reinforce the overall requirements to redevelop the Project site in a manner that is protective of construction workers, the public, and the environment, including the preparation of an operations and maintenance plan for treatment of contaminated groundwater prior to disposal. Implementation of the following mitigation measures would reduce impacts to less than significant.

Mitigation Measure HYD-1a: Creek Protection Plan.

The Project sponsor shall comply with the provisions of the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16), for which the Oakland-Alameda Estuary is a qualifying waterbody.

a. Creek Protection Plan Required

   Prior to the approval of a construction-related permit, the Project sponsor shall submit a Creek Protection Plan for review and approval by the City. The Plan shall be included with the set of project drawings submitted to the City for site improvements and shall incorporate the contents required under section 13.16.150 of the Oakland Municipal Code including Best Management Practices ("BMPs") during construction and after construction to protect the creek. Required BMPs are identified below in sections (b), (c), and (d).

b. Construction BMPs

   The Creek Protection Plan shall incorporate all applicable erosion, sedimentation, debris, and pollution control BMPs to protect the creek during construction. The measures shall include, but are not limited to, the following:

   i. On sloped properties, the downhill end of the construction area must be protected with silt fencing (such as sandbags, filter fabric, silt curtains, etc.) and hay bales oriented parallel to the contours of the slope (at a constant elevation) to prevent erosion into the creek.

   ii. The Project sponsor shall implement mechanical and vegetative measures to reduce erosion and sedimentation, including appropriate seasonal maintenance. One hundred (100) percent biodegradable erosion control fabric shall be installed on all graded slopes to protect and stabilize the slopes during construction and before permanent vegetation gets established. All graded areas shall be temporarily protected from erosion by seeding with fast growing annual

species. All bare slopes must be covered with staked tarps when rain is occurring or is expected.

iii. Minimize the removal of natural vegetation or ground cover from the site in order to minimize the potential for erosion and sedimentation problems. Maximize the replanting of the area with native vegetation as soon as possible.

iv. Immediately upon completion of work in or near creek channels, soil must be repacked and native vegetation planted.

v. Install filter materials (such as sandbags, filter fabric, etc.) acceptable to the City at the storm drain inlets nearest to the project site prior to the start of the wet weather season (October 15); site dewatering activities; street washing activities; saw cutting asphalt or concrete; and in order to retain any debris flowing into the City storm drain system. Filter materials shall be maintained and/or replaced as necessary to ensure effectiveness and prevent street flooding.

vi. Ensure that concrete/granite supply trucks or concrete/plaster finishing operations do not discharge wash water into the creek, street gutters, or storm drains.

vii. Direct and locate tool and equipment cleaning so that wash water does not discharge into the creek.

viii. Create a contained and covered area on the site for storage of bags of cement, paints, flammables, oils, fertilizers, pesticides, or any other materials used on the project site that have the potential for being discharged to the creek or storm drain system by the wind or in the event of a material spill.

ix. Gather all construction debris on a regular basis and place it in a dumpster or other container which is emptied or removed at least on a weekly basis. When appropriate, use tarps on the ground to collect fallen debris or splatters that could contribute to stormwater pollution.

x. Remove all dirt, gravel, refuse, and green waste from the sidewalk, street pavement, and storm drain system adjoining the Project site. During wet weather, avoid driving vehicles off paved areas and other outdoor work.

xi. Broom sweep the street pavement adjoining the project site on a daily basis as needed. Caked-on mud or dirt shall be scraped from these areas before sweeping. At the end of each workday, the active work area must be cleaned and secured against potential erosion, dumping, or discharge to the creek, street, gutter, or storm drains.

xii. All erosion and sedimentation control measures implemented during construction activities, as well as construction site and materials management shall be in strict accordance with the control standards listed in the latest edition of the Erosion and Sediment Control Field Manual published by the Regional Water Quality Control Board (RWQCB).

xiii. Temporary fencing is required for sites without existing fencing between the creek and the construction site and shall be placed along the side adjacent to construction or both sides of the creek if applicable) at the maximum practical

distance from the creek centerline. This area shall not be disturbed during construction without prior approval of the City.

c. Post-Construction BMPs

The Project shall not result in a substantial increase in stormwater runoff volume or velocity to the creek or storm drains. The Creek Protection Plan shall include site design measures to reduce the amount of impervious surface to maximum extent practicable. New drain outfalls shall include energy dissipation to slow the velocity of the water at the point of outflow to maximize infiltration and minimize erosion.

d. Landscaping

The Project sponsor shall include landscaping details for the site on the Creek Protection Plan, or on a Landscape Plan, for review and approval by the City. Landscaping information shall include a planting schedule, detailing plant types and locations, and a system to ensure adequate irrigation of plantings for at least one growing season. Plant and maintain only drought-tolerant plants on the site where appropriate as well as native and riparian plants in and adjacent to riparian corridors. Along the riparian corridor, native plants shall not be disturbed to the maximum extent feasible. Any areas disturbed along the riparian corridor shall be replanted with mature native riparian vegetation and be maintained to ensure survival.

e. Creek Protection Plan Implementation

The Project sponsor shall implement the approved Creek Protection Plan during and after construction. During construction, all erosion, sedimentation, debris, and pollution control measures shall be monitored regularly by the Project sponsor. The City may require that a qualified consultant (paid for by the Project sponsor) inspect the control measures and submit a written report of the adequacy of the control measures to the City. If measures are deemed inadequate, the Project sponsor shall develop and implement additional and more effective measures immediately.

