

4.8 Hydrology and Water Quality

This section describes existing hydrologic conditions in the Inner Harbor Specific Plan vicinity and presents conditions and applicable regulations that pertain to surface water drainage, stormwater management, flooding potential, and water quality. This section also discusses the potential changes in the aforementioned hydrological conditions (including flooding associated with sea level rise) and water quality that could result from implementation of each the Specific Plan and the Harbor View project, and identifies potential project impacts and feasible mitigation measures where necessary.

4.8.1 Environmental Setting

Hydrology

Regional

Redwood City lies in the Central Basin within the San Francisco Bay hydrologic region. San Francisco Bay marks a natural topographic separation between the northern and southern coastal mountain ranges. The San Francisco Bay estuarine system conveys the waters of the Sacramento and San Joaquin rivers into the Pacific Ocean. The rivers enter the Bay through the delta at the eastern end of Suisun Bay. Within the San Francisco Bay hydrologic region, the City is a part of the South Bay planning area. This unit is divided into a number of smaller watersheds that are defined by major drainages or hydrologic features of the region. A series of linear drainage basins trending southwest to northeast extend from the ridges of the Santa Cruz Mountains across the alluvial plain¹ to San Francisco Bay. The Bair Island Wetlands, located across the Redwood Creek Channel from the Plan Area is also considered a significant hydrologic feature of the South Bay planning area (RWQCB, 2007).

Plan Area

The Inner Harbor Plan Area is bounded on the west by the Redwood Creek Channel, which contains a deep water channel that has been deepened and widened over the years. The Redwood Creek Channel is part of a system of sloughs and channels that connect freshwater drainages from the foothills with the Bay.

Redwood and Steinberger Creeks physically define the Plan Area. Redwood Creek flows from the north side of the City, under Highway 101, combines with Steinberger Creek, and then flows into the San Francisco Bay. Both creeks, within the extents of the Plan Area, exist in a natural condition. The shoreline in the area of the project site is predominantly protected with rip-rap, large concrete debris pieces, and some timbers.

¹ Alluvial plain is an area formed by deposition of sediment by a stream.

In June 2012, BKF Engineers prepared a Draft Redwood Creek Deficiency Review (Report), which identifies the lower reaches of Redwood Creek (near the City Police Station on Maple Street) as saline emergent wetlands (discussed further in Section 4.3, *Biological Resources*). They found Redwood Creek to have capacity for a 30-year storm event. Although most of the Creek does not have capacity for the 100-year event, improvements were deemed impractical and no creek repair to increase capacity was recommended within the Report (Fuscoe, 2014).

Infrastructure

The City is divided into several major storm water drainage areas, and the overall system includes pumps stations, standard storm drain catch basins, siphon storm drain catch basins, miles of storm drain pipe, miles of creeks, and in certain areas, retention basins (in Redwood Shores).

Pumping is required due to the combination of tidal action and the low elevation. The existing storm drain system that serves the proposed Plan area is comprised of four separate watersheds named by the downstream pump station or outfall location (West Yost, 2015; reference document also included as Appendix G to this Draft EIR). The Inner Harbor Specific Plan area is part of the greater Redwood City Eastern Low-Lying Area. The four watersheds, include:

1. Oddstad (pump station).
2. Maple Street K-mart (pump station)
3. Maple Street (gravity outfall)
4. Seaport Boulevard (Pump Station)

Each system discharges into Steinberger Creek. Two of the systems include runoff from both the south side of Highway 101 and the Inner Harbor Area. One of these two systems directs gravity flow into the Oddstad Pump Station located adjacent to the north side of Highway 101. The storm waters from the Oddstad station are pumped through a 39” pipe within the Inner Harbor Area where they discharge into Steinberger Creek. The second drainage area is directed through gravity lines into an existing wetland area along the east loop of Maple Street, which then connects to the K-Mart Pump Station at the edge of Steinberger Creek. The K-Mart pump station is estimated to require 2 hours, 38 minutes to eliminate ponding during their maximum designed event. The third system collects flows on the west loop of Maple Street and discharges via gravity into Steinberger Creek. The Seaport Boulevard (pump station) system collects runoff from a low-lying 52 acre watershed that consists of industrial and commercial land uses. The runoff is conveyed in intermittent roadside ditches, culverts, and drainage channels that ultimately discharge through the Seaport Boulevard Pump Station to Steinberger Creek. The entire drainage area feeding into these storm-collection systems encompass the Plan Area and is part of the greater Redwood City Eastern Low-Lying Area (West Yost, 2015).

The Plan Area is serviced by a combination of gravity mains, force mains, and the aforementioned pump stations. Pumping is required because of tidal action and low elevation. Localized flooding occurs when a rainfall greater than the 30-year storm event occurs and overwhelms the capacity of the storm drains and pumps.

Jurisdictions

Redwood Creek and Steinberger Creek are within the jurisdiction of the California Department of Fish and Wildlife (CDFW), San Francisco Bay Regional Water Quality Control Board (RWQCB), and the U.S. Army Corps of Engineers (Corps), and any work associated with these creeks would require permits from these approving agencies). Within the interior of the Inner Harbor, two linear drainage features carry local stormwater runoff from the Plan Area into Redwood Creek. Also, the Ferrari Property in the northeast corner of the study area is a shallow open-water area. These areas fall within the jurisdiction of the US Corps and RWQCB pursuant to the Clean Water Act (Sections 404 and 401) (also see Section 4.3, *Biological Resources*). Additional detail on these permitting and regulatory bodies is provided under *Regulatory Setting*, below.

Water Quality

Regional

The San Francisco Bay is an estuary with complex hydrodynamics that result in intricate sediment and chemical fate transport processes. The water quality in the Bay is influenced by a variety of factors including a mix of point and non-point source discharges, groundwater and surface water interactions, and water quality/water quantity relationships.² A number of water bodies in the Bay are impaired due to excessive siltation, but it is very difficult to distinguish between excessive siltation and impairment due to flow alterations. The State and RWQCBs have implemented the Water Management Initiative as the model for which water resources are to be protected. The RWQCB is now structured to promote a watershed-based approach towards implementation of programs, with particular emphasis on integration of programs within county watershed management areas. RWQCB staff has identified issues for the San Francisco Watershed Management Area, which would include the Plan Area, based on consideration of a combination of water quality, customer service, and program requirements.

During periods of wet weather, rain carries pollutants and sediments from all parts of a watershed into surface water bodies such as storm drains, streams, rivers, reservoirs, or marshes. In an urban setting, natural drainage patterns have been altered and stormwater runoffs, as well as non-storm discharges (irrigation water, accidental spills, washdown water, etc.), pick up sediments and contaminants from land surfaces, and transport these pollutants into surface and ground water. These diffuse sources of pollutants range from parking lots, bare earth at construction sites, agricultural sites and a host of many other sources. The total amount of pollutants entering aquatic systems from these diffuse, nonpoint sources is now generally considered to be greater than that from any other source, such as pipe discharges (point source).

² A point source is any discernible, confined, and discrete conveyance (e.g., a pipe discharge) of pollutants to a water body from such sources as industrial facilities or wastewater treatment plants. Nonpoint pollutant sources are sources that do not have a single, identifiable discharge point but are rather a combination of many sources.

Plan Area

The Plan Area is currently covered by buildings, pavement, open storage areas, and limited landscaping – primarily natural areas along the east loop of Maple Street and around the municipal facilities on the west loop of Maple. The majority of the land area of the site is impervious surface. It is assumed these surfaces generate the typical range of non-point source urban pollutants, such as litter, packaging materials, landscaping fertilizers and pesticides, heavy metals, oil and gas residues, tire fragments, and debris normally deposited by vehicular traffic.

Pollutant sources discharging into the Redwood Creek also include both point and nonpoint discharges, as discussed for the broader regional context above. Point sources in the Plan Area likely include discharges through pipelines that drain into Redwood Creek. The Plan Area also experiences nonpoint overland stormwater flow and urban runoff, which can cause pollution due to sediments, sand, industrial fuels, equipment and other operations, infiltration from sewer system, accidental spills of hazardous materials, and construction activities.

Groundwater Resources

The Plan Area is located within the San Mateo County portion of the 580-square-mile Santa Clara Valley groundwater basin that surrounds the southerly end of San Francisco Bay.

Topographically defined by the coastside and East Bay hills that rim the Bay, the Santa Clara Valley basin consists of younger, water-bearing alluvial deposits that are mainly recharged by percolation through the coarse, gravelly material found in the region's streambeds and, to a lesser extent, by the direct percolation of rainfall within relatively pervious soils found in some upland valleys. Water quality is generally acceptable within the bayside areas of the County, and well yields can be adequate for a range of uses, including municipal supply.

Flooding

Flooding is inundation of normally dry land as a result of rise in the level of surface waters or rapid accumulation of stormwater runoff. Flooding can also occur due to tsunamis, seiches, or failure of dams. Tsunamis are waves caused by an underwater earthquake, landslide, or volcanic eruption, while seiches are waves in an enclosed or semi-enclosed body of water such as a lake, reservoir, or harbor. Flooding from tsunamis is more likely to affect Pacific Ocean coastlines and although, low-lying areas along San Francisco Bay are susceptible to waves entering the bay they are expected to attenuate or diminish with distance from the Golden Gate entrance. In addition, the San Francisco Bay is not considered an enclosed body of water that is susceptible to seiche waves. Flooding can also occur due to dam failure. Although some areas in Redwood City are within one or more dam failure inundation areas, the project site does not lie within any of these areas (ABAG, 2003).

