3.9 Hydrology and Water Quality

Environmental Setting

PHYSICAL SETTING

Climate and Land Use

The City of Livermore has a Mediterranean climate, characterized as warm on summer days and cool on summer nights, and fairly wet and mild during the winter. Temperatures range from the low 50s to the high 80s during the summer and from the upper 30s to the high 50s during the winter. On average, the city receives approximately 14.53 inches of total rainfall per year, with most occurring from November through March (Western Regional Climate Center, n.d).

Land use in the Arroyo Las Positas watershed, wherein the Planning Area is located (Oakland Museum of California, n.d.), includes residential, recreation, agriculture, and open space uses. The Planning Area is located within the southwestern portion of the watershed and covers approximately 2.2 percent of the watershed. Much of the upper portion of the watershed is rangeland, farmland, or open space, although substantial land development is predicted in the future.

Surface Water Hydrology

The Arroyo Las Positas watershed is a 77-square mile watershed within the larger San Francisco Bay Watershed. Arroyo Las Positas originates at the confluence of its two major tributaries, Altamont Creek and Arroyo Seco. Arroyo Las Positas is one of the main tributaries to Alameda Creek, first draining west to Arroyo Mocho, then downstream into Arroyo de la Laguna, which drains to Alameda Creek, which drains to San Francisco Bay. Other tributaries to Arroyo Las Positas include Cottonwood Creek, Collier Canyon Creek, and Cayetano Creek. Collier Canyon Creek/channel crosses the Planning Area and drains southerly into Arroyo Las Positas adjacent to Airway Boulevard. An unnamed drainage that collects runoff on the eastern portion of the Planning Area flows south to Arroyo Las Positas just north of I-580 (San Francisco Bay RWQCB, 2007).

Arroyo Las Positas is a perennial stream, while Collier Canyon Creek is believed to be intermittent, with groundwater-fed base flow occurring from December through May. For most of the year, the upper portions of all of the creeks in the Arroyo Las Positas watershed are dry. During the dry season the primary source of water in Arroyo Seco is wastewater from the Lawrence Livermore National Laboratory, which is drained by the Zone 7 Water Agency P-1 flood-control channel (San Francisco Bay RWQCB, 2007).

The Alameda County Flood Control and Water Conservation District is responsible for sections of Arroyo Las Positas Creek within the Planning Area. Currently, Zone 7 has no capital improvement plans to modify any of these creeks. Between the Las Positas College entry and North Canyons Parkway, Collier Canyon Creek runs in a series of city-owned culverts and drainage pipes. South of North Canyons Parkway to I-580, Collier Canyon Creek runs in a natural water way through privately owned land.

Existing Drainage Patterns/Stormwater Drainage

The Federal Emergency Management Agency (FEMA) maps indicate that all waterways surrounding and through the Planning Area contain the current 100-year flood zone within their channels. Impervious surfaces in the Planning Area include major and minor roadways, areas of residential and commercial development, and areas on Las Positas College property. Storm drains serve developed areas and roadways and generally discharge into Arroyo Las Positas and Collier Creek channel, which runs through the Airway Business Park. The Planning Area ranges from nearly flat south of I-580, with slopes below 5 percent, to gently sloping on the north side of I-580, then to steeper slopes north of Portola Avenue/North Canyons Avenue, with slopes over 30 percent on some of the northwestern and northeastern slopes at the edge of the Planning Area.

The existing storm drainage system in the City of Livermore consists mostly of underground pipes and local creeks. These facilities carry runoff water within the drainage basin to nearby flood control channels and arroyos (City of Livermore, 2004). Zone 7 Water Agency of Alameda County owns and maintains the major storm drainage facilities in the Planning Area, while the City of Livermore owns the storm drain mains, collection pipes, culverts, and drainage ditches. The storm drain system consists of gravity pipe lines, predominantly made of reinforced concrete, which discharge to underground storm drain lines or man-made open channels owned by Zone 7. Collected stormwater from the Planning Area drains into the Arroyo Las Positas and flows west, eventually through Alameda Creek and ultimately to the San Francisco Bay.

Groundwater

The Planning Area is situated above the Livermore Valley groundwater basin (Basin No. 2-10). The Livermore Valley lies approximately 40 miles east of San Francisco and 30 miles southwest of Stockton within a structural trough of the Diablo Range. The groundwater basin extends from the Pleasanton Ridge east to the Altamont Hills and from the Livermore Upland north to the Orinda Upland. Surface drainage features converge on the west side of the basin to form Arroyo de la Laguna, and flows south to join Alameda Creek in Sunol Valley. Lateral movement of groundwater is restricted due to geologic structures and faults, but the general groundwater gradient is to the west, then south towards Arroyo de la Laguna. Groundwater-bearing materials are below the entire floor of Livermore Valley and portions of the upland areas. The materials consist of deposits from alluvial fans, outwash plains, and lakes. Under most conditions, the valley-fill and Livermore sediments yield adequate to large quantities of groundwater to all types of wells, with predominantly good to excellent water quality. Groundwater inflow to the groundwater basin includes natural recharge such as infiltration of rainfall and landscape irrigation (10,000 acre feet), artificial recharge (10,900 acre feet), applied water recharge (1,740 acre feet), and subsurface inflow (1,000 acre feet) (California Department of Water Resources, 2006).

Water Quality

Surface Water Quality

Water quality in a typical surface water body is influenced by processes and activities that take place within the watershed. The quality of the stormwater runoff from the Planning Area is typical of urban watersheds where water quality is affected primarily by discharges from both point and nonpoint sources. Point-source discharges are discharges that one can point to as known sources of pollutants, while nonpoint source discharges generally result from diffuse sources, such as land runoff, precipitation, or seepage. Point and nonpoint sources include outfalls, winter storms, overland flow, exposed soil, roofs, parking lots, and streets. Water quality in the vicinity of the Planning Area is directly affected by stormwater runoff from adjacent streets and properties that deliver fertilizers, pesticides, automobile and traffic pollutants (e.g., oil, grease, and metals), sediment with associated pollutants from soil erosion, trash, and other pollutants. Potential water quality issues in the Arroyo Las Positas watershed include pesticides, erosion, sedimentation, nutrients, and dissolved oxygen.

The San Francisco Bay Basin Plan (Basin Plan) specifies the beneficial uses that apply to the Planning Area, as shown in Table 3.9-1. Beneficial uses form the cornerstone of water quality protection under the Basin Plan. Once beneficial uses are designated, appropriate water quality objectives can be established, and programs that maintain or enhance water quality can be implemented to ensure the protection of beneficial uses. The designated beneficial uses, together with water quality objectives, form water quality standards.

Table 3.9-1: Beneficial Uses of Surface Waters within the Project Vicinity

Water Body	*Beneficial Uses*
Arroyo Las Positas	Groundwater recharge (GWR), cold freshwater habitat (COLD), fish migration (MIGR), preservation of rare and endangered species (RARE), fish spawning (SPWN), warm freshwater habitat (WARM), wildlife habitat (WILD), water contact recreation (REC-1), noncontact water recreation (REC-2)
Collier Canyon Creek	Preservation of rare and endangered species (RARE), warm freshwater habitat (WARM), wildlife habitat (WILD), water contact recreation (REC-1), noncontact water recreation (REC-2)

Source: San Francisco Bay Regional Water Quality Control Board, 2015. San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan). Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: February 10, 2017.