Mitigation Measure HYD-1b: NPDES Stormwater Requirements.

a. Post-Construction Stormwater Management Plan Required

The Project sponsor shall comply with the City's Municipal Regional Stormwater Permit issued under the National Pollutant Discharge Elimination System (NPDES), including the requirements of Provision C.3. Prior to approval of construction-related permit, the Project sponsor shall submit a Post-Construction Stormwater Management Plan to the City for review and approval with the project drawings submitted for site improvements, and shall implement the approved Plan during construction. The Post-Construction Stormwater Management Plan shall include and identify the following:

i. Location and size of new and replaced impervious surface;

ii. Directional surface flow of stormwater runoff;

iii. Location of proposed on-site storm drain lines;

iv. Site design measures to reduce the amount of impervious surface area;

v. Source control measures to limit stormwater pollution;

vi. Stormwater treatment measures to remove pollutants from stormwater runoff, including the method used to hydraulically size the treatment measures; and

vii. Hydromodification management measures, if required by Provision C.3, so that post-project stormwater runoff flow and duration match pre-project runoff.

b. Maintenance Agreement Required

Prior to building permit final, the Project sponsor shall enter into a maintenance agreement with the City, based on the Standard City of Oakland Stormwater Treatment Measures Maintenance Agreement, in accordance with Provision C.3, which provides, in part, for the following:

i. The Project sponsor accepting responsibility for the adequate installation/ construction, operation, maintenance, inspection, and reporting of any on-site stormwater treatment measures being incorporated into the project until the responsibility is legally transferred to another entity; and

ii. Legal access to the on-site stormwater treatment measures for representatives of the City, the local vector control district, and staff of the Regional Water Quality Control Board, San Francisco Region, for the purpose of verifying the implementation, operation, and maintenance of the on-site stormwater treatment measures and to take corrective action if necessary.

The maintenance agreement shall be recorded at the County Recorder's Office at the sponsor's expense.

Mitigation Measure HAZ-1a: Preparation and Approval of Consolidated RAW, LUCs and Associated Plans. (See Section 4.8, *Hazards and Hazardous Materials*)

Mitigation Measure HAZ-1b: Compliance with Approved RAW, LUCs and Associated Plans. (See Section 4.8, *Hazards and Hazardous Materials*)

Mitigation Measure HAZ-1c: Health and Safety Plan. (See Section 4.8, *Hazards and Hazardous Materials*)

Significance after Mitigation: Less than Significant.

Groundwater Supplies and Recharge

Impact HYD-2: The Project would not result in substantially depleting groundwater supplies or interfere substantially with groundwater recharge that would result in a net deficit in aquifer volume or lowering the local groundwater table. (Criterion 2) (*Less than Significant*)

Construction Impacts

Phase 1 and Buildout – Construction

Construction of the proposed Project would require excavations for the installation of structural supports and utilities. Some excavation would be at depths below the current groundwater surface

elevation below the Project site. Therefore, construction would require pumping groundwater in excavations to keep the trenches dry until installation of infrastructure is complete and during the installation of the cutoff wall and lowering the groundwater level within the area enclosed by the cutoff wall. Dewatering operations would be temporary and short term, and limited to the construction of underground infrastructure only. It is important to note that groundwater beneath the Project site is brackish due to proximity to the Inner Harbor and therefore is not designated by the RWQCB as a drinking water beneficial use. The LUCs prohibit the use of groundwater beneath the Project site for any purpose other than construction dewatering. The groundwater removed during construction of underground infrastructure would be replenished with groundwater infiltration from the Inner Harbor to the west and the greater East Bay Groundwater Basin to the east. The quantity of groundwater dewatered during the construction of underground infrastructure would not be substantial relative to the volume of the adjacent Inner Harbor and would not result in a net deficit in the groundwater aquifer. Groundwater within the cutoff wall area would be physically separated from the surrounding groundwater. The dewatering within this area during construction would not affect the surrounding groundwater levels. Further, the groundwater removed from dewatering activities may be contaminated and not suitable for use elsewhere under current conditions.

See also Section 4.8, *Hazards and Hazardous Materials*, for more details on dewatering and requirements for the management of the contaminated groundwater. Groundwater would not be used for any construction purposes. In addition, as discussed previously, the LUCs and associated plans would require engineered methods to reduce the volume of groundwater dewatering during construction under the oversight and approval of DTSC. Depending on the concentration of chemicals in the dewatering effluent, the disposal options for the effluent include (1) transportation to an offsite licensed disposal facility permitted to accept the waste or (2) discharge into the City of Oakland's sanitary sewer system under the City's existing permit requirements. Both groundwater effluent disposal options would require the effluent be tested prior to disposal to determine the appropriate disposal option.

Further, the required compliance with the numerous laws and regulations discussed previously that govern groundwater would limit the potential impacts from construction to less than significant. See additional discussion of groundwater quality impacts under Impact HYD-1, above.

Operational Impacts

Phase 1 and Buildout – Operations

Once developed, the proposed Project would have an amount of impervious surface similar to what is currently on the Project site. Further, any and all changes to the cap would be required to restore the integrity of the cap to prevent any contact with or infiltration of water to the contaminated groundwater beneath the existing cap or engineered equivalent. As previously described, the cap and engineered equivalents would be periodically inspected, maintenance conducted as needed, and disturbance of the cap and engineered equivalents prohibited without DTSC approval. Maintaining the cap would not result in a change in the recharge of groundwater under the Project site compared to existing conditions, and the Project would not use groundwater from the aquifer beneath the Project site.