As previously referenced, localized flooding in the Plan Area currently occurs frequently when heavy rainfall overwhelms the capacity of the existing storm drains and pumps that were designed to older standards (West Yost, 2015). Increased flooding is experienced during the combination of high tides and major rainstorms and can occur during some high tides. The high tides raise the controlling water surface elevation within the creeks; backwater occurs and inundates adjacent,

low-lying lands. The Plan Area is partially within the 100-year flood plain as defined by the Federal Emergency Management Agency's Flood Insurance Rate Map (FEMA) (FEMA, 2012)

Precipitation and Stormwater Runoff

Stormwater runoff is that portion of rainfall that is not absorbed into the ground, taken up by plants, or lost through evaporation. Coarse-grained, permeable soils and heavy vegetative cover reduce runoff, while steep slopes, fine-grained soils, and impervious surfaces (buildings and pavement) increase runoff. The duration, frequency, and total amount of rainfall also affect the volume of runoff; frequent or heavy rains saturate the soil and reduce infiltration, so the percentage of rain that runs off the land increases with the severity of a storm. As discussed under Hydrology, most of the Plan Area is currently covered with pavement or buildings, which limited pervious surfaces.

Average annual rainfall in the region is approximately 20 inches. Nearly 95 percent of this precipitation falls during the winter rainy season, October through April, with the heaviest rainfall typically occurring in December, January, and February. Rainfall intensity during a 30-minute duration, 100-year recurrence interval storm is approximately 1.65 inches per hour. During more frequent 10-year and one-year storms, rainfall intensity decreases, respectively, to 1.15 inches and 0.33 inches per hour. (Redwood City, 2012).

Sea Level Rise

As previously discussed in Section 4.6, *Greenhouse Gas Emissions and Climate Change*, of this Draft EIR, a rise in average global temperature due largely to an increase in greenhouse gas (GHG) emissions is expected to be accompanied by a rise in the global sea level.

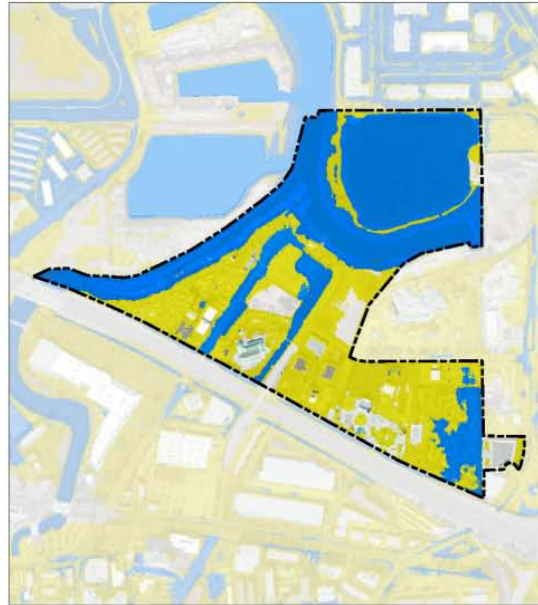
The State of California has provided planning guidance for assessing and adapting to the impacts of sea level rise. The State's current guidance (Ocean Protection Council, 2013) incorporates the most recent scientific findings from the National Academy of Science National Research Council (NRC, 2012). For the San Francisco Bay Region, the National Research Council projects sea level rise of 11 inches by 2050 and 36 inches by 2100. These projections consider regional sea levels and vertical land motion. The NRC's possible range for San Francisco Bay sea level rise in 2050 is 5 to 24 inches and in 2100 is 17 to 66 inches. The ranges account for uncertainty in future greenhouse gas emissions and Earth's response to these emissions. In spite of this uncertainty in NRC's and other's projections, all trend upward and are similar in magnitude when rounded to the nearest foot and allowing for variability of one or two decades.

The Inner Harbor Specific Plan area is already at risk of inundation from the highest water levels that can occur in San Francisco Bay. As shown in Figure 4.8-1, even without sea level rise, much of the Specific Plan Area is within the 100-year flood hazard region. For three feet of sea level rise, projected to occur by 2100 (as shown in Figure 4.8-1, the inundation depth during 100-year flooding will further increase substantial portions of the Plan Area would be inundated by the average daily high tides. In addition, as water levels in San Francisco Bay increase with sea level rise and coincide with high creek discharge, there will be an increased potential for flooding due to back water effects along Redwood Creek.

Today
 MHHW=7.2 ft NAVD
 100 yr WSE= 10.7 ft NAVD



Mid Century (+11 inches SLR)
 MHHW=8.1 ft NAVD
 100 yr WSE= 11.6 ft NAVD



End of Century (+36 inches SLR)
 MHHW=10.2 ft NAVD
 100 yr WSE= 13.7 ft NAVD



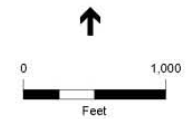
 Inner Harbor Specific Plan Area
Water Level
 Areas Below Daily High Tide Elevation (MHHW)
 Areas Below 100-year Flood Elevation

SLR = Sea Level Rise
 MHHW = Mean Higher High Water (the average of the higher high water height of each tidal day)
 NAVD = North American Vertical Datum

Source of LIDAR: USGS 2010, available at <http://www.csc.noaa.gov/dataviewer/>.

Source of MHHW: NOAA Station #9414523; Foxgrover et al., 2007

Source of 100-year Water Level: DHI, 2013



4.8.2 Regulatory Setting

Federal

Federal Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. 1251 – 1376) established the basic structure for regulating discharges of pollutants into the waters of the U.S. and gave the U.S. Environmental Protection Agency (US EPA) the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA sets water quality standards for all contaminants in surface waters. The statute employs a variety of regulatory and nonregulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The U.S. Army Corps of Engineers (Corps) has jurisdiction over all waters of the U.S. including, but not limited to, perennial and intermittent streams, lakes, and ponds, as well as wetlands in marshes, wet meadows, and side hill seeps. Under Section 401 of the CWA every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards. Compliance with the water quality standards required under Section 401 is a condition for issuance of a Section 404 permit. Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects.

Section 303(d) of the CWA requires that each state identify water bodies or segments of water bodies that are “impaired” (i.e., not meeting one or more of the water quality standards established by the state). These waters are identified in the Section 303(d) list as waters that are polluted and need further attention to support their beneficial uses. Once the water body or segment is listed, the state is required to establish Total Maximum Daily Load (TMDL) for the pollutant causing the conditions of impairment. TMDL is the maximum amount of a pollutant that a water body can receive and still meet water quality standards. Generally, TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The intent of the Section 303(d) list is to identify water bodies that require future development of a TMDL to maintain water quality.

United States Environmental Protection Agency

The US EPA is responsible for implementing federal laws designed to protect air, water, and land. While numerous federal environmental laws guide US EPA’s activities, its primary mandate with respect to water quality is the CWA. US EPA has developed national technology-based water quality standards and states have developed water quality standards in accordance with the CWA. US EPA also has authority to establish water quality standards if a state fails to do so. In the National Toxics Rule (NTR) and CTR, US EPA has established such standards for certain toxic pollutants applicable to California waters. These standards are used to determine the amount and the conditions under which pollutants can be discharged.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program under the CWA controls water pollution by regulating point and nonpoint sources that discharge pollutants into “waters of the U.S.” California has an approved state NPDES program. The US EPA has delegated authority for NPDES permitting to the California State Water Resources Control Board (SWRCB), which has nine regional boards. The San Francisco Bay RWQCB regulates water quality in the Plan Area and surroundings. Under this system, municipal and industrial facilities are required to obtain a NPDES permit that specifies allowable limits, based on available wastewater treatment technologies, for pollutant levels in their effluent. Stormwater discharges are regulated somewhat differently than pollutant discharges. Discharge of stormwater runoff from construction areas of one acre or more requires either an individual permit issued by the RWQCB or coverage under the statewide Construction General Stormwater Permit for stormwater discharges (discussed below). Specific industries and public facilities, including wastewater treatment plants that have direct stormwater discharges to navigable waters, are also required to obtain either an individual permit or obtain coverage under the statewide General Industrial Stormwater Permit.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 prohibits work affecting the course, location, conditions or capacity of navigable waters of the United States without a permit from the Corps. Examples of activities requiring a permit from the Corps are the construction of any structure in or over any navigable water; excavation or deposition of materials in such waters; and various types of work performed in such waters, including placement of fill and stream channelization. The Corp’s compliance with Section 404 of the Clean Water Act and NEPA will also satisfy requirements under Section 10 of the Rivers and Harbors Act.

State, Regional and Local

Porter-Cologne Act

The SWRCB and the RWQCB share the responsibility under the *Porter-Cologne Act* to formulate and adopt water policies and plans, and to adopt and implement measures to fulfill CWA requirements. In order to meet this requirement for the San Francisco Bay area, the Regional Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) (discussed below) was prepared by the RWQCB to protect the water quality of the State according to the beneficial uses identified for each water body. Prior to authorizations of waste discharge by the RWQCB, the Porter-Cologne Act requires reports of waste discharges to be filed. The RWQCB then prescribes Waste Discharge Requirements, which serve as NPDES permits under a provision of the Porter-Cologne Act.

Water Quality Control Plan for the San Francisco Region (Basin Plan)

The RWQCB is responsible for developing and implementing the San Francisco Bay Basin Plan, which documents approaches to implementing State and federal policies in the context of actual water quality conditions. The RWQCB’s other activities include permitting of waste discharges and implementing monitoring programs of pollutant effects (as discussed above).

The RWQCB most recently revised the Basin Plan on December 31, 2011, which the SWRCB and the Office of Administrative Law previously adopted in 1995. The Basin Plan identifies beneficial uses of receiving waters, water quality objectives imposed to protect the designated beneficial uses, and strategies and schedules for achieving water quality objectives. Section 303(c)(2)(B) of the Clean Water Act requires basin plans to include water quality objectives governing approximately 68 of US EPA's list of 126 pollutants.