Constituents or pollutants in stormwater runoff vary with surrounding land uses, impervious surface area, and topography as well as with the intensity and frequency of rainfall or irrigation. Stormwater runoff generated at the onset of the wet season, or the "first-flush," typically contains the highest pollutant concentrations. The Planning Area is located within a developed area of the city where the majority of the ground surface is covered by pavement (roads and parking lots) and structures (office, commercial, and residential). Street surfaces are the primary source of pollutants in stormwater runoff in urban areas. Common sources of stormwater pollution in the Planning Area include construction sites, parking lots, large landscaped areas, and household and industrial sites. Grading and earthmoving activities associated with new construction can accelerate soil erosion. Grease, oil, hydrocarbons, and metals deposited by vehicles and heavy equipment can accumulate on streets and paved parking lots. From there, they are carried into storm drains by

runoff. Pesticides, herbicides, fungicides, and fertilizers that are used for landscape maintenance can be washed into storm drains when irrigation exceeds the rate of soil infiltration and plant uptake or when the chemicals are applied in excess. As shown in Table 3.9-2, the pesticide Diazinon is listed as a 303(d) impairment to Arroyo Las Positas. Paints, solvents, soap products, and other toxic materials may be inadvertently or deliberately deposited in storm drains in residential and industrial areas. Nutrients and eutrophication can threaten aquatic life beneficial uses, as designated by the Basin Plan. Arroyo Las Positas has a history of elevated water temperature, elevated levels of the herbicide oxadiazon, and low dissolved oxygen (San Francisco Bay RWQCB 2007). In addition, Arroyo Las Positas drains to Arroyo Mocho, which is also 303(d) listed as impaired for Diazinon and water temperature.

Table 3.9-2: 303(d) Listed Water Body in the Project Area: Arroyo Las Positas

Pollutant	*Expected TMDL Completion Date*	*EPA TMDL Approved Date*	*Potential Sources*
Nutrient/Eutrophication Biological Indicators	2021		Unknown
Diazinon		05/16/2007	Urban Runoff/Storm Sewers

Source: State Water Resources Control Board 2012 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report). Last updated 2015. Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml. Accessed: February 10, 2017.

Groundwater quality

In general, groundwater quality throughout most of the region is suitable for most urban and agricultural uses, with only local impairments. The primary constituents of concern are high total dissolved solids, nitrate, boron, and organic compounds (California Department of Water Resources, 2003). Water quality varies throughout the Livermore Valley groundwater basin, with bicarbonate generally occurring throughout the entire basin. Total dissolved solids range from 300 mg/L to 550 mg/L with an average of 450 mg/L. Beneath Livermore, the area along the eastern portion of the basin is generally prevalent with magnesium (California Department of Water Resources, 2006).

Beneficial uses, as designated by the Basin Plan (San Francisco Bay RWQCB, 2015), are identified for the Livermore Valley groundwater basin, as follows:

- Municipal and domestic supply (MUN);
- Industrial process supply (PROC);
- Industrial service supply (IND); and
- Agricultural supply (AGR).

The primary groundwater objective identified in the Basin Plan is the maintenance of existing high-quality groundwater. At a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances that produce taste and odor in excess of the objectives described in Table 3.9-3, unless naturally occurring background concentrations are greater. Under existing law, the San Francisco Bay Regional Water Quality Control Board (Regional

Water Board) regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards (San Francisco Bay RWQCB, 2015).

Table 3.9-3: 303(d) Water Quality Objectives for Groundwater in the Project Area

Constituent	*Groundwater Quality Objective*
Bacteria	Median of the most probable number of coliform organisms over any 7- day period shall be less than 1.1 most probable number per 100 milliliters (MPN/100 mL).
Organic and Inorganic Chemical Constituents	All groundwater shall be maintained free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, shall not contain concentrations of constituents in excess of the maximum contaminant levels (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the provisions of Title 22.
Radioactivity	At a minimum, shall not contain concentrations of radionuclides in excess of the MCLs specified in Table 4 (Radioactivity) of Section 64443 of Title 22.
Taste and Odor	Shall not contain taste- or odor- producing substances in concentrations that cause a nuisance or adversely affect beneficial uses. At a minimum, shall not contain concentrations in excess of the SMCLs specified in Tables 64449- A (Secondary MCLs- Consumer Acceptance Limits) and 64449- B (Secondary MCLs- Ranges) of Section 64449 of Title 22.

Source: San Francisco Bay Regional Water Quality Control Board, 2015. San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan). Last updated: March 2015. Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml. Accessed: August 31, 2015.

Flooding

As shown in Figure 3.9-1, the majority of the Planning Area is within areas designated by the Federal Emergency Management Agency (FEMA) as being outside of FEMA flood zones. These areas within FEMA flood Zone X are of minimal flood hazard, outside of the 500-year floodplain.

However, there has been a history of flooding in some portions of the Planning Area, in particular at the Airway Boulevard crossing of Arroyo Las Positas. This is due to limited channel capacity on the Las Positas Golf Course, which is situated immediately adjacent to the Planning Area, and limited capacity in the roadway culverts, often intensified by siltation (City of Livermore, 2015).

Portions of the Planning Area that are within the 100-year Floodplain FEMA Zone A (FEMA, 2009)[1] include areas adjacent to Arroyo Las Positas and Collier Canyon Creek. These areas, which are subject to inundation by the one percent annual chance flood event, are contained within the floodplain of existing drainage channels, and include the Portola Avenue flyover, as well as commercial areas along the north side of Airway Boulevard (City of Livermore, 2015). North of I-

[1] FEMA designated Zone A areas can be further subdivided (AO, AH, A1-A30, AE, A99, AR, AR/AE, AR/AO, AR/A1-A30, AR/A) according to variations in depth of potential flooding, flood velocity, and other factors derived from hydraulic analysis.

580, some sections along Collier Canyon Creek also are within Flood Zone A. The one percent annual flood discharge areas are contained in culverts along the creek. In addition, portions of the Planning Area in the vicinity of Arroyo Las Positas are within FEMA Zone X. These are areas of moderate flood hazard, usually between the limits of the 100-year and 500-year floods. Areas within the 500-year flood-hazard area are subject to a 500-year flood, which means that, in any given year, the risk of flooding is 0.2 percent.

Potential for Tsunami, Seiche, and Mudflows

The Planning Area is located approximately 38 miles east of the Pacific Ocean, and is not subject to flooding from tsunami or seiche. According to the State of California Tsunami Inundation Map for Emergency Planning, the Planning Area is not located within a tsunami inundation area (CalEMA, n.d). Seiches occur in an enclosed or partially enclosed body of water, such as a lake or reservoir. Because there are no large bodies of freshwater, such as reservoirs or lakes, within the vicinity of the Planning Area, it is not subject to the risk of seiche. Although the Planning Area is relatively flat, regional landslide mapping indicates one area of landslide deposits, located mostly to the north of Portola Avenue (Association of Bay Area Governments, n.d). Landslide deposits also are located on steeper slopes north of the Planning Area, but appear to be generally outside the Planning Area (City of Livermore, 2016). More information on landslide potential is provided in Section 3.12 of this EIR, *Geology and Soils*.

Dam and Levee Failures

Lake Del Valle is located south of the Planning Area, and Patterson Reservoir is located east of the Planning Area. However, according to dam failure inundation maps, although portions of the City are within the Del Valle and Patterson Dam inundation zones, the Planning Area is not located within a dam inundation zone (City of Livermore, 2014). In addition, there are no levees within or adjacent to the Planning Area.