However, as described in Chapter 3, *Project Description*, a cutoff wall would likely be installed around the boundaries of the ballpark and a drainage system would be installed beneath the ballpark to drain off stormwater. Seasonal rainwater would be collected in this shallow drainage system that would route the rainwater to the stormwater system. While the cutoff wall would largely isolate groundwater beneath the ballpark, it is anticipated that some groundwater may seep through or under the cutoff wall. The groundwater levels within the area of the cutoff wall would be monitored and groundwater that infiltrated the system would be pumped out by sump pumps on an as-needed basis. The pumped groundwater would be tested to assess the appropriate treatment and disposal method, as discussed previously in Impact HYD-1. As described under Impact HYD-1, the cutoff wall drain water collection system will likely be located below the baseball playing field and may incorporate an impermeable liner to separate water that seeps through the cutoff wall from the irrigation and precipitation collected in the baseball field underdrain system so the two water sources are not mixed. The pumped groundwater collected in the cutoff wall drain would be tested to assess the appropriate treatment and disposal method, which could include discharge to the stormwater drainage system, while the underdrain collecting precipitation and irrigation water beneath the baseball playing field will not need to be treated and is proposed to be recycled for subsequent use.

As noted above, groundwater beneath the Project site is not designated by the RWQCB as a drinking water beneficial use, and the LUCs prohibit the use of groundwater beneath the Project site. Removal of groundwater through the cutoff wall drain water collection system would be necessary because of groundwater infiltration from the Inner Harbor to the west and the greater East Bay Groundwater Basin to the east. The quantity of groundwater dewatered on an as-needed basis during the maintenance of the cutoff wall drain water collection system would not be substantial relative to the volume of the adjacent Inner Harbor, and would not result in a net deficit in the groundwater aquifer. Further, the groundwater removed from dewatering activities may be contaminated and not suitable for use elsewhere under current conditions. Therefore, Project operations would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge that would result in a net deficit in aquifer volume or lowering the local groundwater table, and impacts would be less than significant.

Mitigation: None required.

Flooding

Impact HYD-3: The Project would not result in substantial flooding on- or off-site or create or contribute substantial runoff which would be an additional source of polluted runoff. (Criteria 4 and 6) (*Less than Significant with Mitigation*)

Construction Impacts

Phase 1 and Buildout – Construction

Construction of the proposed Project would include earthmoving activities such as excavation, trenching, grading, and importation of fill. As discussed in Section 4.6, *Geology, Soils, and Paleontological Resources*, and in Impact HYD-1, above, construction contractors would be

required to notify the RWQCB with a Notice of Intent and prepare and submit a SWPPP for construction activities. The SWPPP would describe BMPs for controlling site run-on and runoff of sediment from the Project site. BMPs contained in the SWPPP would control the volume and velocity of runoff, thereby reducing the risk of substantial on- or off-site flooding during construction. The RWQCB would provide a NPDES General Construction Permit with specific requirements prior to issuance of a construction permit for the Project site. Further, the required compliance with the numerous laws and regulations (discussed in Section 4.9.2) and Mitigation Measure HYD-1a (Creek Protection Plan) would limit the potential impacts from construction on stormwater runoff to less than significant.

Operational Impacts

Phase 1 and Buildout – Operations

As discussed in Section 4.9.1, *Environmental Setting*, the Project site is currently covered in impervious surfaces and stormwater runoff is collected by onsite stormwater inlets that are connected to the Port's stormwater drainage system and discharged through two outfalls to the Inner Harbor. Portions of the Project site stormwater runoff discharges to the Inner Harbor by sheet flow. Construction of the Project site would include removal of existing impervious surfaces and importation of fill to raise the elevation of the Project site for adaptation to future sea level rise. Installation of a new stormwater drainage system would occur prior to, during, and after importation of fill and final grading. Design and final grading of the Project site would result in capture of all site runoff into the newly installed stormwater drainage system once the site has been resurfaced and structures begin construction. As discussed in Section 4.16, *Utilities and Service Systems*, specific control measures required for stormwater treatment from impervious runoff from the Project site would provide reduction of stormwater runoff velocities and volume compared with pre-project conditions, thereby reducing the risk of substantial flooding on- or off-site. As discussed under Impact HYD-1, the proposed Project would be designed to meet the City's MRP NPDES Permit for post-project requirements of reducing pollutant load from the site into the stormwater system and receiving waters as required through Mitigation Measure HYD-1b (NPDES Stormwater Requirements). In addition, site boundaries would be graded to adjacent property elevations with stormwater collection inlets to capture and prevent Project runoff from entering adjacent properties. Further, the required compliance with the numerous laws and regulations discussed previously that govern surface water and groundwater quality would limit the potential impacts from operation to less than significant.

Mitigation Measure HYD-1a: Creek Protection Plan (See Impact HYD-1)

Mitigation Measure HYD-1b: NPDES Stormwater Requirements. (See Impact HYD-1)

Significance after Mitigation: Less than Significant.

Impact HYD-4: The Project would place structures, including potential housing, within a 100-year flood hazard area, which could impede or redirect flood flows, exposing people or structures to a significant risk of loss, injury or death involving flooding. (Criterion 8 and 9) (*Less than Significant with Mitigation*)

The majority of the Project site is not located in a designated 100-year or other flood zone, a floodplain, or a floodway and would not impede or otherwise redirect any flood flows to other areas. However, a small portion at the northeast corner of the Project site is within a portion of the Special Flood Hazard Area (SFHA) Flood Zone AE (elevation 10 feet, NAVD 88 datum) as shown in the most recent FEMA FIRM. The FIRM elevation is rounded up from the actual BFE of 9.71 feet (NAVD 88 datum), since FEMA shows only whole number in its FIRMs. Converted to Oakland datum (OCD), the BFE would be approximately 3.9 feet (Moffatt & Nichol, 2019). The Project proposes new mixed use development on this portion of the Project site. Given parts of development block #18 are within the SFHA, future surveys are warranted to verify that the building floor levels are above the base flood elevation. The surveys would factor in more specificity known in the future about the location of the future residential or commercial-serving mixed uses, the design proposal, specific site flooding characteristics and refined grading. This evaluation only considers the Project sponsor's preliminary grading plan in **Figure 4.9-1**. Figure 4.9-1 shows that the building on development block #18 would have a finished floor elevation of at least 6.0 feet, which would be higher than the BFE of approximately 3.9 feet.