Water quality objectives are achieved primarily through the establishment and enforcement of Waste Discharge Requirements for each wastewater discharger, as discussed under *Porter-Cologne Act*, above. 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. Therefore, all water resources must be protected from pollution and nuisance that may occur from waste discharges. Beneficial uses of surface waters, ground waters, marshes, and mud flats serve as a basis for establishing water quality standards and discharge prohibitions to attain this goal.

Construction General Permit

The California Construction Stormwater Permit (Construction General Permit)³, adopted by the SWRCB, regulates construction activities that include clearing, grading, and excavation resulting in soil disturbance of at least one acre of total land area. The Construction General Permit authorizes the discharge of storm water to surface waters from construction activities. It prohibits the discharge of materials other than stormwater and authorized non-storm water discharges and all discharges that contain a hazardous substance in excess of reportable quantities established at 40 Code of Federal Regulations 117.3 or 40 Code of Federal Regulations 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

The Construction General Permit requires that all developers of land where construction activities will occur over more than one acre do the following:

- Complete a Risk Assessment to determine pollution prevention requirements pursuant to the three Risk Levels established in the General Permit;
- Eliminate or reduce non-storm water discharges to storm sewer systems and other waters of the Nation;
- Develop and implement a Stormwater Pollution Prevention Plan (SWPPP), which specifies Best Management Practices (BMPs) that will reduce pollution in storm water discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standards; and
- Perform inspections and maintenance of all BMPs.

³ *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities*, Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ, National Pollutant Discharge Elimination System No. CAS000002.

Typical BMPs contained in SWPPPs are designed to minimize erosion during construction, stabilize construction areas, control sediment, control pollutants from construction materials, and address post construction runoff quantity (volume) and quality (treatment). The SWPPP must also include a discussion of the program to inspect and maintain all BMPs.

Dewatering Permit

Construction activities such as excavation and trenching in areas with shallow groundwater would require dewatering, which would be subject to the RWQCB construction dewatering permit requirements. Dewatering operations are regulated under State requirements for stormwater pollution prevention and control. Discharge of non-stormwater from a trench or excavation that contains sediments or other pollutants to sanitary sewer, storm drain systems, creek bed (even if dry), or receiving waters without treatment is prohibited. Discharge of uncontaminated groundwater from dewatering is a conditionally exempted discharge by the RWQCB. However, the removed water could potentially be contaminated with chemicals released from construction equipment or sediments from excavation. Therefore, disposal of dewatering discharge would require permits either from the RWQCB for discharge to surface creeks and groundwater or from local agencies for discharge to storm or sanitary sewers. The RWQCB lists non-stormwater discharge controls specifically for dewatering operations. The control measures are described in the mitigation for impacts discussion. Discharge of water resulting from dewatering operations would require an NPDES Permit, or a waiver (exemption) from the RWQCB, which would establish discharge limitations for specific chemicals (if they occur in the dewatering flows).

Dredging Permitting

Construction activities associated with implementation of the Specific Plan, such as the shoreline improvements or wharf construction, could involve dredging. The project sponsor for such projects would be required to apply for and obtain Section 404 permit from the Corps prior to dredging. (See also Section 4.3, *Biological Resources*, for additional discussion of Section 404 permit). As a part of the Section 404 permitting process, the project sponsor would be required to obtain a water quality certification from the RWQCB under Section 401 of the CWA. The project would be required to dredge and dispose material in accordance with the requirements of the RWQCB Basin Plan and Corps. The RWQCB may choose to act under the authority of the state Porter Cologne Water Quality Control Act and issue waste discharge requirements for the project in conjunction with the water quality certification. Typically, the dredged material is disposed at ocean or in-bay disposal sites or reused for wetland restoration or dike maintenance provided sediment sampling meets permitted requirements. In the event an in-bay disposal is proposed, the project sponsor would be required to provide an adequate alternatives analysis showing that there are no practicable alternatives to in-bay disposal.

The Dredged Material Management Office (DMMO) regulates dredging and dredged material in the San Francisco Bay region. The DMMO consists of representatives from the USEPA- Region 9, U.S. Army Corps of Engineers-San Francisco, San Francisco Bay RWQCB, BCDC, and the State Lands Commission. The DMMO serves as the single point of entry for applicants to the dredging and disposal permitting process. The DMMO regulates two types of dredging projects; 1) small

dredging projects defined by a project depth of less than -12 feet mean lower low water (MLLW) and generating less than 50,000 cubic yards per year on average, and 2) other dredging projects defined by project depth greater than -12 feet MLLW or average annual volumes greater than 50,000 cubic yards (USACE, 2001). The proposed project would likely fall into the first category.

San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP)

The City of Redwood City is a partner in the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP) – a storm water quality program that addresses potential construction-phase and post-construction pollutant impacts to local waterbodies. The program is designed in accordance with the San Francisco Bay State Water Resources Control Board NPDES permit. The Stormwater Treatment Section 32.12 F requires protection and maintenance of areas within 30 feet of a creek centerline or 25 feet from the top of bank, of a protected watercourse. Development of structures or additions of new impervious surfaces are restricted to improvements that will not disturb riparian vegetation, that will maintain the stability of the slope and creek bank, and will not discharge pollutants directly to the watercourse and any runoff is to be properly filtered. Section 2.88 defines a “Sensitive Area”. A Sensitive Area is any area located less than two hundred feet away from a water resource including but not limited to a wetland, pond, river, the San Francisco Bay or other bodies of water. The land areas within the Plan Area that are adjacent to Redwood and Steinberger Creeks would be subject to these provisions.

C.3 Permit Requirements

The NPDES permit lists provision C.3 that 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. “Redevelopment” is defined as a project on a previously developed site that results in the addition or replacement of a minimum of 10,000 square feet of impervious surface. Projects that would occur to implement the Specific Plan and that would ultimately replace more than 10,000 square feet of impervious surfaces would be required to implement treatment measures and appropriate source control and site design measures under the NPDES permit.

City of Redwood

Redwood City General Plan

The Redwood City General Plan identifies multiple policies in its *Built Environment Element*, *Natural Resources Element*, and *Public Services Element*, that pertain to hydrology and water quality considerations pertinent to the Specific Plan and the Harbor View project, and that are adopted for the purpose of avoiding or mitigating an environmental effect issues. Policies listed below that are also considered land use policies are addressed in Section 4.9, *Land Use and Planning*, of this Draft EIR.

- Policy BE-24.11: Consider the impacts of global warming, such as rising sea levels and floodplain areas, when reviewing plans for new development.

- Policy NR-5.1: Restore, maintain, and enhance Redwood City's creeks, streams, and sloughs to preserve and protect riparian and wetland plants, wildlife and associated habitats, and where feasible, incorporate public access.
- Policy NR-5.2: Limit construction activities to protect water quality in creeks and streams.
- Policy NR-5.3: Except for floating home communities, marinas, and the infrastructure necessary for the communities and marinas, prohibit building and development activities to establish a creek buffer zone, based on the site and floodplain characteristics and/or where sensitive species, communities, or habitats occur within the creek or 100-year floodplain, unless construction methods or other methods can substantially minimize damage from potential flooding.
- Policy NR-5.4: In conjunction with new development located along existing creeks and streams and where appropriate, incorporate daylighting for culverted portions or other bank naturalizing approaches for channeled sections as a means of creek and stream restoration.
- Policy NR-5.6: Promote natural stream channel function.
- Policy PS-7.1: Avoid or minimize the risks of flooding to new development. Carefully evaluate whether new development should be located in flood hazard zones, and identify construction methods or other methods to minimize damage if new development is located in flood hazard zones.
- Policy PS-7.2: Improve the drainage system's level of service to minimize storm flooding.

Redwood City Stormwater Management and Discharge Control Plan

The Redwood City *Municipal Code*, Chapter 27A, sets forth the Redwood City Stormwater Management and Discharge Control Program (SMDCP). The program outlines exempted activities (e.g., NPDES permitted discharges), broad watercourse protection objectives, illicit discharge prohibitions, and BMPs for new and redevelopment projects. It also refers to the NPDES regulations for stormwater protection and treatment (previously discussed under *SMCWPPP*).

Redwood City Municipal Code

The Redwood City *Municipal Code*, Chapter 41, set forth the Redwood City Floodplain Management regulations. The purpose of Chapter 41 is to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- A. Protect human life and health;
- B. Minimize the expenditure of public money for costly flood-control projects;
- C. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. Minimize prolonged business interruptions;
- E. Minimize damage to public facilities and utilities, such as water and gas mains, electric, telephone and sewer lines, and streets and bridges located in areas of special flood hazard;

- F. Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- G. Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

In order to accomplish its purposes, Chapter 41 includes methods and provisions for:

- A. Restricting or prohibiting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. Controlling the alteration of natural floodplains, stream channels and natural protective barriers which help accommodate or channel floodwaters;
- D. Controlling filling, grading, dredging and other development which may increase flood damage; and
- E. Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

4.8.3 Project Baseline

The Plan Area is an existing underdeveloped area that is largely covered by impervious surfaces and stormwater is conveyed off-site by a drainage system that empties directly into Redwood and Steinberger Creeks. Baseline conditions reflect the hydrologic and stormwater quality in the Plan Area as they existed at the time that the Notice of Preparation for the Plan was issued on November 6, 2014. Specific conditions are described above in *Environmental Setting* and documented throughout.