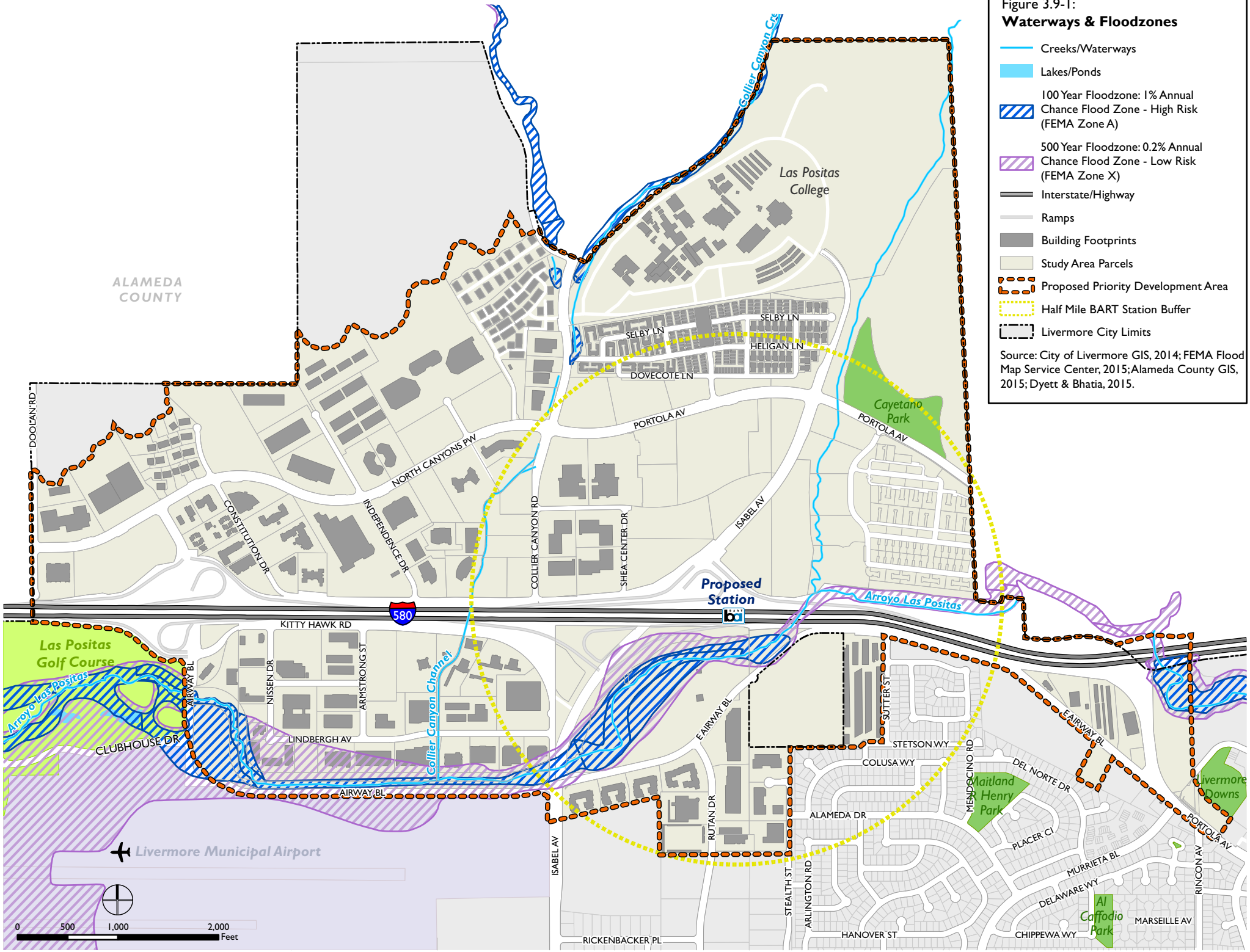
Figure 3.9-1:
Waterways & Floodzones
Creeks/Waterways
Lakes/Ponds
100 Year Floodzone: 1% Annual Chance Flood Zone - High Risk (FEMA Zone A)
500 Year Floodzone: 0.2% Annual Chance Flood Zone - Low Risk (FEMA Zone X)
Interstate/Highway
Ramps
Building Footprints
Study Area Parcels
Proposed Priority Development Area
Half Mile BART Station Buffer
Livermore City Limits
Source: City of Livermore GIS, 2014; FEMA Flood Map Service Center, 2015; Alameda County GIS, 2015; Dyett & Bhatia, 2015.
ALAMEDA COUNTY
Las Positas College
Collier Canyon Cr
SELBY LN
HELIGAN LN
DOVECOTE LN
DOOLAN RD
PORTOLA AV
NORTH CANYONS PW
CONSTITUTION DR
INDEPENDENCE DR
COLLIER CANYON RD
SHEA CENTER DR
ISABEL AV
Cayetano Park
Proposed Station
580
KITTY HAWK RD
Las Positas Golf Course
Arroyo Las Positas
AIRWAY BL
NISSEN DR
ARMSTRONG ST
Collier Canyon Channel
LINDBERGH AV
CLUBHOUSE DR
E AIRWAY BL
SUTTER ST
STETSON WY
COLUSA WY
DEL NORTE DR
MENDOCINO RD
Maitland Henry Park
Livermore Downs
ALAMEDA DR
RUTAN DR
PLACER CI
MURRIETA BL
DELAWARE WY
RINCON AV
Al Caffodio Park
MARSEILLE AV
CHIPPEWA WY
HANOVER ST
STEALTH ST
ARLINGTON RD
RICKENBACKER PL
Livermore Municipal Airport
0
500
1,000
2,000
Feet

REGULATORY SETTING

Federal Regulations

The primary federal law for regulating water quality is the federal Clean Water Act (CWA). EPA has delegated enforcement of the CWA in California to the State Water Resources Control Board (State Water Board) and its nine Regional Water Boards. All proposed project activities need to comply with, at a minimum, the CWA, the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act), and the San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).

Clean Water Act

Several sections of the CWA pertain to regulating impacts on waters of the United States. The CWA sections below pertain to projects within the Planning Area. The term "waters of the United States" refers to all surface waters, such as all navigable waters and their tributaries; all interstate waters and their tributaries; all wetlands adjacent to these waters; and all impoundments of these waters. EPA is the overarching authority for protecting the quality of waters of the United States. However, the State Water Board administers CWA Sections 303, 401, and 402; USACE has jurisdiction over waters of the United States under CWA Section 404.

Section 303—Impaired Waters. The State of California adopts water quality standards to protect beneficial uses of waters of the state ("waters of the state" is defined below under *Porter-Cologne Water Quality Control Act*), as required by Section 303(d) of the CWA and the Porter-Cologne Act. Section 303(d) of the CWA established the TMDL process to guide the application of State water quality standards (refer to the discussion of State water quality standards below). To identify candidate water bodies for TMDL analysis, a list of water quality–limited segments was generated by the State Water Board. These stream or river segments are impaired by the presence of pollutants such as sediment and are more sensitive to disturbance because of this impairment.

In addition to the impaired water body list required by CWA Section 303(d), CWA Section 305(b) requires states to develop a report that assesses statewide surface water quality. Both CWA requirements are addressed through the development of a 303(d)/305(b) Integrated Report, which addresses both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board's statewide 2012 California Integrated Report was based on Integrated Reports from each of the nine Regional Water Boards. After approval of the 303(d) list portion of the California Integrated Report by the State Water Board, the 2012 California Integrated Report was approved by EPA on July 30, 2015.

Section 401—Water Quality Certification. Section 401 of the CWA requires an applicant who pursues a federal permit for conducting an activity that may result in a discharge of a pollutant to obtain Water Quality Certification (or waiver). Water Quality Certification requires the evaluation of water quality considerations associated with dredging or the placement of fill materials into waters of the United States. Water Quality Certifications are issued by one of the nine geographically separated Regional Water Boards in California. Under the CWA, the Regional Water Board must issue Section 401 Water Quality Certification for a project to be permitted under CWA Section 404.

Section 402—National Pollutant Discharge Elimination System. The 1972 amendments to the federal Water Pollution Control Act established the National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants from point sources. NPDES is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States.

The 1987 amendments to the CWA created a new section that was devoted to stormwater permitting (Section 402). EPA has granted the State of California primacy in administering and enforcing the provisions of the CWA and NPDES within state boundaries. NPDES permits are issued by one of the nine Regional Water Boards.

Projects within the Planning Area would be required to comply with both construction and municipal NPDES stormwater requirements. More information is provided below in the *State Regulations* section.

Section 404—Dredge/Fill Permitting. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of the CWA and, specifically, Section 404 (Discharges of Dredged or Fill Material) of the CWA. Section 404 of the CWA regulates the placement of fill materials into the waters of the United States. Section 404 permits are administered by USACE.