Mitigation Measure HYD-2, Structures in a Flood Zone, would require that the Project's final grading plans for development within the SFHA show finished site grades and floor elevations above the BFE. With implementation of Mitigation Measure HYD-2, the Project would not place structures within flood hazard area that would impede or redirect flood flows, exposing people or structures to a significant risk of loss, injury or death involving flooding, and impacts would be less than significant.

> **Mitigation Measure HYD-2: Structures in a Flood Zone**.
>
> The Project shall be designed to ensure that new structures within a 100-year flood zone do not interfere with the flow of water or increase flooding. Prior to approval of construction-related permit, the Project sponsor shall submit plans and hydrological calculations for City review and approval with the construction-related drawings that show finished site grades and floor elevations of buildings located within the current 100-year coastal flood Special Flood Hazard Area (SFHA) and/or 100-year Base Flood Elevation (BFE) elevated above the current 100-year coastal flood SFHA and/or 100-year BFE.
>
> **Significance after Mitigation:** Less than Significant.

Impact HYD-5: The Project could expose people or structures to a significant risk of loss, injury or death involving flooding. (Criterion 10 and 11) (*Less than Significant with Mitigation*)

Flood Impacts related to Tsunami

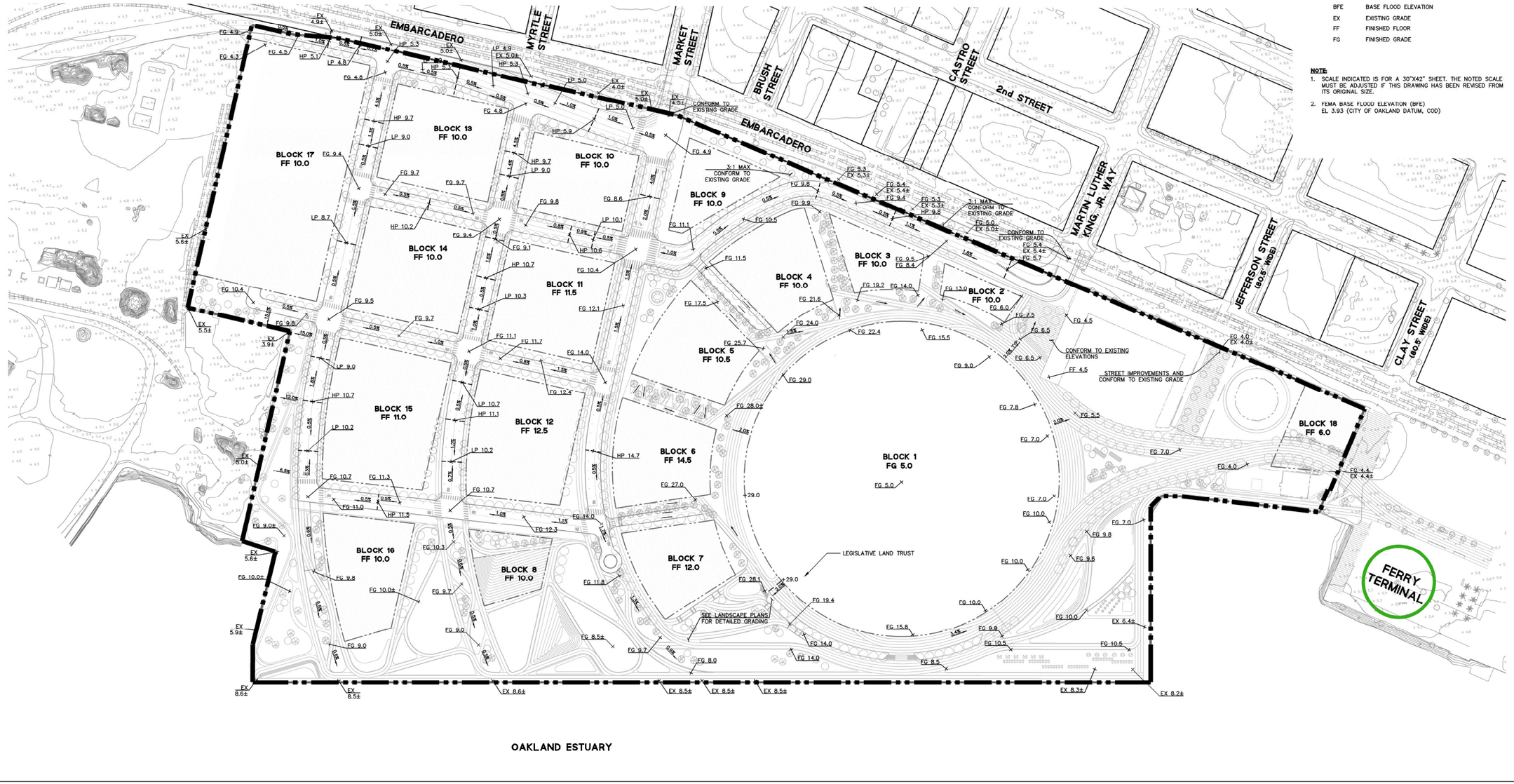
As discussed in Section 4.9.1, *Environmental Setting*, the Project site is located within a mapped tsunami inundation area. While the San Francisco Bay is a mostly enclosed body of water and