4.8.4 Impact and Mitigation Measures

Significance Criteria

Based on California Environmental Quality Act (CEQA) Guidelines Appendix G, the Project would cause adverse impacts to hydrology and water quality if it would:

- a) Violate any water quality standards or waste discharge requirements;
- b) 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 (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

- c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface run-off in a manner which would result in flooding on-or off-site;
- e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- f) Otherwise substantially degrade water quality;
- g) 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;
- h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, or sea level rise; or
- j) Result in or cause inundation by seiche, tsunami, or mudflow.

Approach to Analysis

Inner Harbor Specific Plan

The analysis of the Specific Plan in this document is based on proposed planned development occurring anywhere within the Plan area and pays particular attention to existing site conditions and drainage patterns compared to what could occur with implementation of the Specific Plan.

Harbor View Project

The analysis of the Harbor View project in this document is based on the conditions that are known and the proposed plans including a utility feasibility report prepared for the site by BKF Engineers that includes a discussion of the storm drainage (BKF, 2015). Due to the project site's close proximity to the Bay, and predominantly impervious surface area, the proposed project would likely be faced with relatively similar issues to the broader Plan area and thus would not differ greatly from analysis used for the Specific Plan.

Cumulative

Regarding the assessment of cumulative impacts, a project's contribution to cumulative impacts to hydrology and water quality should be considered significant if the project's contribution to past, present and future projects would combine to be significant.

Topics Considered and Determined No Impact

The following topics are considered to have no impact to the Inner Harbor Specific Plan or the Harbor View project based on the proposed project plan, its geographical location, and

underlying conditions according to several geotechnical investigations that have occurred within the Plan area. No impact discussion is provided for these topics for the following reasons:

- *Otherwise Degrade Water Quality (Criteria f).* The Specific Plan would allow for the Plan area to be redeveloped with new land uses. However, besides from changes to drainage patterns associated with new development which is discussed below, there are no industrial or other land uses that would include discharge of water that might otherwise affect water quality of receiving waters. Therefore, there would be no impact related to this criterion.
- *Flooding as a Result Levee or Dam Failure (Criteria i).* The project site is not protected by levee or within a dam inundation area (ABAG, 2003). Therefore, there would be no impact related to this criterion with regard to levee or dam failure.
- *Seiche, Tsunami, or Mudflow (Criteria j).* The project site is not located immediately adjacent to the Bay shoreline, but relatively inland although close to the Redwood Creek channel. However, according to mapping compiled by the Association of Bay Area Governments, the project site is not located within a tsunami inundation hazard area. The relatively flat topography of the site and surround area also makes it unlikely to experience mudflows. Therefore, considering the location of the project which is not immediately adjacent to an enclosed or semi-enclosed water body where seiche waves could become a hazard, within a tsunami hazard area, or in an area susceptible to mudflows there would be no impact from these potential hazards.

4.8.5 Program-Level Impacts of the Inner Harbor Specific Plan

Impacts

Impact HYD-1.SP: Development under the Specific Plan could violate water quality requirements or waste discharge requirements (Criteria a). (Less than Significant)

Construction

Project construction would require earthwork on the majority of the project site. Earthwork activities would include demolition and removal of building remnants, the stripping of surface vegetation, grading, excavation of soils, and possibly the placement of imported engineered soils on the project site. During construction, existing impervious surfaces and established ground cover that serves to stabilize site soils would be removed, potentially resulting in increased erosion and sedimentation.

Future construction activities at the project site would be required to comply with NPDES General Construction Activities Permit requirements. Adherence to this permit is required for projects that would disturb more than one acre or are part of a larger plan that would disturb more than one acre. Therefore, a project applicant would be required to prepare a SWPPP for General Construction Activities within the Plan area to reduce potential impacts to surface water quality during construction. SWPPPs would include the specific erosion control and storm water quality BMPs that would be employed to minimize pollutants in storm water runoff, the proper methods of installation, and the placement of those BMPs. In addition to erosion control BMPs, SWPPPs include BMPs for preventing the discharge of other NPDES pollutants besides sediment (e.g.

paint, solvents, concrete, petroleum products) to downstream waters. Project compliance with NPDES General Construction Activities Permit requirements are required by law and have proven effective in protecting water quality at construction sites. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

In addition, Project construction for future development may also require in-water work for dredging, shoreline improvements or repair, or shoreline protection measures. The United States Army Corps of Engineers (Corps) requires submittal of permit applications for essentially all construction activities that occur in the Nation's waters, including wetlands. Corps permits are also necessary for any work, including construction and dredging, in the Nation's navigable waters. The Corps permit process requires that all construction activities that would occur in or near waters of the Nation would be required to comply with BMPs set forth in accordance with Section 404 Corps permit as well as BMPs that would be included as part of the SWPPP.

Implementation of the SWPPP and Corps permit requirements at the project site would prevent significant construction-related impacts to water quality and ensure that all construction activities minimize the potential to adversely affect receiving waters.

Operation

Development associated with the proposed Plan would result in changes in the amount of impervious surfaces within the Plan area. Any increase in the amount of impervious surfaces would have the potential to generate additional stormwater pollution in runoff during storm events. The introduction of new paved areas, building rooftops, parking lots etc., could therefore present the potential for accumulation and release of petroleum hydrocarbons, lubricants, sediments, and metals (generated by the wear of automobile parts), which, if not managed appropriately, could violate water quality standards.

The management of landscaped areas would also present the potential for runoff and/or infiltration of herbicides and pesticides. These types of common urban pollutants could be transported in runoff, potentially adversely affecting the quality of receiving surface waters or groundwater. Nonpoint source pollutants would still be washed by rainwater from rooftops and landscaped areas into onsite and local drainage networks. Potential nonpoint source pollutants include products used in landscaping (e.g., pesticides, herbicides and fertilizers); oil, grease, and heavy metals from automobiles; and petroleum hydrocarbons from fuels.

Pollutant concentrations in stormwater runoff from a particular site would depend on numerous factors, including:

- Land use conditions;
- Implementation of best management practices (BMPs);
- Site drainage conditions;

- Intensity and duration of rainfall; and
- Climatic conditions preceding a rainfall event.

However, in general, existing stormwater management plans and policies, and State Water Board requirements, which implement federal Clean Water Act requirements, would prevent these potential impacts from rising to a level of significance under CEQA through requirements that minimize the creation of pollution generating surfaces. Clean Water Act Section 402 NPDES MS4 Permit, which covers Redwood City, require stormwater management plans, which in turn require source and treatment control measures. As part of the NPDES program to reduce the severity of impacts, stormwater drainage control/Low Impact Design (LID) measures would be required as standard conditions of approval and building permit application submittals, along with compliance with RWQCB Municipal Regional Stormwater Permit Order No. R2-2011-0083 (amendment to original Order No. R2-2009-0074) Provision C.3 (Provision C.3).

As required by Provision C.3, for new development that would introduce or replace 10,000 square feet of new impervious surfaces, a project applicant would be required to incorporate LID strategies, such as stormwater reuse, onsite infiltration, and evapotranspiration as initial stormwater management strategies. Secondary methods that could be incorporated include the use of natural, landscape based stormwater treatment measures, as identified by Provision C.3. Stormwater treatment measures may also be required in the final design plans in accordance with local stormwater management plans. The treatment measures may vary from “local” improvements at individual building sites to “area wide” concepts such as stormwater treatment wetlands with large open space areas. Treatment control measures may include use of vegetated swales and buffers, grass median strips, detention basins, wet ponds, or constructed wetlands, infiltration basins, and other measures. Filtration systems may be either mechanical (e.g., oil/water separators) or natural (e.g., bioswales and settlement ponds).

In addition, Redwood City has adopted the Redwood City Stormwater Management and Discharge Control Program (SMDCP) which includes drainage control requirements such as exempted activities (e.g., NPDES permitted discharges), broad watercourse protection objectives, illicit discharge prohibitions, and BMPs for new and redevelopment projects.

Adherence to stormwater control measures as a part of the Municipal Regional NPDES stormwater permit and the City’s SMDCP would minimize the water quality impact to a less-than-significant level by requiring all proposed development to include stormwater design measures that protect water quality.

Mitigation: None Required

Impact HYD-2.SP: Development under the Specific Plan could 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 (Criteria b). (Less than Significant)

The Plan area includes a mix of pervious and impervious surfaces. Implementation of the proposed Plan would result in potential changes and may even increase impervious surfaces across the Plan Area, potentially reducing the infiltration of stormwater runoff that currently provides groundwater recharge. However, the Plan Area is located in an area close to the Bay where the underlying groundwater resources are not accessed for water supply purposes mainly due to the brackish water quality.

Regardless, as new development occurs, on-site drainage plans would be designed to retain, capture and convey increased runoff in accordance with the city design standards and Municipal Regional NPDES permit requirements that include Provision C.3 site control features. These requirements generally require the use of LID features such as vegetated swales, permeable paving, use of landscaping for infiltration, and other measures that would retain runoff as much as possible and allow for onsite infiltration. As a result, storm water flows generated from new development associated with the project would minimize the amount of stormwater discharge offsite as much as possible. In addition, stormwater detention that would be implemented as part of the project would encourage groundwater recharge and help to offset the effects of impervious surfaces. As a result, the potential impact of the increased impervious surfaces would be less than significant.

Therefore, considering the absence of use of the underlying groundwater for water supply, and the drainage control requirements which include measures to encouragement onsite infiltration, development associated with the Plan would not substantively reduce the aquifer volume or lower the local groundwater level. The potential impact is less than significant.