Safe Drinking Water Act

The U.S. EPA administers the Safe Drinking Water Act (SDWA), the primary federal law that regulates the quality of drinking water and establishes standards to protect public health and safety. The law requires many actions to protect drinking water and its sources such as rivers, lakes, and reservoirs. The Department of Health Services (DHS) implements the SDWA and oversees public water system quality statewide. DHS establishes legal drinking water standards for contaminates that could threaten public health.

National Flood Insurance Program

In response to the increasing cost of disaster relief, Congress passed the National Flood Insurance Program (NFIP) of 1968 and the Flood Disaster Protection Act of 1973. FEMA administers the NFIP to provide subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains. A Flood Insurance Rate Map (FIRM) is an official FEMA-prepared map of a community. It is used to delineate both the Special Flood Hazard Areas (SFHAs), areas which would be inundated during a flood event, and the flood-risk premium zones that are applicable to the community. As discussed above, the Planning Area is not located within a SFHA; therefore, the NFIP does not apply.

State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act was established and implemented by the State Water Board and nine Regional Water Boards. The State Water Board is the primary State agency with responsibility for protecting the quality of the state's surface and groundwater supplies, or "waters of the state." "Waters of the state" are defined more broadly than "waters of the United States" (i.e., any surface

water or groundwater, including saline waters, within the boundaries of the state). This includes waters in both natural and artificial channels. It also includes all surface waters that are not waters of the United States or nonjurisdictional wetlands, which are essentially distinguished by whether they are navigable. If waters are not navigable, they are considered to be isolated and, therefore, fall under the jurisdiction of only the Porter-Cologne Act and not the CWA. The Regional Water Boards are responsible for implementing CWA Sections 303(d), 401, and 402, as mentioned above and described in more detail below.

The Porter-Cologne Act authorizes the State Water Board to draft State policies regarding water quality. The act requires projects that are discharging, or proposing to discharge, wastes that could affect the quality of the State's water to file a Report of Waste Discharge (RWD) with the appropriate Regional Water Board. The Porter-Cologne Act also requires the State Water Board or a Regional Water Board to adopt basin plans for the protection of water quality. Basin plans are updated and reviewed every 3 years. They provide the technical basis for determining waste discharge requirements (WDRs), taking enforcement actions, and evaluating clean water grant proposals. A basin plan must include (1) a statement of beneficial water uses that the Regional Water Board will protect, (2) the water quality objectives needed to protect the designated beneficial water uses, and (3) strategies to be implemented, with time schedules for achieving the water quality objectives. The San Francisco Bay Basin Plan was last updated in 2015 (San Francisco Bay RWQCB, 2015).

In basin plans, Regional Water Boards designate beneficial uses for all water body segments in their jurisdictions and then set the criteria necessary to protect these uses. Consequently, the water quality objectives developed for particular water segments are based on the designated use and vary, depending on such use. Each Regional Water Board has region-wide and water body–specific beneficial uses and sets numeric and narrative water quality objectives for several substances and parameters in numerous surface waters in its region. For waterbodies that do not have specific beneficial uses or water quality objectives designated in the Basin Plan, the tributary rule[2] applies. Specific objectives for concentrations of chemical constituents are applied to bodies of water according to their designated beneficial uses (San Francisco Bay RWQCB, 2015). In addition, the State Water Board identifies waters that fail to meet standards for specific pollutants, which are then State-listed in accordance with CWA Section 303(d), described previously.

The Planning Area lies within the jurisdiction of the San Francisco Bay Regional Water Board, which is responsible for the protection of the beneficial uses of water resources in San Francisco Bay, from Tomales Bay south to Pescadero Creek, an area that encompasses Alameda, Contra Costa, San Francisco, Santa Clara (north of Morgan Hill), San Mateo, Marin, Sonoma, Napa, and Solano Counties. More information on beneficial uses, water quality objectives, and the 303(d) impairments that apply to the proposed project are provided in the surface water quality discussions above in the Physical Setting section.

[2] The "tributary rule" refers to any waterbody or stream not specifically listed in the Basin Plan that is deemed to have the same beneficial uses and water quality objectives of the listed stream, river, or lake to which they are a tributary.

NPDES General Construction Stormwater Permit

The General NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit) regulates stormwater discharges related to construction activities. Dischargers whose projects disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that, in total, disturbs one or more acres, are required to obtain coverage under the Construction General Permit. The Construction General Permit requires development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must list best management practices (BMPs) that the discharger will use to reduce or eliminate pollutants associated with construction activities in stormwater runoff and document the placement and maintenance of those BMPs. Additionally, the SWPPP must contain a visual monitoring program, a chemical monitoring program for "nonvisible" pollutants to be implemented in case of a BMP failure, and a monitoring plan for turbidity and pH for projects that meet defined risk criteria (State Water Resources Control Board, 2013). The requirements of the SWPPP are based on the construction design specifications detailed in the final design plans of a project and the hydrology and geology of the site expected to be encountered during construction. The local or lead agency requires proof of coverage under the Construction General Permit prior to building permit issuance. The SWPPP is submitted to the State Water Resources Board, and a copy is kept at the jobsite where it is updated during different phases of construction. The SWPPP must be available for inspection and review upon request. For future proposed projects within the Planning Area that would involve more than one acre of land disturbance, an NPDES Construction General Permit would be required.

NPDES General Municipal Stormwater Permit

CWA Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4s). Phase I MS4 regulations cover municipalities with more than 100,000 residents, certain industrial processes, or construction activities that disturb an area of 5 acres or more. Phase II "small" MS4 regulations require stormwater management plans to be developed by municipalities with fewer than 100,000 residents and construction activities that disturb one or more acres of land.

The Planning Area must comply with the requirements of the MS4 Phase I San Francisco Bay Region Municipal Regional Stormwater NPDES Permit. The RWQCB issued MS4 Phase I San Francisco Bay Region Municipal Regional Stormwater NPDES Permit No. CAS029718 (Order No. R2-2015-0049-DWQ) (San Francisco Bay MS4 or MRP) on November 19, 2015, and it became effective on January 1, 2016. This presents the provision for permanent post-construction stormwater requirements. Within the Planning Area, the Municipal Regional Permit is administered regionally by the Alameda Countywide Clean Water Program to assist developers and engineers in complying with treatment and hydromodification requirements (Alameda Countywide Clean Water Program, 2016).

The Municipal Regional Permit states provisions and requirements for permanent stormwater treatment. Stormwater treatment measures must reduce the sediment and pollutant load resulting from the loss of pervious area and creation of impervious area. The permit sets impervious area thresholds at which projects must implement permanent stormwater treatment measures. If a project creates and/or replaces impervious area equal to more than 50% of the existing impervious

area not previously requiring treatment, then the project must provide treatment for all existing and newly created impervious area. Provision C.3 of the San Francisco Bay MS4 Permit is for new development and redevelopment projects. It requires authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects, with specific requirements for certain projects and are based on project size and/or location.

The State Water Board is advancing low-impact development (LID) in California as a means of complying with municipal stormwater permits. LID incorporates site design, including, among other things, the use of vegetated swales and retention basins and minimizing impermeable surfaces, to manage stormwater and maintain a site's predevelopment runoff rates and volumes.

In addition to permanent stormwater treatment requirements, the Municipal Regional Permit states provisions and requirements for hydromodification mitigation. Hydromodification is defined as the alteration of the hydrologic characteristics of coastal and noncoastal waters, which in turn could degrade water resources. According to the Alameda Countywide Clean Water Program Hydromodification Management Plan Map, the Planning Area is located where hydromodification impacts are of concern due to factors such as bank instability, sensitive habitat, or restoration projects (Alameda County Clean Water Program, 2016).

The Municipal Regional Permit regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards (San Francisco Bay Regional Water Quality Control Board, 2015).