thus limits the probability for a potential tsunami, because of the City's low-lying nature, the impacts of a potential tsunami could result in severe damage (City of Oakland, 2016). Many areas of Oakland and other coastal cities within Alameda County are within tsunami inundation zones. Precautions and warning systems would be activated by the City Emergency Management Services Division in coordination with first responders, and local, State, and federal emergency management agencies to instruct the public on preparedness and response in the event of a tsunami. The National Oceanic and Atmospheric Administration (NOAA) operates the National Tsunami Warning Center and the Pacific Tsunami Warning Center that alert local authorities to order the evacuation of low-lying areas, if necessary. For most tsunamis approaching the coast, several hours are available to evacuate residents and undertake other emergency preparations. Therefore, although the Project is located within a tsunami inundation zone, the City and County's tsunami warning system coupled with the infrequent nature of tsunamis, and increased grade of buildings under the proposed Project would result in a less-than-significant impact related to tsunami.

Flood Impacts related to Sea Level Rise

As discussed in Section 4.9.1, *Environmental Setting,* the current projections for San Francisco Bay sea level rise in 2050 are 1.1 feet under the low risk aversion projection, or 1.9 feet under a medium-high risk aversion projection; and in 2100 to be 2.4 to 3.4 feet under the low risk aversion projection, and 5.7 to 6.9 feet under the medium-high risk aversion projection (Cal OPC, 2018). BCDC's most recent analysis of sea level rise (e.g., its 2017 ART Project) used OPC's 2013 sea level rise projections, which fall between OPC's 2018 low and medium-high risk aversion projections. Hence, the 2018 OPC medium-high risk scenarios used to assess the Project consider a higher sea level rise of up to 6.9 feet, as compared to BCDC's ART mapping, which considered up to 5.5 feet. Although BCDC's ART analysis and mapping used the older sea level rise projections, BCDC acknowledges that the more recent 2018 OPC guidance will help local agencies update their analysis and decision-making (BCDC, 2019a). Additionally, AB 1191 requires that plans for the Project account for 100-year storm events, wave run-ups, king tides, and other extreme high tides associated with the medium-high risk aversion for the high-risk emissions scenario through 2100. AB 1191 also requires consideration of the H++ scenarios as defined by the Ocean Protection Council, for purposes of risk management, by outlining adaptation pathways that would be implemented as contingency plans to ensure resiliency if H++ scenarios occur. Accordingly, the extreme risk aversion projection (H++ scenario) is also presented in this analysis for informational purposes only.

Since AB 1191 requires that the Project use the medium-high risk aversion for the high-risk emissions scenario through 2100, this EIR uses that measure for determining whether the Project's impact due to sea level rise are significant under CEQA. Since AB 1191 is Project-specific legislation, the use of that scenario for this EIR does not set a precedent for its use in other City EIRs.



SOURCE: BKF, 2020

Oakland Waterfront Ballpark District Project

Figure 4.9-1
Preliminary Site Grading Plan

ESA

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Medium-High Risk Aversion Analysis

Existing grades at the Project site range from around 3.6 feet City of Oakland datum (COD) to 8 feet COD, depending on location. The lower elevations are primarily located on the western portions of the site adjacent to the Schnitzer Steel property, and the east side near the Peaker Power Plant. Elevations along the southern portion of the Project site along the wharf structure are approximately 7.5 feet COD. The northern boundary along Embarcadero West and the Union Pacific Railroad tracks to the north is generally at an elevation between 4 feet and 5.4 feet COD.

According to flood mapping conducted for regional assessments (Source: ART mapping, used by Port of Oakland for its 2019 sea level rise assessment), under conditions similar to OPC's medium-high risk aversion projection recommended for coastal housing development, the existing Project site would see increasing inundation from its eastern boundary near the Oakland Fire Station 2 and the Peaker Power Plant, when sea level rise reaches approximately 3 feet around 2070; when sea level rise reaches 4 feet to 5 feet sometime between 2070 and 2100, the existing Project site would see further increasing inundation in this area and also along its western boundary near the Schnitzer Steel property, as well as along the northern boundary of the site.

The Project site would be elevated such that proposed grades include an allowance for sea level rise. As described in Chapter 3, *Project Description*, the Project's proposed grading plan calls for the addition of soil throughout much of the Project site to raise the ground surface elevations. In addition, the finished floor elevations of all residential buildings on the site, except development block #18 at the corner of Embarcadero West and Clay (see Figure 4.9-1), are proposed to be at or above 10 feet COD to accommodate future increases in the base flood elevation (BFE) due to future sea level rise (see Table 4-9.1 in the *Environmental Setting*). At an elevation of 10 feet COD, the finished floors would remain above the BFE for up to 6.1 feet of sea level rise. This amount of sea level rise by 2100 falls with the guidance range (5.7-6.9 feet) for medium-high risk aversion from the state (Cal OPC, 2018),[6] and is above the guidance range (2.6-5.5 feet) from BCDC. Although the elevations for the proposed finished floors only fall within, not above, the medium-high risk aversion range for 2100, the incremental difference of 0.8 feet does not cause substantial additional risk, since minimal adaptations, such as subtle modifications to grades, would be required to keep up with rising sea levels under the medium-high risk aversion scenario. Additionally, the medium-high risk aversion projection has only a 0.5 percent probability of being exceeded (Cal OPC, 2018) and the proposed finished floor elevation meets the medium-high risk aversion sea level rise range through 2090 (Table 4.9-1).