Mitigation: None Required

Impact HYD-3.SP: Development under the Specific Plan would potentially alter the drainage pattern of the site such that it would result in substantial erosion or siltation on or off the site. (Criteria c and d). (Less than Significant)

As mentioned above, the development associated with the Specific Plan would result in a change of drainage patterns and could create new impervious surfaces that could increase the amount of surface run-off if not managed appropriately. Concentrated runoff could cause erosion of exposed soils resulting in sedimentation and siltation of discharge flows on- or off-site. However, the proposed development associated with the Plan would all be constructed in accordance with local, regional and state drainage control requirements that include LID measures such as vegetated swales, permeable paving, use of landscaping for infiltration, detention basins, and other measures that would limit the ability of stormwater pollutants to be discharged offsite. The new development would include design standards consistent with local requirements and a Storm Water Management Plan as required by the NPDES MS4 permit which has pollutant source control features such as use of landscaped areas for infiltration of stormwater, permeable paving, and treatment planters. The City of Redwood City has drainage standards which require detention of stormwater in order to control runoff rates which in turn reduces the potential to cause erosion

or siltation. Implementation of these design features in accordance with drainage control requirements have proven effective in controlling erosion potential and minimizing transport of siltation on or off site. Therefore, changes to the drainage patterns would not result in substantial erosion or siltation and the potential impact is considered less than significant with adherence to stormwater control measures as a part of the Municipal Regional NPDES stormwater permit.

Mitigation: None required.

Impact HYD-4.SP: Development under the Specific Plan would potentially increase runoff and result in flooding on- or off-site. (Criteria e). (Less than Significant)

Existing land uses at the project site consist of open space, abandoned improvements and structures. Implementation of the Specific Plan would result in new development that could potential result in increases in impervious surfaces. In turn, any substantive increase in impervious surface area would result in an increase in peak flows in downstream drainage infrastructure, potentially exacerbating existing or creating new flooding problems.

In order to accommodate post-development increases in runoff from new development in the Plan Area, each project would be required to develop a drainage plan that must comply with the City's drainage design standards and the requirements of the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP) which include requirements for flow control. The City's drainage design standards require that project drainage infrastructure be designed to adequately convey all runoff from peak storm events. Any potential increases in stormwater runoff resulting from additional impervious surfaces must be detained to ensure peak flows do not result in flooding onsite or create problems downstream. Site specific hydrologic analysis for proposed development would be required to determine peak flow calculations and provide drainage control improvements that can adequately manage peak flows. The City's current engineering standard requires the conveyance of the 100-year design storm flows in the City's pipe system with 0.5 feet of freeboard to the gutter flow-line (GFL). The proposed storm drainage improvements that would be implemented would be designed to accommodate the 100-year design storm flow as is currently required and any amendments to current criteria that may become applicable to proposed facilities.

Mandatory compliance with the City's drainage design standards, STOPPP and NPDES requirements, as required by law, would ensure that proposed improvements include drainage control features such as detention basins and features that promote onsite infiltration such that project-related increases in peak runoff would be considered less than significant.

Mitigation: None required.

Impact HYD-5.SP: Development facilitated by the Specific Plan would potentially exceed the capacity of existing or planned stormwater infrastructure. (Criteria e). (Less than Significant)

As noted above in the Setting section, there are four existing storm collection systems within the Plan Area. Each system discharges into Steinberger Creek. One of these two systems directs gravity flow into the Oddstad Pump Station located adjacent to the north side of Highway 101. The storm waters from the Oddstad station are pumped through a 39 inch pipe within the Inner Harbor Area where they discharge into Steinberger Creek. The second drainage area is directed through gravity lines into an existing wetland area along the east loop of Maple Street, which then connects to the K-Mart Pump Station at the edge of Steinberger Creek. A recent analysis of the existing drainage system noted that existing facilities are sufficient for a 10-year event but would need to be improved to accommodate a 100-year flow with implementation of the Plan (West Yost, 2015). Therefore, development associated with the Plan would connect to the existing infrastructure onsite with increased capacities and the sizing and design of the infrastructure would be required to meet these City minimum standards, including NPDES Provision C.3 requirements for capacity minimum as well as the City's SMDCP and the County's STOPPP. As a result of adherence to these drainage control requirements, there would be a less- than-significant impact related to the capacity to convey high storm events.

Mitigation: None required.

Impact HYD-6.SP: Development under the Specific Plan would potentially place housing or other structures within the 100 year flood plain. (Criteria g and h). (Less than Significant)

As mentioned above, according to FEMA FIRM maps, the Plan Area includes areas that are located within the 100 year flood hazard area. Development, including residential units, could be exposed to flooding hazards if not designed appropriately. The City of Redwood City's Municipal Code, Chapter 41 Floodplain Management, requires that uses vulnerable to floods be protected against flood damage at the time of initial construction. The code requires that finished floors of structures be above the 100 year base flood elevation. According to Chapter 41, new residential construction shall have the lowest floor, including basement, elevated to or above the base flood elevation. Upon completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, and verified by the City's Building Inspector to be properly elevated, with certification and verification provided to the Floodplain Administrator. The base flood elevation for the Plan area has been determined to be 10 feet above the North American Vertical Datum of 1988 (NAVD 88). Grading activities associated with implementation of the Specific Plan would include raising the ground level at least one foot above the Effective FEMA 100-year still water elevation of 10.0 feet (NAVD88) in the San Francisco Bay. Other grading improvements including raising the elevation of Blomquist Street just west of the Union Pacific Railroad and raising the elevation of the areas that could be exposed to the future sea level inundations (discussed further below) would also be effective in ensuring that future improvements are not susceptible to adverse effects related to flooding.

Therefore, implementation of grading which would increase ground elevations above flood hazard levels and adherence to Municipal Code requirements, would ensure that housing or other structures would have less than significant impacts related to development within the 100-year flood plain.

Mitigation: None required.

Impact HYD-7.SP: Development facilitated by the Specific Plan could expose people or structures to a significant risk of loss, injury or death involving inundation as a result of sea level rise. (Criteria i, sea level rise). (Less than Significant)

Potential Risk and Adaptation Approaches

The sea level rise projections may expose people and structures that would be developed under the Specific Plan to significant risk. A three foot rise in sea level could lead to more than half the land in the Plan Area subject to daily inundation (see Figure 4.8-1 in this section). In addition to the anticipated three feet of sea level rise, ongoing FEMA flood map updates are anticipated to increase the base flood elevation⁴ in the Specific Plan Area by up to two feet for year 2016.

To ensure resiliency and address this potential environmental effect, the proposed Specific Plan utilizes an adaptation approach that incorporates two distinct, yet compatible strategies: managed retreat and mitigation, both discussed further below.

Rationale

The basis for the proposed adaptation approach described in the Inner Harbor Specific Plan follow State guidance and consider the following rationales:

- Timeframe – Accommodate a rise in sea level of three feet by 2100. Under the possible scenario that SLR is more rapid, three feet of rise could occur by 2075. Given general building assumptions, this is consistent with the expected lifespan of development on the scale of the Inner Harbor Specific Plan.
- Adaptive capacity – Substantial buildings and infrastructure typically have limited and/or costly options for future adaptation to sea level rise. Hence, the Specific Plan calls for new construction and significant improvements to accommodate three feet of sea level rise at the outset. For features with more adaptive capacity, such as open space and floating homes, the adaptive capacity can be addressed more readily in the future when sea level rise has occurred.
- Risk tolerance – Risk tolerance for structures is articulated by the flood insurance process, most notably FEMA’s National Flood Insurance Program, which calls for design at the 100-year return interval, which means there would be a one percent chance of flooding

⁴ “Base flood elevation” is the elevation at which a building has a one percent chance of flooding annually.

annually. The Specific Plan forecasts societal risk tolerance forward by adding three feet to the 100-year base flood elevation.