Waste Discharge Requirements for Dewatering and Other Low-threat Discharges to Surface Waters

CWA Section 402 also includes WDRs for dewatering activities. Although small amounts of construction-related dewatering are covered under the Construction General Permit, the San Francisco Bay Regional Water Board has regulations specific to dewatering activities that typically involve reporting and monitoring requirements.

Projects developed within the Planning Area will need to be in compliance with the RWQCB's dewatering requirements for activities that require dewatering. Coverage under the Construction General Permit typically covers uncontaminated dewatering activities, which are considered in the permit to be authorized non-stormwater discharges. As part of the Construction General Permit, all dewatering discharges are required to be filtered or treated, using appropriate technology, from sedimentation basins. Authorized non-stormwater dewatering discharges may require a permit because some Regional Water Boards have adopted General Permits for dewatering discharges. The San Francisco Bay RWQCB has adopted a NPDES Low Threat Discharge General Permit. Therefore, coverage under the NPDES Low Threat Discharge and Dewatering permit would need to be obtained, which will require the dewatering discharge to be treated prior to discharge to any local water way.

If dewatering activities lead to discharges to the storm drain system or other water bodies, water treatment measures may be designed and implemented as necessary so that water quality objectives are met prior to discharge to waters of the State to comply with San Francisco Bay Regional Water Board dewatering requirements. As a performance standard, these measures will be selected to achieve the maximum removal contaminant found in the groundwater and will represent the best available technology that is economically feasible. Implemented measures may include using infiltration areas and retaining dewatering effluent until particulate matter has settled before the water is discharged. The contractor should perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained; the contractor will also need to conduct observations of the water (e.g., check for odors, discoloration, or an oily sheen on groundwater). Other pre-discharge sampling and reporting activities required by the RWQCB are typically conducted, if necessary. The final selection of water quality control measures would be subject to review by the RWQCB. If the groundwater is found not to meet water quality standards and treatment measures are not effective, the water may need to be hauled offsite for treatment and disposal at an appropriate waste treatment facility.

In addition, if there is potential for groundwater to be contaminated with fuel products during construction of a future project within the Planning Area, the project sponsor would be required to comply with the San Francisco Bay RWQCB's Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds (VOCs), Fuel Leaks, and Other Related Wastes (VOC and Fuel General Permit; Order No. R2-2012-0012).

California Department of Pesticides Regulation

The California Department of Pesticides Regulation (DPR) is the lead agency for regulating the registration, sale, and use of pesticides in California. It is required by law to protect the environment, including surface waters, from adverse effects of pesticides by prohibiting, regulating, or controlling the uses of such pesticides. DPR has both a Surface Water and Groundwater Protection Program that address sources of pesticide residue in surface waters and preventive and response components that reduce the presence of pesticides in surface and groundwaters. The preventive component ranges from local outreach to the promotion of management practices to reduce pesticide runoff and prevent continued movement to groundwater in contaminated areas. To protect water from the adverse effects of pesticides, DPR and the State Water Board signed a Management Agency Agreement (MAA). The intent of the MAA and its companion document, California Pesticide Management Plan for Water Quality, is to coordinate interaction, facilitate communication, promote problem solving, and ultimately ensure the protection of water quality. The operation and maintenance of landscaped areas and lawns may require the use of pesticides; however, landscaping would be required to comply with DPR regulations.

California's National Flood Insurance Program

In response to increasing costs of disaster relief, Congress passed the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The Federal Emergency Management Agency (FEMA) is the nationwide administrator of the National Flood Insurance Program (NFIP). This program was established by the National Flood Insurance Act to protect lives and property and to reduce the financial burden of providing disaster assistance by subsidizing flood insurance to communities that comply with FEMA regulations limiting development in floodplains. Under

the NFIP, FEMA has the lead responsibility for flood hazard assessment and mitigation. FEMA offers federally backed flood insurance to homeowners, renters, and business owners in communities that choose to participate in the program. FEMA has adopted the 100-yr floodplain as the base flood standard for the NFIP. FEMA is also concerned with construction within a 500-year floodplain for proposed projects that are considered "critical actions," which is defined as any activity where even a slight chance of flooding is too great. FEMA issues the FIRM for communities that participate in the NFIP. A FIRM is the official map of a community prepared by FEMA to delineate both the special flood hazard areas and the flood risk premium zones applicable to the community.

In California, nearly all of the flood-prone communities participate in the NFIP, which is locally administered by the California Department of Water Resources Division of Flood Management. Under California's NFIP, communities have a mutual agreement with the State and Federal governments to regulate floodplain development according to certain criteria and standards, which is further detailed in the NFIP. Typically, each county (or community) has a flood insurance study, which is used to develop FIRMs and base flood elevations locally.

Local Regulations

Alameda County Ordinances and Policies

The Alameda County Ordinances and Policies contain the following ordinances related to the planning Area.

- Ch. 6.36 Flood Control and Water Conservation District Use Regulations. This ordinance establishes the requirement for obtaining a flood encroachment permit as a prerequisite of accessing District property.
- Ch. 13.08 Stormwater Management and Discharge Control. This ordinance provides the regulations for discharging into the County storm drain system, including the provisions for stormwater permits.
- Ch. 13.12 Watercourse Protection. The watercourse ordinance controls development within and adjacent to privately owned natural bodies of water, and provides the provisions for the issuance of watercourse permits.
- Ch. 15.36 Grading, Erosion, and Sediment Control. This ordinance is intended to control the construction of cuts and fills on private property, particularly with regard to limiting sedimentation of the County storm drain and flood control systems.
- Ch. 15.40, Floodplain Management. The floodplain management ordinance invokes the requirements of the FEMA NFIP with regard to development with areas of special flood hazard.

Alameda Countywide Clean Water Program

The Alameda Countywide Clean Water Program, representing 17 agencies, has been issued NPDES Municipal Stormwater Permits since 1991. Each permit is shared by the 14 cities, the unincorporated area, and the two flood control districts of Alameda County. Updated stormwater quality control measures for the Alameda County Municipal NPDES permit include stormwater treatment and control, source control and site design, and hydromodification management. Alameda County stormwater control measures include design guidelines for landscaped-based stormwater controls, landscape design to minimize pesticide fertilizer pollution, and protecting water quality during construction.

The Alameda County C.3 Stormwater Technical Guidance (Alameda Countywide Clean Water Program, 2016) guides developers, builders, and project sponsors to include post-construction stormwater controls in their projects to meet local municipal requirements. The municipalities in Alameda County require post-construction stormwater controls or permanent features to be included in a project to reduce pollutants in stormwater and/or erosive flows during the life of the project.

Alameda County Flood Control and Water Conservation District Programs

The Alameda County Flood Control and Water Conservation District (ACFCWC) works to protect western Alameda County from possible flooding caused by winter rains and San Francisco Bay tides. Every year, the District develops and implements a capital improvement program to improve flood control. ACFCWC's Clean Water Program protects and enhances local creeks, watersheds and San Francisco Bay as a member of the Alameda Countywide Clean Water Program, in partnership with all 14 cities in Alameda County, unincorporated Alameda County, and the Zone 7 Water Agency. Staff from the Alameda County Public Works Agency are responsible for coordinating several different clean water programs including the Alameda Countywide Clean Water Program and the Unincorporated Area Clean Water Program, as required for NPDES permits.

City of Livermore Stormwater Program

The RWQCB requires cities and counties to conduct stormwater management programs. The City of Livermore, along with Alameda County, Zone 7 Water Agency, and 13 additional cities in the county, regulate stormwater discharge through a permit issued by the RWQCB and administered regionally by the Alameda Countywide Clean Water Program. The entities also coordinate activities with other pollution prevention programs, such as wastewater treatment plants, hazardous waste disposal, and water recycling. As part of the Stormwater Program, the Source Control Section of the Water Resources Division prevents pollutants from entering the storm drain system. The Source Control staff inspects industrial and commercial facilities to identify illegal discharges or conditions that could allow pollutants to enter the storm drain system. The staff educates business operators about the requirement to implement BMPs to reduce pollutants entering storm drains and takes enforcement action in the event of noncompliance with regulations.