Development block #18 would have a finished floor elevation of 6.0 feet based on the preliminary grading plan. Additionally, proposed roadway elevations on the Project site would be approximately 9-14 feet COD for most internal roads and decrease to 4.9 feet COD on the north edge of the Project site, and 4.4 feet COD on the eastern edge of the Project site to match with the existing grade of adjacent properties. The Project site currently matches grades with surrounding properties, which may be more susceptible to flooding with sea level rise than the proposed

[6] As addressed in setting, this is the reasonable risk scenario for the project: The *medium-high risk* aversion projection, which represents a 0.5 percent chance of being exceeded, is useful for providing a precautionary projection that can be used for less adaptive, more vulnerable projects or populations that will experience medium to high consequences because of underestimating sea level rise (e.g., coastal housing development).

Project. By creating a large area of raised ground along the shoreline and other adaptive management approaches, the Project site could be readily incorporated in regional flood management efforts to adapt this stretch of Inner Harbor shoreline to sea level rise. The proposed grades for development block #18 and the proposed roadways would accommodate the BFE and the 1.9 feet of SLR projected for 2050 under the medium-high risk aversion scenario. Along the northern and eastern edges of the site, grades would be above the BFE, but adaptations would be necessary to keep up with rising sea levels in the future.

The Project proposes to maintain the existing wharf at its current elevation of 7.2-8.2 feet COD, which is lower than the proposed ground surface in the site's interior. At the current elevation, the wharf would accommodate the BFE and 3.3 feet of the SLR projected for 2070 under the medium-high risk aversion scenario. However, this lower elevation is consistent with the wharf's intended use, as shoreline public open space and access, as compared to the buildings and key infrastructure within the site's interior. At this elevation, the wharf deck would be at risk of flooding during the 100-year event after 3.6 feet of sea level rise. This amount of sea level rise by 2100 is higher than the guidance range (2.4-3.4 feet) for low risk aversion from the state (Cal OPC, 2018) for coastal trails, and is consistent with guidance from BCDC when considering recreational open space. Because this wharf provides a function similar to a recreational resource such as a trail, it falls under the characterization of a "lower consequence decision," occasional flooding would not result in a significant risk to loss of life, injury, or death. At this time the Project does not propose to modify the wharf; however, future actions, such as elevating the wharf edge, or creating landscape berms, steps, or amphitheaters above the BFE with sea level rise behind the wharf, could be taken to adapt it to increased risk of inundation, which could reduce risk of flooding from sea level rise across the site (Moffat & Nichol, 2019).

The Project would use one existing stormwater outfall and relocate the second existing outfall (i.e., construct a new outfall) to the southern corner of the Project site. Existing stormwater outfalls are at -5.9 feet COD, and new outfall would be at approximately the same elevation. The Project would provide structural and/or mechanical measures such as flap gates and pumps so that the stormwater system continues to function for the same amount of sea level rise that the Project's structures can tolerate.

The majority of the proposed ballpark structure would be at elevations of 5-10 feet COD and higher (with the potential for lower elevations discussed below). At this elevation, the finished floors would remain above the BFE for 1.1 to 6.1 feet of sea level rise. An exception would be some field-level suite areas of the ballpark (these areas would include social space, dining areas and back of house operations), which would be at 0-4 feet COD. This elevation range is below to just above the current BFE, and would increasingly fall below the BFE with sea level rise. The ballpark may also include garage and storage enclosures at lower elevations then the current BFE, which is typically acceptable for building code compliance, provided their use is limited and provided that these areas meet the definition of an enclosure and other engineering design

requirements for an enclosure (e.g., FEMA, 2017). The raised ground between these suite areas and San Francisco Bay would reduce the coastal flood exposure of the suite areas.[7]

AB 1191 requires that plans for the Project account for the medium-high risk aversion for the high-risk emissions scenario through 2100. As described above, the proposed Project grades vary across the site from elevations that allow for sea level rise through 2090 to elevations that match existing grades of adjacent properties. Therefore, adaptations would be required in the future to keep up with rising sea levels. Future strategies, such as elevating the wharf edge, or creating landscape berms, steps, or amphitheaters above the BFE with sea level rise behind the wharf, have been developed to adapt the Project site to increased risk of inundation (Moffat & Nichol, 2019). **Mitigation Measure HYD-3, Sea Level Rise Final Adaptive Management and Contingency Plan** would ensure that adaptation strategies are implemented and enforced as necessary to address the medium-high risk aversion scenario through 2100 pursuant to AB 1191. With approval of a trust exchange agreement pursuant to AB 1191, the Project would be required to incorporate an adaptive management approach to sea-level rise. If the California State Lands Commission finds that the exchange does not meet the conditions related to sea-level rise, the Project could not proceed.

Extreme Risk Aversion Considerations (H++ scenario) –Discussion for informational purposes only.

Under the extreme risk aversion projection (H++ scenario), approximately 10.2 feet of sea level rise could occur. AB 1191 requires that the Project plans address sea-level rise associated with the Project include enforceable strategies incorporating an adaptive management approach to sea-level rise for the duration of the ground lease term for the final trust lands. The plan must also include consideration of the H++ scenarios as defined by the OPC, for purposes of risk management, by outlining adaptation pathways that would be implemented as contingency plans to ensure resiliency if H++ scenarios occur. Creating a landscape berm or urban steps adjacent to the wharf above the BFE with sea-level rise are proposed strategies for the Project to adapt to the potential 10.2 feet of sea level rise under the H++ scenario (Moffat & Nichol, 2019). Therefore, the Project has considered and identified certain adaptation strategies to address the H++ scenario in the event it actually occurs and adaptation strategies are needed to address impacts.