Geographical Scope

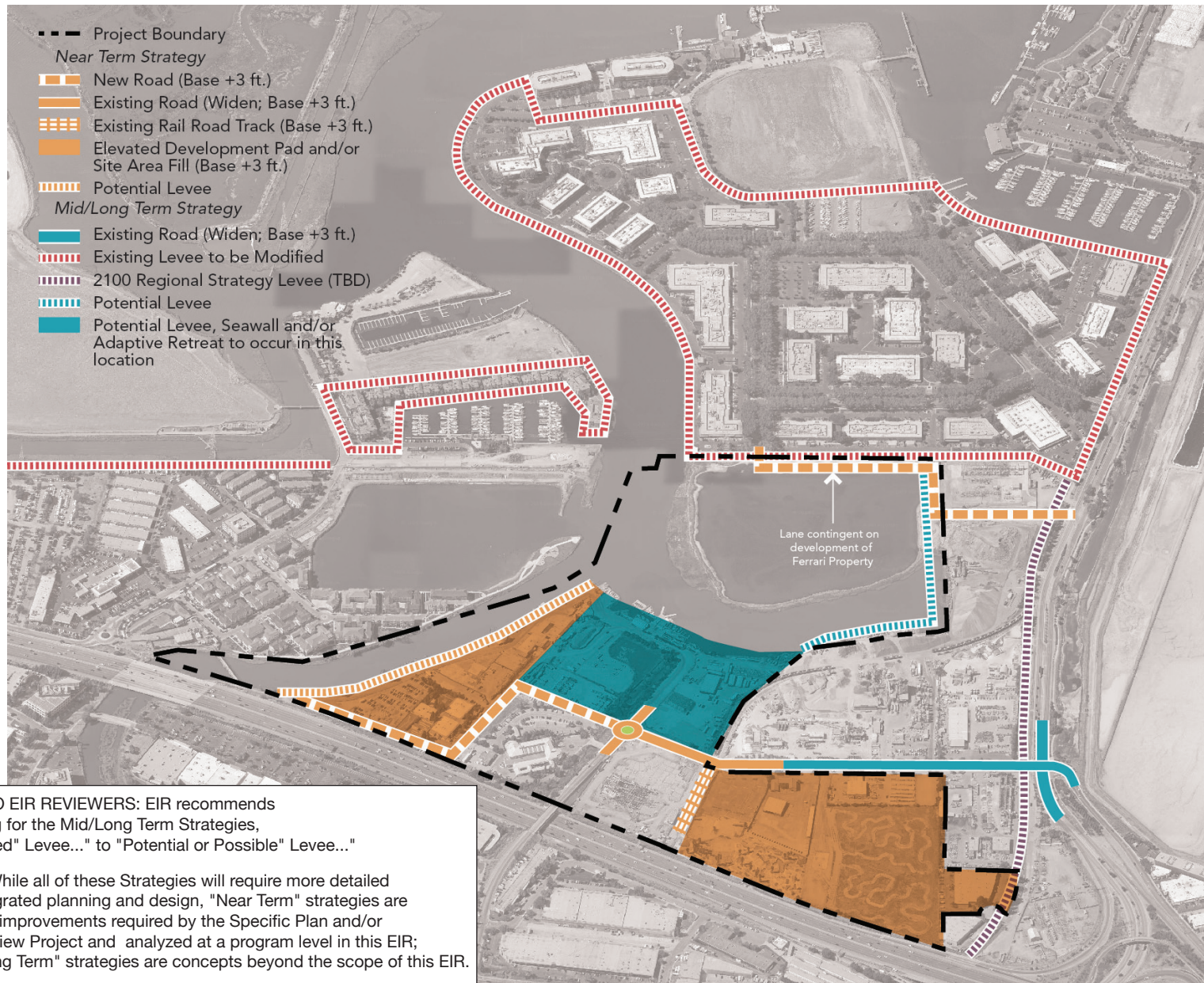
The geographical scope of the sea level rise adaptation approach for the Specific Plan includes each land use designation within the Specific Plan Area individually, as well as the Specific Plan Area as a whole. As sea level rise occurs, Redwood City will need to create citywide adaptation strategies. Implementation of the future citywide strategy will need to tie in to and be compatible with the adaptation approach for the Inner Harbor Specific Plan Area. While the proposed adaptation strategy specifically applies to the Specific Plan Area, it also serves as a basis for future sea level rise discussions and standards citywide. As adaptation and engineering methods evolve, strategies related specifically to the Specific Plan may also evolve.

Adaptation Approach

A key tenant of the Specific Plan's sea level rise adaptation strategy is a Plan-wide approach that specifies land use designations and associated development standards providing for long term managed retreat from the shoreline. Managed retreat requires that dense development be set back to avoid greater risks along the shoreline, thus preserving the shoreline's adaptive capacity for long-term flood management measures such as restoration, a levee, or a combination of measures. The Specific Plan consolidates dense development zones in inland areas, allowing the lands nearest the bay (also known as "outboard" areas) to remain devoted to wetlands restoration and water-dependent uses.

New and substantially improved roads, infrastructure, and land-based developments are proposed to be located at higher elevations that anticipate three feet of future sea level rise. Most Specific Plan Areas that are located adjacent to waterways are zoned for open space (OS) and wetlands restoration or Water Dependent Development (WD), which would contain small structures (that incorporate sea level rise adaptation features) and facilitate public access to the water.

The Specific Plan's approach also recognizes that development features vary in their timeframe, adaptive capacity, and risk, and that three feet of sea level rise will take decades to occur. Thus, the adaptation approach assumes three phases: near-term (next decade), mid-term (mid-century), and long-term (end of century). **Figure 4.8-2** delineates the proposed sea level rise adaptation measures times and timeframes. (Timeframes for specific measures are described further in Table 4.8-1 further below.) Near-term (next decade) adaptations accommodate sea level rise at the parcel-scale with both managed retreat and mitigation and in addition to the Plan-wide managed retreat approach. Mid-term (mid-century) adaptation strategies are a range of options that would evolve for future consideration. These are focused on portions of Blomquist Street between the western end of Inner Harbor-2 (IH-2) and Seaport Boulevard, as well as mitigation approaches along Redwood Creek, Steinberger Slough, and outboard areas to form a levee, seawall, and/or floodwall. Long-term (end of century) adaptation strategies are long-term scenarios to address actual sea level rise reaching or exceeding three feet, specifically future utilization of Open Space-L (OS-L). Adaptation measures implemented in earlier phases would consider the implications of these measures for the adaptive capacity of later phases.



SOURCE: MIG, 2015

Inner Harbor Specific Plan . 130467

Figure 4.8-2
Sea Level Rise Strategy and Timing

Required Adaptation Measures

Section 4.6.1 of the draft Specific Plan specifies development standards that are required sea level rise adaptation measures to which all new land-based buildings and land-based substantial improvement projects constructed pursuant to the Inner Harbor Specific Plan shall be designed to show long-term resilience to sea level rise of three feet above base flood elevation (of 2016), and thereby avoid and/or reduce potential environmental effects of persons and structures subject to effects of sea level rise. As discussed in Chapter 3, *Project Description*, the required and near-term development improvement strategies are factored into the environmental analyses in this EIR; other potential and mid-/long-term improvements remain conceptual and are address programmatically, as feasible.

Required Approaches

Required development approaches are (1) managed retreat, and (2) fill. Fill is a required mitigation approach.

1. **Managed Retreat Approach:** Provide for a phased conversion of the outboard portions of any project area to tidal marsh. To provide flood protection for inland areas, mitigation will be needed to support the managed retreat approach including the use of levees or fill with flatter slopes (minimum 20:1) to provide transitional habitat and levee scour protection. The Specific Plan identifies the need for a specific near term structure along Redwood Creek and IH-2.
- 2.a **Mitigation Approach – Fill:** Place fill to raise the existing grade of the project area to an elevation that accommodates three feet of sea level rise. A structure's lowest floor shall be built at or above the new grade. When the outboard edge of the fill approaches the shoreline, it shall be graded at a slope of 20:1 and shall be restored to tidal action with tidal marsh and native uplands vegetation on the outboard slope.

Other Approaches

Other development approaches that could be implemented in or near the Specific Plan Area shall require evidence that managed retreat of outboard areas and fill for inboard areas (discussed above as the *Required Approaches*) are infeasible options. Other development approaches in the Inner Harbor Specific Plan are described below and shall also require the applicant to prepare an engineering study that concludes such approach will similarly reduce flood hazard to development from a three-foot rise in sea level added to the 100-year base flood elevation of 2016. Any flood hazard reduction approach shall also ensure continued public access to the waterfront. These "other" approaches include the following:

- 2.b **Mitigation Approach – Levees and Seawalls:** – Construct levees and/or seawalls according to FEMA accreditation standards and the 100-year base flood elevation plus three feet of sea level rise. Any new portion of a levee above existing grade shall be sloped at least 10:1. Scour protection shall be vegetation rather than riprap, where possible. Floodwalls may be used on top of a levee to provide additional protection. Structures wholly protected by a FEMA-accredited levee and/or seawall system do not have a specified elevation for the lowest floor.

2.c Mitigation Approach – Floodproofing: Non-residential buildings may be designed to minimize flood impacts by elevating the lowest floor of buildings or enabling tethered floating structures. For land-based development, floodproofing is not a stand-alone option.

Table 4.8-1 (same as Specific Plan Table 4.6-1) specifies each required sea level rise adaptation measure(s) for each land use designation in the Specific Plan. For each measure, the implementation phase or phases (timeframes) are noted.

**TABLE 4.8-1
SEA LEVEL RISE ADAPTATION MEASURES**

Land Use Designation	Sea Level Rise Adaptation Measures	Implementation Phases
Inner Harbor-1 and Inner Harbor-2	City Preference: Raise entire site’s elevation equal to or above the 100-year base flood elevation plus three feet of sea level rise. Space between the existing grade and lowest floor can be filled with earth or remain as crawlspace.	N
	Alternative: Raise the existing grade just within structures’ footprint or more broadly to include larger portions of development sites. This alternative could be considered on a project-by-project basis, evaluating factors such as proposed land uses, construction types, on and off-site public improvements and infrastructure, and site access, among other factors.	
	Also see OS-T and OS-W regarding near-term managed retreat with a perimeter levee/sea-wall prior to development of IH-1	
	Consideration of future fill placement, should be incorporated when implementing either of the two options to ensure for adaptive capacity by providing for transitions to future elevations of adjacent properties (notably Blomquist Street), and stormwater management.	N, M
Water Dependent Development-1	Non-residential structures may have lowest floor below the 100-year base flood plus three feet of sea level rise, if this floor is fully enclosed and watertight. Space that is only partially enclosed must be wet floodproofed, and used only for building access, parking, and/or storage.	N
	If a building’s total floor area is less than 200 square feet or the building is designed such that the building can be raised to 100-year based flood elevation plus three feet of sea level rise for not more than one quarter of its assessed value, then the lowest floor need only be at or above the current FEMA base flood elevation.	N, M, L
	Build docks and over-water walkways to accommodate three feet of sea level rise.	N, M
Water Dependent Development-2	Build docks to tether floating homes that can rise with floodwaters and provide utilities and access to accommodate the 100-year base flood elevation plus three feet of sea level rise.	N, M
	If a building’s total floor area is less than 200 square feet or the building is designed such that the building can be raised to 100-year base flood elevation plus three feet of sea level rise for not more than one quarter of its assessed value, then the lowest floor need only be at or above the current FEMA base flood elevation.	N, M, L
	To extent feasible, focus development away from Open Space-Wetland (OS-W) to minimize impacts on that area’s function as restored wetlands.	N