City of Livermore General Plan

The City of Livermore General Plan Infrastructure and Public Services Element identifies goals and policies that are relevant to the safe storage and disposal of stormwater in a sanitary, environmentally acceptable, and financially sound manner. Policies within the element call for new development to construct stormwater collection systems and pay relevant storm drainage free and to minimize and regular runoff from urban areas. The Element also approaches stormwater management through the maintenance and preservation of natural areas, such as creeks and arroyos.

The Public Safety Element contains goals and policies to reduce hazards from flooding and inundation within the Planning Area, including the prohibition of modifications to floodways for new development, however, allowing modifications for creek restorations and water quality improvements. Modifications to land are also restricted within the 100-year flood zone and flood-

prone areas. The element states that when feasible, arroyos and creeks should be preserved in their natural state. To meet these goals, and to minimize flood risks to developments themselves, policies call for requiring studies for new development on drainage, stormwater runoff, flooding, erosion, and other information related to storm drain and flood control systems.

The Open Space and Conservation Element also addresses water quality through the implementation of Best Management Practices (BMPs) to minimize erosion, sedimentation, and water quality degradation resulting from new imperious surfaces and through management of public access to arroyos and creeks.

The Land Use Element of the General Plan calls for the preservation of environmentally sensitive areas by analyzing the infrastructure (i.e., roads, water, sewers, storm drainage) and public services (i.e., police, fire, schools) of receiving sites in the cases of transferring of density.

City of Livermore Municipal Code

Livermore Municipal Code Chapter 16.12, Flood Control Regulations, discusses public health, safety and general welfare, due to flood conditions. Specifications include controlling the alteration of natural floodplains, stream channels, and natural protective barriers which help accommodate or channel floodwaters; controlling filling, grading, dredging, and other development which may increase erosion or flood damage; and restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards.

Chapter 13.44, Storm Drainage Facilities, includes provisions for a stormwater drainage fee (13.44.050), Chapter 13.45, Stormwater Management and Control Program, includes provisions to eliminate non-stormwater discharges to the municipal separate storm sewer; control of the discharge to municipal separate storm sewers from spills, dumping or disposal of materials other than stormwater; and to reduce pollutants in stormwater discharges to the maximum extent practicable. To provide funding for the stormwater management and discharge control program, the City of Livermore stormwater enterprise fund was established (Chapter 13.46).

Impact Analysis

SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact if it would:

Criterion 1: Violate any water quality standards or waste discharge requirements;

Criterion 2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

Criterion 3: 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;

Criterion 4: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

Criterion 5: 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;

Criterion 6: Otherwise substantially degrade water quality;

Criterion 7: 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;

Criterion 8: Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

Criterion 9: 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

Criterion 10: Inundation by seiche, tsunami, or mudflow.

METHODOLOGY AND ASSUMPTIONS

All project elements were analyzed by comparing baseline conditions, as described in the Environmental Setting section, to conditions during construction and/or operation of the proposed Plan. The analysis focused on issues related to surface hydrology, flood hazards, groundwater supply, and surface and groundwater quality. The key construction-related impacts were identified and evaluated qualitatively, based on the physical characteristics of the Planning Area and the magnitude, intensity, location, and duration/frequency of activities. This analysis of hydrologic and

water quality impacts is based on a determination of the potential for water quality degradation and individual project or cumulative projects potential to cause increased erosion, sedimentation, and adverse conditions associated with changes to stormwater runoff attributable to implementation of the proposed Plan, with consideration of legally-mandated requirements for protecting water quality. The resultant effects can only be generalized relative to the significance criteria to determine if the project would result in significant impacts and if mitigation measures would be warranted.

Surface Water Hydrology. The surface water hydrology impact analysis considers potential changes in the physical characteristics of water bodies, impervious surfaces, and drainage patterns throughout the Planning Area as a result of the proposed Plan's implementation.

Groundwater Hydrology. Impacts on groundwater supply and recharge are assessed by comparing existing groundwater use and recharge capabilities with project conditions. Recharge is determined by the ability of water to infiltrate into the soil.

Water Quality. Impacts of the proposed Plan on surface water and groundwater quality were analyzed by comparing existing water quality conditions and potential project water quality conditions. Potential project-related sources of water contaminants generated by residential, office, and industrial project operational activities, such as vehicle use, building maintenance, pesticide use, trash generation, and the storage or inadvertent release of hazardous materials during project construction, are considered. The potential for water quality objectives to be exceeded and beneficial uses to be compromised is also considered.

Flooding. The flood risk analysis uses FEMA data and historical flood information to determine the existing flood zone and whether the project area overlaps designated 100-year floodplains, whether it would affect the drainage system, and whether it was a flood risk. Pursuant to the recent Supreme Court case decision in *California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal. 4th 369, Case No. S213478*, CEQA does not require an analysis of how existing environmental conditions will affect a project's residents or users unless the project would exacerbate an existing environmental hazard. Accordingly, hazards resulting from a project that places development in an existing or future flood hazard area are not considered impacts under CEQA unless the project would exacerbate the flood hazard. Thus, the analysis evaluates whether the project would exacerbate existing or future flood hazards in the Planning Area, resulting in a substantial risk of loss injury or death. If evidence indicates it would not, then the analysis will conclude by stating such. If it would potentially exacerbate the issue, then evidence is provided to determine if the exacerbation would or would not be significant.

IMPACTS

Impact 3.9-1 Implementation of the proposed Plan would not violate any water quality standards or waste discharge requirements. *(Less than Significant)*

Construction

Construction activities for each future development occurring under the proposed Plan, such as demolition of existing structures, site clearing and grading, excavation, new building construction, paving, and landscaping, could temporarily affect water quality by introducing sediments, turbidity, and pollutants into storm drains or other water bodies. Land-disturbing activities and the placement of stockpiles in proximity to storm drain inlets or nearby surface waters may result in a temporary increase in sediment loads into nearby waterbodies such as the Arroyo Las Positas. The release of sediments, along with other pollutants, including trash, petroleum products, concrete waste (dry and wet), and sanitary waste, can have a detrimental effect on water quality during construction. Pollutants, such as nutrients, trace metals, and hydrocarbons attached to sediment, can be transported to downstream locations and degrade water quality. In addition, chemicals, liquid products, and petroleum products (such as paints, solvents, and fuels) may be spilled or leaked during construction, and would have the potential to be transported via storm runoff into nearby receiving waters and eventually may affect downstream hydrologic areas, such as Arroyo Las Positas or Collier Canyon.

The delivery, handling, and storage of construction materials and wastes (e.g., concrete debris), as well as the use of heavy construction equipment, could also result in stormwater contamination, thereby affecting water quality. Construction activities may involve the use of chemicals and operation of heavy equipment, which could result in accidental spills of hazardous materials (e.g., fuel and oil) during construction activities. Such spills could enter the groundwater aquifer or nearby surface water bodies from runoff or storm drains. Constituents in fuel, oil, and grease can be acutely toxic to aquatic organisms and/or bioaccumulate in the environment.

Each future development proposal occurring under the proposed Plan would be assessed individually to ensure compliance with applicable NPDES requirements, as referenced above under the Regulatory Setting section. Future projects implemented under the proposed Plan that would involve the disturbance of more than one acre of land would be subject to the SWRCB Construction General Permit. Projects disturbing less than an acre of ground surface during construction would not be required to prepare a SWPPP, but would be required to implement the construction site control BMPs required by the Alameda County Municipal NPDES permit (MS4).