Conclusion

Strategies, such as elevating the wharf edge, or creating landscape berms, steps, or amphitheaters above the BFE with sea level rise behind the wharf, and raised ground between the ballpark and the Bay would reduce flood exposure for portions of the ballpark have been developed to adapt the Project site to potential increased risk of inundation due to future sea level rise under the medium-high risk aversion scenario through 2100. Mitigation Measure HYD-3 would require the Project sponsor to develop and implement strategies to address the medium-high risk aversion scenario subject to approval of the City and California State Lands Commission pursuant to AB 1191. With the implementation of Mitigation Measure HYD-3, the proposed Project would have a less than significant effect due to exposing people or structures to a substantial risk of loss,

[7] Areas that fall below the BFE, but have high ground between them and the flood source, are typically evaluated relative to FEMA floodplain methods on a case-by-case basis. No engineering assessments of how the Project's grading below the BFE may affect floodplain mapping have been provided.

injury or death due to sea level rise related flooding under the medium-high risk aversion scenario through 2100.

Mitigation Measure HYD-3: Sea Level Rise Final Adaptive Management and Contingency Plan.

Prior to the issuance of the first grading permit for the Project, the Project sponsor shall develop a final adaptive management and contingency plan for sea level rise using the strategies identified in the *Tidal Datums and Sea Level Rise Design Basis Memorandum* prepared for the Project (Moffat & Nichol, 2019) or other equivalent strategies that will be implemented to address the medium-high risk aversion scenario through 2100, subject to approval of the City and the State Lands Commission pursuant to AB 1191. The final adaptive management and contingency plan shall, at a minimum, include enforceable strategies incorporating an adaptive management approach to sea level rise for the duration of ground lease term for the final trust lands. The plan shall establish a monitoring and compliance program providing for regular review and enforcement by the City, including actual measured sea level rise adjacent to the Project site, and strategies that have been implemented, or are required to be implemented in the future, to address then-current projections of sea level rise.

Significance after Mitigation: Less than Significant.

Maritime Reservation Scenario

Under the Maritime Reservation Scenario, the Port of Oakland may choose to retain up to approximately 10 acres of the Project site to accommodate future expansion of the turning basin that is used to turn large vessels accessing berths in Oakland's Inner Harbor. If this option is exercised, that portion of the proposed Project site would not be developed. The reconfigured Project site would become smaller, although the impacts relative to hydrology and water quality on the Project site would be the same as those discussed above for the proposed Project, since the surface and groundwater conditions would remain unchanged and development on the smaller site would be subject to the same regulatory framework protecting water quality. Relative to hydrology and water quality impacts, the impacts from the removal of the portion of the wharf and construction and operation of an expanded turning basin would be analyzed by the Port of Oakland under a separate CEQA document if that project goes forward.

4.9.5 Cumulative Impacts

Impact HYD-1.CU: The Project, combined with cumulative development in the Project vicinity and citywide, could result in significant cumulative impacts on surface water or groundwater quality. (*Less than Significant with Mitigation*)

Geographic Context

The geographic scope for cumulative impacts on water quality is the area managed by the RWQCB's Basin Plan that receives runoff from tributaries and discharges from industrial and

urban sources into the Bay. The cumulative development for water quality includes all development within the Basin Plan, as described previously in this section. The cumulative context for groundwater is the East Bay Basin Plan boundary. The cumulative context for sea level rise are all areas within the BCDC's jurisdiction over low-lying areas of land developed or planned for development that are subject to predicted inundation from sea level rise in the future. Because the Project's stormwater runoff would be isolated and contained on the Project site through a separate stormwater system and discharged at the end of the City's stormwater system at two outfalls at the Inner Harbor boundary of the Project, the Project's impacts on flooding from stormwater would not combine with other areas of the City.

Cumulative Impact and Project Contribution

Water Quality

The proposed Project, in combination with other past, present, and future development in the Basin Plan watersheds would continue to contribute runoff and discharges to the Bay that contain constituents from agriculture, industrial, and urban land uses that would continue to potentially impact water quality in the Basin Plan area resulting in the need for continual updates to water quality control plans like the Basin Plan, as described previously on pages 4.9-2 to 4.9-3, and water quality regulations like those listed in the regulatory setting in this section. Likewise, these activities would continue to infiltrate and affect groundwater quality in the East Bay Basin. This is considered a significant cumulative impact. As described previously, development under the proposed Project would include construction and operation activities that could result in the degradation of surface water and groundwater quality, resulting in a potentially significant contribution to the cumulative impact. However, the Project would be required to comply with the current and future Basin Plan, applicable NPDES Permit requirements and ordinances, and other water quality regulations, as referenced previously in Impacts HYD-1 and HYD-2, as well as Mitigation Measures HYD-1a (Creek Protection Plan) and HYD-1b (NPDES Stormwater Requirements). These regulatory requirements and the design of the Project to capture all onsite stormwater within a new onsite stormwater system meeting stormwater quality design specifications would reduce the Project's incremental contribution to the cumulative impact to a less-than-considerable level.