Land Use Designation	Sea Level Rise Adaptation Measures	Implementation Phases
Maple Street and Blomquist Street	The minimum elevations for Maple Street and the new Blomquist Street right-of-way, as well as existing portions east of its intersection with Maple Street to transition back to existing street grade along the frontage Inner Harbor-2, will be base flood elevation plus three feet for sea level rise.	N
	If determined to be necessary as part of future adaption strategies, most likely because Citywide measures are not fully implemented, raise the remaining eastern portion of Blomquist Street from Inner Harbor-2 to Seaport Boulevard to base flood elevation plus three feet for sea level rise.	M,L
Public Facilities	Public buildings should develop sea level rise adaptation plans that do not rely upon flood management from other elements, e.g. an outboard certified levee. At a minimum, the plan should maintain the lowest floor at or above the 100-year base flood elevation as this elevation is revised upward.	N, M
	Parking and landscaped areas should be raised with fill to reduce flooding frequency and transition to adjacent property, notably Blomquist Street and Inner Harbor-2.	N, M
Open Space – Tidal (OS-T) and Open Space-Wetland (OS-W)	Retreat from existing levees to breach site to full range of Bay tides to restore hydraulic and sediment connectivity. Develop restoration design such that site's expected evolution is the development of vegetated tidal marsh in approximately two to four decades.	N
	A perimeter levee/seawall will be needed to support managed retreat approach in proximity to IH-1, and be implemented prior to development of IH-1 (shown in Figure 4.8-2).	
	As rates of sea level rise increase in the second half of the century, continue to monitor habitat evolution and manage as appropriate to sustain vegetated tidal marsh.	M
	Build any infrastructure for education or public access at elevations that can accommodate three feet of sea level rise.	N, M
Open Space-Land (OS-L)	Non-residential structures may have lowest floor below the 100-year base flood plus three feet of sea level rise, if this floor is fully enclosed and watertight. Space that is only partially enclosed must be wet floodproofed, and used only for building access, parking, and/or storage.	N
	If a building's total floor area is less than 200 square feet or the building is designed such that the building can be raised to 100-year base flood elevation plus three feet of sea level rise for not more than one quarter of its assessed value, then the lowest floor need only be at or above the current FEMA base flood elevation.	N, M, L
	Open space has adaptive capacity for managed retreat, fill, levees, floodwalls, and/or seawalls in the future, so initial development of recreation fields and trails may stay at existing grade. Preserving adaptive capacity of these areas should be considered during planning and design.	N, M, L

NOTES:
 Implementation Phases are Near-term (N), Mid-term (M), and Long-term (L).

Other specific development standards include Section 4.6.2.A of the Specific Plan, which sets creek setback standards. Specifically, buildings shall be set back 60 feet from the edge of Redwood Creek and Steinberger Slough, as measured at mean high tide as generally evidenced in July 2015 (This required setback shall not apply to water-dependent uses).

Therefore, all development associated with the Specific Plan would require implementation of these near-term adaptation strategies of managed retreat approach and placement of fill that raises the grade for placement of new structures or project sites to accommodate an additional three feet of sea level rise added to the 100-year base flood elevation of 2016. In addition, a levee or seawall is required in the near-term along Redwood Creek in combination with these approaches to ensure adequate adaptation of future development on IH-1 district. The impact would be less than significant.

While not required given the scope of this EIR, other mid- and long-term approaches involving the construction of seawalls and levees as well as floodproofing buildings – subject to specific study, conditions, and findings – could combine to further reduce the potential impact of sea level rise in the Plan Area to less than significant levels.

Mitigation: None required.

4.8.6 Project-Level Impacts of the Harbor View Project

Impact HYD-1.HV: Development of the Harbor View Project could violate water quality requirements or waste discharge requirements (Criteria a). (Less than Significant)

Construction

As discussed for the Specific Plan above, project construction would require earthwork activities that would include disturbance of surface vegetation, grading, excavation of soils, and the placement of imported engineered soils on the project site. During construction, existing impervious surfaces and established ground cover that serves to stabilize site soils would be removed, potentially resulting in increased erosion and sedimentation.

However, construction activities would be required to comply with NPDES General Construction Activities Permit requirements. The project applicant would be required to prepare a SWPPP for General Construction Activities to reduce potential impacts to surface water quality during construction. The erosion control and storm water quality BMPs that would be employed to minimize pollutants in storm water runoff would be effective in preventing the discharge of NPDES pollutants to downstream waters. Project compliance with NPDES General Construction Activities Permit requirements are required by law and have proven effective in protecting water quality at construction sites. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment

monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Implementation of the SWPPP at the project site would prevent significant construction-related impacts to water quality by ensuring that all construction activities include the implementation of BMPs that minimize the offsite discharge of sedimentation and other pollutants.

Operation

Development associated with the project would result in changes in the amount of impervious surfaces within the Plan area. Any increase in the amount of impervious surfaces would have the potential to generate additional stormwater pollution in runoff during storm events. However, the proposed project would actually result in a net decrease in the amount of impervious surfaces. Under existing conditions, the pervious area of the site is approximately 278,779 square feet (sf) and the impervious area is 794,104 sf. The proposed project would increase pervious surfaces to 366,087 sf and reduce impervious surfaces to 706,796 sf which would represent an eight percent increase in pervious surfaces (BKF, 2015). The decrease in the amount of impervious surface has the potential to reduce stormwater pollution in runoff during storm events. The addition of pervious areas, would also act towards reducing stormwater flows and potentially allowing for more stormwater to infiltrate onsite.

Regardless, the proposed improvements would be required to incorporate LID strategies, such as stormwater reuse, onsite infiltration, and evapotranspiration as initial stormwater management strategies, as identified by Provision C.3. Stormwater treatment measures may also be required in the final design plans in accordance with local stormwater management plans. Treatment control measures may include use of vegetated swales and buffers, grass median strips, detention basins, wet ponds, or constructed wetlands, infiltration basins, and other measures. Filtration systems may be either mechanical (e.g., oil/water separators) or natural (e.g., bioswales and settlement ponds).

In addition, Redwood City has adopted the Redwood City Stormwater Management and Discharge Control Program (SMDCP) which includes drainage control requirements such as exempted activities (e.g., NPDES permitted discharges), broad watercourse protection objectives, illicit discharge prohibitions, and BMPs for new and redevelopment projects.

Adherence to stormwater control measures as a part of the Municipal Regional NPDES stormwater permit and the City's SMDCP would minimize the water quality impact to a less-than-significant level.

Mitigation: None Required

Impact HYD-2.HV: Development of the Harbor View Project could 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 (Criteria b). (Less than Significant)

The proposed project does not require the extraction or importation of any groundwater supplies to meet water supply demand for the project. The City of Redwood City does not access local groundwater supplies due to poor water quality and according to its 2010-2030 Urban Water Management Plan has no plans to in the future (Redwood City, 2015). As noted above, the proposed project would actually result in a net decrease in the amount of impervious surfaces within the Plan area. The net eight percent increase in pervious surfaces would allow for greater potential onsite infiltration of stormwater runoff (BKF, 2015).

In addition, on-site drainage plans would require the use of LID features such as vegetated swales, permeable paving, use of landscaping for infiltration, and other measures that would retain runoff as much as possible and allow for onsite infiltration. As a result, storm water flows generated from new development associated with the project would minimize the amount of stormwater discharge offsite as much as possible. In addition, stormwater detention that would be implemented as part of the project would encourage groundwater recharge and help to offset the effects of impervious surfaces. As a result, the potential impact of the increased impervious surfaces would be less than significant.

Mitigation: None Required

Impact HYD-3.HV: Development of the Harbor View Project would potentially alter the drainage pattern of the site such that it would result in substantial erosion or siltation on or off the site. (Criteria c and d). (Less than Significant)

As mentioned above, the development of the project would result in a net increase of pervious surfaces which could reduce the amount of stormwater flows generated onsite. Concentrated runoff, though, could still cause erosion of any exposed soils if the drainage plan is not designed appropriately. However, similar to what is described above for the Plan implementation, the proposed project would be required to adhere to local, regional and state drainage control requirements that include LID measures such as vegetated swales, permeable paving, use of landscaping for infiltration, detention basins, and other measures that would limit the ability of stormwater pollutants to be discharged offsite. The project would include design standards consistent with local requirements and a Storm Water Management Plan as required by the NPDES MS4 permit which has pollutant source control features such as use of landscaped areas for infiltration of stormwater, permeable paving, and treatment planters. The City of Redwood City has drainage standards which require detention of stormwater in order to control runoff rates which in turn reduces the potential to cause erosion or siltation. Implementation of these design features in accordance with Provision C.3 NPDES drainage control requirements have proven effective in controlling erosion potential and minimizing transport of siltation on or off site. Therefore, with a net increase in pervious surfaces and adherence to drainage control requirements, the potential impact is considered less than significant.

Mitigation: None Required.

Impact HYD-4.HV: Development of the Harbor View Project would potentially increase runoff and result in flooding on- or off-site. (Criteria e).(Less than Significant)

As described above, the proposed project would reduce the amount of impervious surfaces at the site and as a result would decrease the amount of runoff from the site. Regardless, the project would still be required to develop a drainage plan that complies with the City's drainage design standards and the requirements of the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP) and Provision C.3 NPDES requirements which include requirements for flow control. The City's drainage design standards require that project drainage infrastructure be designed to adequately convey all runoff from peak storm events. Site specific hydrologic analysis for the proposed development would be required to determine peak flow calculations and ensure that drainage control improvements that can still adequately manage peak flows. The project includes improvements to the existing infrastructure and may include the relocation of a 33 inch storm drain pipe which is replaced with a 36 inch pipe thus increasing full flow capacity in accordance with City requirements and approval. The drainage improvements would be consistent with the storm drainage system analysis by West Yost in 2015 (West Yost, 2015). Therefore, considering the net decrease in impervious surfaces and drainage control requirements that would be included into project design, the proposed project would have a less than significant impact related to potential flooding from any increase in runoff.