As described above, the Construction General Permit requires development and implementation of a SWPPP, which includes BMPs to eliminate or reduce stormwater and other discharge from construction sites and ensure that water quality is not degraded. Standard erosion and sediment control measures and other housekeeping BMPs, such as vehicle and equipment maintenance, material delivery and storage, and solid waste management, would be identified in the SWPPP. BMPs included in the SWPPP would represent the best available technology that is economically achievable and the best conventional pollutant control technology to reduce pollutants. Commonly practiced BMPs consist of a wide variety of measures that can be implemented to reduce pollutants in stormwater and other nonpoint-source runoff. These measures would be identified for each

individual project proposed under the proposed Plan and implemented during construction to reduce contamination and sedimentation in waterways.

The SWPPP would include the following standard erosion- and sediment-control BMPs:

- Keep disturbed areas (areas of grading and related activities) to the minimum necessary for demolition or construction of the project.
- Keep runoff away from disturbed areas during grading and related activities.
- Stabilize disturbed areas as quickly as possible by vegetative, mechanical, and/or physical methods.
- Trap sediment before it leaves the site with such techniques as check dams, sediment ponds, or straw wattles, including perimeter protection.
- Use dirt and sediment tracking BMPs, including stabilized construction entrances and wheel washers.
- Cover exposed soils and material stockpiles to prevent wind erosion.
- Use interceptor ditches, drainage swales, or detention basins to prevent storm runoff from transporting sediment into drainage ways and sediment-laden runoff from leaving any disturbed areas.
- Use landscaping and grading methods that lower the potential for downstream sedimentation (e.g., modified drainage patterns, longer flow paths, encouraging infiltration into the ground, and slower stormwater conveyance velocities).
- During the installation of the erosion and sediment transport control structures, supervise the implementation of the designs and the maintenance of the facilities throughout the grading and construction period.
- Perform routine monitoring of erosion control facilities during construction and during/after rain events.

The SWPPP would also include a range of stormwater control BMPs (e.g., installing silt fences, staked straw wattles, or geofabric to prevent silt runoff to storm drains or waterways); requirements for the stockpiling, protection, and replacement of topsoil and backfill at the conclusion of construction activities; and requirements for revegetation of turf, plants, and other vegetation upon completion of construction.

Additionally, all projects implemented under the proposed Plan, including those that would result in less than one acre of ground disturbance, would be required to comply with City and Alameda County grading, erosion, and sediment control ordinances, in addition to policies that limit sedimentation of local and regional storm drain and flood control systems. Per local requirements, specific erosion and sediment control BMPs would be implemented for construction during the wet season to minimize the potential for large rain events to mobilize loose sediment during construction. Additionally, whenever possible, earth-disturbing construction activities would not be scheduled during anticipated rain events.

Construction Dewatering

Construction dewatering in areas of shallow groundwater may be required during excavation activities, which could result in the release of pollutants from spills or other activities and may contaminate groundwater. Although small amounts of construction-related dewatering are covered under the Construction General Permit, the San Francisco RWQCB has regulations specific to dewatering activities that typically involve reporting and monitoring requirements. Projects developed within the Planning Area would be required to comply with the RWQCB's dewatering requirements, where applicable.

If dewatering activities lead to discharges to the storm drain system or other water bodies, including Arroyo Las Positas, water treatment measures would be designed and implemented as necessary so that water quality objectives are met prior to discharge to waters of the State to comply with RWQCB dewatering requirements. As a performance standard, these measures would be selected to achieve the maximum removal of contaminant found in the groundwater and would represent the best available technology that is economically feasible. Implemented measures may include using infiltration areas and retaining dewatering effluent until particulate matter has settled before the water is discharged.

Contractors for future development projects within the Planning Area would be required to perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained; contractors would also need to conduct observations of the water (e.g., check for odors, discoloration, or an oily sheen on groundwater). The final selection of water quality control measures would be subject to review by the RWQCB. If the groundwater is found not to meet water quality standards and treatment measures are not effective, the water may need to be hauled offsite for treatment and disposal at an appropriate waste treatment facility.

Dewatering discharge methods would include options for direct discharge to the Arroyo Las Positas in compliance with WDRs to ensure that any discharges would be within the capacity of existing facilities and would not require the construction or expansion of existing facilities. WDRs also include monitoring and reporting requirements specific to dewatering. If the groundwater does not meet water quality standards, it must either be treated as necessary prior to discharge so that all applicable water quality objectives (as designated in the Basin Plan) are met or hauled offsite instead for treatment and disposal at an appropriate waste treatment facility permitted to receive such water. For water to be discharged to Arroyo Las Positas, the contractor would need to notify the RWQCB and comply with the Board's requirements related to the quality of water and discharges.

In addition, if there is potential for groundwater to be contaminated with fuel products during construction of a future project within the Planning Area, the project sponsor would be required to comply with the San Francisco Bay RWQCB's Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds (VOCs), Fuel Leaks, and Other Related Wastes (VOC and Fuel General Permit; Order No. R2-2012-0012).

Construction activities could result in short-term surface and groundwater quality impacts associated with the input of sediment loads that exceed water quality objectives or chemical spills

into storm drains or groundwater aquifers if proper minimization measures are not implemented. However, projects implemented under the proposed Plan would be required to comply with the Construction General Permit as well as local stormwater and construction site runoff ordinances and regulatory controls described above. These requirements involve development and implementation of a Construction General Permit SWPPP specific to the individual project sites to minimize water quality impacts related to spills or other activities that could contaminate groundwater. Compliance with WDRs and dewatering regulations would ensure that dewatering activities are monitored and treated as required and that no violations of any water quality standards or waste discharge requirements occur. Because the project would be required to comply with the regulatory controls described above, potential water quality impacts associated with construction activities and degradation of stormwater runoff would be less than significant.

Operations

At buildout, it is estimated that the proposed Plan would accommodate about 4,095 new housing units and up to 2,104,000 square feet of office, commercial, and industrial uses. The intensification of land uses by implementation of the proposed Plan may introduce new or additional pollutants to an existing area. Pollutants associated with the operation of the new and/or redeveloped residential, commercial, and industrial structures generally include sediments, trash, petroleum products, metals, and chemicals that could potentially discharge into surface waters either directly or during stormwater runoff events. This could create new or exacerbate existing water quality impairments.

As described above, Arroyo Las Positas is impaired by Nutrient/Eutrophication Biological Indicators; nutrients can be worsened by introduction of various landscape fertilizers associated with land uses included in the proposed Plan. Any additional pollutants that enter into surface waters either directly or during stormwater runoff events could result in further impairment of surface water quality.

Operation and maintenance activities associated with future projects in the Planning Area would generate pollutants of concern from commercial, industrial, residential, landscape maintenance, building maintenance, the storage of materials and substances, and vehicle use. These land uses and operational activities could increase existing or generate new levels of potential pollutants of concern within the Planning Area, such as trash, sediments, pesticides, bacteria, nutrients, metals, oils, suspended solids, nitrate nitrogen, phosphorous, copper, lead, zinc, and other toxins. These pollutants could reach surface waters in the vicinity through storm drains or direct discharge into Arroyo Las Positas.

Any increase in impervious areas that may occur as a result of implementation of the proposed Plan would increase the volume of runoff during a storm, which would more effectively transport pollutants generated during operation into receiving waters. In addition, as the amount of impervious surface and runoff increases, less water would be able to infiltrate into the ground, and the velocity of flows to nearby water bodies, including Arroyo Las Positas, would be increased. This would facilitate the transport sediment and other pollutants from the Planning Area to surface waters, thereby impairing water quality of the water body.

Surface water quality may be affected by polluted stormwater runoff from parking lots, roads, and other sites that have impervious surfaces. Runoff from impervious surfaces could contain nonpoint-source pollution that are typical of urban settings. These are normally associated with automobiles, trash, cleaning solutions, and landscaped areas. Grease, oil, hydrocarbons, and metals deposited by vehicles and heavy equipment can accumulate on streets and paved parking lots and be carried into storm drains by runoff. Stormwater would be drained by a combination of new and existing pipes, drainage inlets, and other storm drain facilities. All flows from the Planning Area would be conveyed to local storm drain systems and ultimately to San Francisco Bay.