Further, the required compliance with the numerous laws and regulations previously discussed, and in particular with the requirements of the Remedial Action Workplan (RAW), LUCs, and associated plans and agreements described in Section 4.8, *Hazards and Hazardous Materials*, would remediate and reduce the impact of hazardous materials on water quality, and would render contribution to the cumulative impact to a less-than-considerable level. However, because details of the consolidated RAW, LUCs, and associated plans are not known at this time, Mitigation Measures HAZ-1a through HAZ-1c are provided to ensure that with regulatory requirements and review and approval by DTSC, redevelopment and use of the Project site occurs in a manner that is protective of water quality, the environment, and construction workers, the public, future users and residents of the Project site, specifically, Mitigation Measure HAZ-1a(Preparation and Approval of Consolidated RAW, LUCs and Associated Plans); Mitigation Measure HAZ-1b (Compliance with Approved RAW, LUCs and Associated Plans); and Mitigation Measure HAZ-1c (Health and Safety Plan). The impact with these mitigation measures is less than significant. Therefore, construction and operation of the Project would not

have a cumulatively considerable contribution to the cumulative impact on surface water and groundwater quality. No significant cumulative impact is identified.

Groundwater Supplies

The proposed Project, in combination with other past, present, and future development in the East Bay Basin Plan area would dewater groundwater, as needed, during construction excavation in areas with shallow groundwater levels. Construction of the Project would be temporary, short term, and limited to the construction of underground infrastructure. In addition, the Project's activities would not combine with future or past construction dewatering activities of other development projects because the dewatering activities would be isolated to the time and location of the Project's construction activities, are in an area where underlying groundwater is strictly prohibited from any use other than for remediation purposes, and would not have substantial post-construction dewatering, as dewatering related to maintenance of the potential cutoff wall would occur only on an as needed basis. Likewise, dewatering activities for other development projects would not require dewatering activities at significant levels, due to the temporary nature of dewatering during construction and limited dewatering required during maintenance activities, that would combine together to substantially decrease groundwater supplies in the East Bay Basin.

As discussed previously in Impact HYD-2, the Project would not have any adverse operational effects on groundwater supplies and recharge. However, while the cutoff wall would largely isolate groundwater beneath the ballpark, it is anticipated that some groundwater may seep through or under the cutoff wall. The groundwater levels within the area of the cutoff wall would be monitored and groundwater that infiltrated the system would be pumped out by sump pumps on an as-needed basis. The pumped groundwater would be tested to assess the appropriate treatment and disposal method, as discussed previously in Impact HYD-1. The quantity of groundwater dewatered on an as-needed basis during the maintenance of the cutoff wall drain water collection system would not be substantial relative to the volume of the adjacent Inner Harbor, and would not result in a net deficit in the groundwater aquifer. Therefore, construction and operation of the Project would not have a cumulatively considerable contribution to a cumulative impact on groundwater supplies.

Flooding

As discussed under Impact HYD-4, with implementation of Mitigation Measure HYD-2 (Structures in a Flood Zone), the Project would not expose people or structures to a significant risk of loss, injury or death involving flooding by placing structures, including potential housing, within a 100-year flood hazard area. Therefore, the Project would not contribute to a cumulative impact in this regard. While impacts related to increased flood hazard due to sea level rise are not caused by the Project, i.e., they are global in nature, the impacts from the project on coastal flooding and sea level rise would be minimal in terms of off-site impacts. The Project would include strategies, such as elevating the wharf edge, or creating landscape berms, steps, or amphitheaters above the BFE with sea level rise behind the wharf, to adapt the Project site to increased risk of inundation, and Mitigation Measure HYD-3 (Sea Level Rise Final Adaptive Management and Contingency Plan) would require the Project sponsor to meet conditions related to sea-level rise pursuant to AB 1191, including adaptive management and contingency plans. The volume of water that the site features would displace, relative to the volume of the flood

source, the entire Bay, and potential areas of future inundation with sea level rise, is negligible. Therefore, the Project, combined with other past, present, or reasonably foreseeable future projects, would not result in a cumulative impact to which the proposed Project would have a cumulatively considerably contribution.

Mitigation Measure HYD-1a: Creek Protection Plan. (See Impact HYD-1)

Mitigation Measure HYD-1b: NPDES Stormwater Requirements. (See Impact HYD-1)

Mitigation Measure HYD-2: Structures in a Flood Zone. (See Impact HYD-4)

Mitigation Measure HYD-3: Sea Level Rise Final Adaptive Management and Contingency Plan. (See Impact HYD-5)

Mitigation Measure HAZ-1a: Preparation and Approval of Consolidated RAW, LUCs and Associated Plans. (See Section 4.8, *Hazards and Hazardous Materials*)

Mitigation Measure HAZ-1b: Compliance with Approved RAW, LUCs and Associated Plans. (See Section 4.8, *Hazards and Hazardous Materials*)

Mitigation Measure HAZ-1c: Health and Safety Plan. (See Section 4.8, *Hazards and Hazardous Materials*)

Significance after Mitigation: Less than Significant.

Maritime Reservation Scenario – Cumulative

Under the Maritime Reservation Scenario, up to approximately 10 acres of the proposed Project site would not be developed. The reconfigured Project site boundary would change and the Project site area would become smaller. However, all cumulative site conditions relative to hydrology and water quality would remain the same as described for the proposed Project. Relative to hydrology and water quality impacts, the impacts from the removal of the portion of the wharf and construction and operation of an expanded turning basin would be analyzed by the Port of Oakland under a separate CEQA document if that project goes forward, and would require compliance with applicable NPDES Permit requirements and ordinances, and other water quality regulations, similar to the proposed Project, and would not combine to create a significant cumulative impact. Therefore, the cumulative impacts and analysis for the Maritime Reservation Scenario would be the same as those discussed above for the proposed Project.

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