Mitigation: None Required.

Impact HYD-5.HV: Development of the Project would potentially exceed the capacity of existing or planned stormwater infrastructure. (Criteria e). (Less than Significant)

As noted above, the proposed project would reduce the amount of impervious surfaces at the project site and as a result would produce less runoff compared to existing conditions. In addition, the project plans could include relocation of an existing 33 inch storm drain pipe and replacement with a 36 inch pipe but improvements would be consistent with City approval and the 2015 West Yost report findings (West Yost, 2015). The full flow capacity change from this particular pipe replacement would change from 37 cubic feet per second (cfs) up to a capacity of 43 cfs (BKF, 2015). Therefore, development of the project would connect to existing infrastructure onsite with some increased capacities and design of the infrastructure would be required to meet minimum standards, including the City's Stormwater Management and Discharge Control Program (SMDCP). As a result of these proposed improvements and adherence to existing drainage control requirements, there would a less- than-significant impact related to the capacity to convey high storm events.

Mitigation: None Required.

Impact HYD-6.HV: Development of the Harbor View Project would potentially place housing or other structures within the 100 year flood plain. (Criteria g and h). (Less than Significant)

According to FEMA FIRM maps, the westerly portion of the site is located within Zone X, defined as the 500-year flood area or 100-year flood zone with flood depths of less than one foot, and the easterly portion is located within Zone AE, which is considered the 100-year flood hazard zone includes areas that are located within the 100 year flood hazard area. Development, including residential units, could be exposed to flooding hazards if not designed appropriately. The City of Redwood City's Municipal Code, Chapter 41 Floodplain Management, requires that uses vulnerable to floods be protected against flood damage at the time of initial construction. The code requires that finished floors of structures be above the 100 year base flood elevation. According to Chapter 41, new residential construction shall have the lowest floor, including basement, elevated to or above the base flood elevation. Upon completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, and verified by the City's Building Inspector to be properly elevated, with certification and verification provided to the Floodplain Administrator. The base flood elevation for the project site has been determined to be 10 feet above the North American Vertical Datum of 1988 (NAVD 88). Grading activities associated with the project would include raising the ground level of finished floor elevations at least one foot above the Effective FEMA 100-year still water elevation of 10.0 feet (NAVD 88) plus an additional three feet to accommodate anticipated future sea level rise. The Specific Plan Standard 4.6.1[2] also provides for developments to raise an entire project area elevation 3 feet above current BFE. Therefore, with implementation of grading and finished floor elevations which would increase ground elevations above flood hazard levels in accordance with the minimum standards of Municipal Code requirements and accommodating future sea level rise increases, the construction of the project would have less than significant impact related to development within the 100-year flood plain.

Mitigation: None required.

Impact HYD-7.HV: Development of the Project could expose people or structures to a significant risk of loss, injury or death involving inundation as a result of sea level rise. (Criteria i, sea level rise) (Less than Significant)

As stated above, global warming trends are causing sea levels to rise at rates that are accelerating. Over time, rising sea levels will cause more noticeable changes to shorelines and change shoreline flood hazard areas. Project designs call for adding three feet of height above flood zone requirements to finished floor elevations to account for future sea level increases. As a result, at minimum the finished floor elevations would be at 14 feet NAVD88. Current conditions have

ground elevations that range from 6.5 to 12 feet NAVD88. According to a mapping tool compiled by the National Oceanic and Atmospheric Administration (NOAA), the project site under its current grading would only begin to see encroachment of inundation on the east and west borders of the site when sea level rise reaches approximately 4 feet (NOAA, 2015). Therefore, with the additional fill placement raising finished floor elevations at minimum 2 feet above the current highest point would allow for considerable sea level rise to occur. As previously mentioned, Specific Plan Standard 4.6.1[2] also provides for developments to raise an entire project area elevation 3 feet above current BFE. According to estimates used by the San Francisco Bay Conservation Development Commission, sea level rise projections, range from 10-17 inches at mid-century and 31-69 inches at the end of the century (SFBCDC, 2015). Therefore, considering the proposed increase in grading and projected sea level rise levels, it could be closer to 100 years before the rise in sea levels

4.8.7 Cumulative Impacts

Impact HYD-1.CU: Construction activity and operations for the development under the Specific Plan and/or the Harbor View project in combination with past, present, existing, approved, pending, and reasonably foreseeable future projects in the vicinity of the Plan Area and Harbor View project site, would not contribute considerably cumulative impacts to hydrology and water quality. (Less than Significant)

Implementation of the proposed plan, together with past present and other reasonably foreseeable future projects in the vicinity could cumulatively increase stormwater runoff and pollutant loading to the Bay. Development associated with the proposed plan and other current and future projects in the vicinity would be required to comply with current construction, drainage and grading requirements intended to control runoff and regulate water quality at each site. Additionally, new projects would be required to demonstrate that stormwater volumes could be managed by stormwater conveyance facilities designed to control onsite stormwater flows. New development projects in Redwood City also would be required to comply with City of Redwood City ordinances regarding water quality including MS4 NPDES permitting requirements. All construction work and dredging activities within Redwood Creek and surrounding areas would require permits from the U.S. Army Corps of Engineers and San Francisco Bay RWQCB which require all activities to minimize adverse effects to water quality. Therefore, the effect of the project on water quality and hydrology, in combination with other cumulative projects, would not be significant.

Implementation of the proposed plan, together with past present and other reasonably foreseeable future projects in the vicinity, could also expose people and/or property to flooding from a 100-year event and sea level rise. These effects could occur through increases in stormwater runoff volumes that overwhelm drainage infrastructure or during high tide in a 100-year storm event along with sea level rise in the Bay. The proposed project and other future projects in the vicinity would be required to comply with flood control requirements intended to provide flood protection. Additionally, new projects would be required to demonstrate that stormwater volumes could be managed by stormwater conveyance facilities designed to control onsite stormwater flows. New development projects in Redwood City also would be required to comply with San

Mateo County and City of Redwood City flood control requirements. As discussed above, the proposed project itself would involve structural measures designed to convey stormwater flows through improvements to existing infrastructure to ensure adequate capacity at high tides in a 100-year storm event combined with sea level rise. Therefore, the project, in combination with other cumulative projects, would not result in a significant cumulative impact to people and/or property from a 100-year event in combination with sea level rise. The project would have a less than cumulatively considerable impact, and cumulative effects, therefore, would be less than significant.

References – Hydrology and Water Quality

- Association of Bay Area Governments (ABAG), Dam Failure Inundation Hazard Map for Redwood City, available at <http://www.abag.ca.gov/cgi-bin/pickdamx.pl>, 2003.
- BKF Engineers, *Utility Report, Harbor View, Redwood City*, April 1, 2015.
- City of Redwood (1986). *City, Sewer, Storm Drain, and Water Master Plan*, prepared by Kennedy Jenks, 1986.
- City of Redwood City (2010). *New General Plan Draft EIR – Hydrology and Water Quality, Section 4.8.*, http://www.redwoodcity.org/phed/planning/eir/pdf/gp/4.8_Hydrology_and_Water_Quality.pdf, May 2010.
- City of Redwood City (2010), *Redwood City Downtown Precise Plan*, August 2010.
- City of Redwood City (2012) *Stanford in Redwood City Precise Plan Draft Environmental Impact Report*, prepared by Wagstaff/MIG, February 24, 2012.
- City of Redwood City, Public Works Department, *Water Supply Assessment, Proposed Inner Harbor Specific Plan*, July 23, 2015.
- Federal Emergency Management Agency (FEMA), *Flood Insurance Rate Map (FIRM), San Mateo County, Panels 06081C0301E and 06081C0302E*, October 16, 2012.
- Fusco Engineering (2013). *Inner Harbor Precise Plan Draft Technical Memorandum*. Revised February 10, 2014.
- Intergovernmental Panel Climate Change (IPCC), *Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis, Summary for Policy Makers*, September 27, 2013.
- National Academy of Science National Research Council (NRC, 2012).
- National Flood Insurance Program (2012), *Flood Insurance Rate Maps, San Mateo County and Unincorporated Areas, #06081C0301E and #06081C0302E*, October 16, 2012.
- National Oceanic and Atmospheric Administration (NOAA), *Sea Level Rise and Coastal Flooding Impacts Webtool*, accessed May 14, 2015.
- (Ocean Protection Council, 2013)
- Port of Redwood City. *Wharves 1 and 2 Redevelopment Project Draft Environmental Impact Report*, prepared by ESA. March 2010.

Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, San Francisco Bay Basin Water Quality Control Plan (Basin Plan), 2007.

San Francisco Bay Conservation Development Commission (SFBCDC), *Sea Level Rise Policies Fact Sheet*, http://www.bcdc.ca.gov/planning/climate_change/SLRfactSheet.shtml, accessed May 14, 2015.

TRA Environmental Solutions. *Hazardous Materials and Risk of Upset – Environmental Issues and Options*, Appendix C - Hazardous Materials Reports. February 2014.

West Yost Associates (West Yost), *Inner Harbor Specific Plan Utilities Engineering Report*, April 2015.

US Corps, Long Term Management Strategy For the Placement of Dredged Material in the San Francisco Bay Region, Management Plan (2001), *Prepared by USACE, USEPA, BCDC, and RWQCB*, 2001.