Projects implemented under the proposed Plan would be required to implement Source Control and Treatment Control BMPs to reduce the discharge of pollutants to the maximum extent practicable. To minimize any adverse effects on water quality due to stormwater runoff, stormwater management measures would be included as part of the design of each future project implemented under the proposed Plan. These would utilize LID techniques to reduce pollutant discharges and BMPs to reduce pollutants from stormwater runoff, consistent with Alameda County C.3 Stormwater Technical Guidance, Alameda County NPDES permit, MS4 permits, and/or General Waste Discharge Requirements, as applicable. Site-specific source control, LID, and post-construction stormwater treatment measures would be incorporated into project designs to the extent feasible. Applicable BMPs would be implemented on a case-by-case basis in accordance with Alameda County NPDES permit.

Furthermore, the proposed Plan building guidelines include stormwater runoff reduction and capture measures such as interspersing landscaped areas within impervious areas, detention basins, and landscaped open space. As a result, implementation of these proposed Plan guidelines would also prevent operational impacts related to water quality standards or waste discharge requirements. Therefore, operational water quality impacts would be less than significant.

Future projects implemented under the proposed Plan would be required to comply with NPDES requirements during construction and would be designed in accordance with the Phase I MS4 Permit, Provision C.3.c, for post-construction stormwater management including LID. Future specific projects would also be required to adhere to all proposed Plan policies listed below intended to avoid or minimize increases in stormwater flows and the associated degradation of water quality. With compliance with all construction and design related stormwater regulatory requirements, the projects implemented under the proposed Plan would not violate water quality standards or waste discharge requirements or provide substantial additional sources of polluted runoff. Therefore, potential water quality impacts would be less than significant.

Mitigation Measures

None required.

Impact 3.9-2 Implementation of the proposed Plan would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. (*Less than Significant*)

The proposed Plan would involve additional development and redevelopment within an existing urban area that currently consists of 74 percent impervious area, including buildings, streets, paved sidewalks and parking lots. Implementation of the proposed Plan would generate an increase in the amount of impervious surfaces associated with the development of up to 4,095 new housing units and up to 2,104,000 square feet of office, commercial, and industrial uses. This increase in impervious surfaces within the Planning Area could potentially decrease infiltration.

Individual projects implemented under the proposed Plan would be required to implement hydromodification BMPs to reduce the volume of runoff. To minimize any adverse effects on hydrology due to stormwater runoff, stormwater management measures would be included as part of the design of each future project implemented under the proposed Plan. Measures would include LID techniques to capture and infiltrate stormwater runoff, consistent with Alameda County C.3 Stormwater Technical Guidance, Alameda County NPDES permit, MS4 permits, and/or General Waste Discharge Requirements, as applicable.

Future development in the Planning Area would also be required to conform to proposed Plan design guidelines including stormwater runoff reduction and capture measures such as interspersing landscaped areas within impervious areas and including landscaped open space. With implementation of these requirements and adherence to Plan design guidelines, development under the proposed Plan would not result in a change in impervious surface area such that the infiltration of surface water to groundwater would be affected.

Infill and redevelopment that would occur with implementation of the proposed Plan would result in population growth, thereby increasing demand on water supplies. The Planning Area is located partially within the City's water service area, and partially within the Cal Water-Livermore water service area. The projected 2040 potable water demands for buildout of the Planning Area within the City's water service area total approximately 836 acre-feet per year (AFY), of which approximately 441 AFY is from proposed new development and approximately 395 AFY is from existing development. The projected water demands for buildout of the proposed Plan within the Cal Water-Livermore water service area total approximately 189 AFY, of which approximately 153 AFY is proposed new development and approximately 36 AFY is existing development. The City and Cal Water-Livermore both receive groundwater as part of the overall supply purchased. However, the City does not plan to pump groundwater to meet any water demands of the municipal water service area through the 20-year planning horizon. The groundwater pumped by Cal Water-Livermore currently comprises approximately 30 percent of Cal Water-Livermore's total supply.

City modeling of the future demands at buildout of the Planning Area indicates that the water system is capable of meeting the increased demands to supply, storage capacity, pumping capacity, pressure regulating station capacity, and pipeline capacity. Therefore, the total water demand from the proposed Plan would be accommodated by current water sources and there would not be a net deficit in aquifer volume or a lowering of the local groundwater table level such that the production rate of existing nearby wells would drop to a level which would not support existing land uses or

planned uses for which permits have been granted. Therefore, impacts related to groundwater recharge would be less than significant.

Mitigation Measures

None required.

Impact 3.9-3 Implementation of the proposed Plan would not 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. (*Less than Significant*)

Construction

As described in more detail under Impact 3.9-1, project construction would include excavation and the disturbance of the existing ground surface, thereby exposing bare soil and temporarily altering surface drainage patterns with the potential to cause erosion and siltation. However, construction activities would be required to implement erosion and sediment control BMPs required by the Construction General Permit and MS4 Permit regulations. Compliance with these regulations would ensure substantial erosion or siltation does not occur onsite. These requirements would include the implementation of BMPs as required by Alameda County construction site controls for all construction activities. With implementation of erosion and sediment control BMPs, project construction activities would result in less-than-significant erosion and siltation impact during project construction activities.

Operations

Development within the proposed Planning Area would not involve the alteration of a stream or river. The site is approximately 74 percent impervious, and buildout of the proposed Plan is expected to generate an increase in impervious surfaces with the development of up to 4,095 new housing units and up to 2,104,000 square feet of office, commercial, and industrial uses in the Planning Area. Future projects implemented under the proposed Plan would be required to implement hydromodification BMPs to reduce the volume of runoff, which would also reduce the potential for erosion and siltation. To minimize any adverse effects on hydrology due to stormwater runoff, stormwater management measures would be included as part of the design of each future project implemented under the proposed Plan. These measures would require utilization of LID techniques to capture and infiltrate stormwater runoff, consistent with Alameda County C.3 Stormwater Technical Guidance, Alameda County NPDES permit, and/or General Waste Discharge Requirements, as applicable, to reduce the volume of runoff and infiltrate on site. Applicable BMPs would be implemented on a case-by-case basis in accordance with Alameda County NPDES permit.

Future projects under the proposed Plan also would be required to comply with proposed Plan policies and guidelines (listed below under Proposed Plan Goals and Policies that Reduce the Impact) intended to reduce and capture stormwater runoff. With adherence to regulatory requirements and implementation of the policies and associated design guidelines contained in the proposed Plan, future development within the Planning Area would not 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. Therefore, implementation of the proposed Plan would result in a less-than-significant impact related to erosion and siltation during project construction and operation.

Mitigation Measures

None required.

Impact 3.9-4 Implementation of the proposed Plan would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. (*Less than Significant*)

As noted above, buildout of the Planning Area is expected to generate an increase in impervious surfaces with the development of up to 4,095 new housing units and up to 2,104,000 square feet of office, commercial, and industrial uses. By implementing long-term changes to streetscapes and pedestrian walkways, increasing parking spaces, and otherwise introducing new impervious surfaces, implementation of the proposed Plan would minimally alter local drainage patterns. The proposed Plan would not involve the alteration of the course of a stream or river. Current Alameda County stormwater guidelines would require hydromodification of new development within the Planning Area to detain storm runoff to pre-development rates, thus minimizing the effects of new development. Each specific project that proposes one acre or more of new impervious surface would be required to analyze the project runoff and provide on-site or regional BMP's to reduce the runoff rate. Further, projects implemented under the proposed Plan would be designed in accordance with the Phase I MS4 Permit, Provision C.3.c, for post-construction stormwater management including LID. With application of the Phase I MS4 Permit, the projects implemented within the Planning Area would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Therefore, impacts would be less than significant.

Mitigation Measures

None required.

Impact 3.9-5 Implementation of the proposed Plan would not 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. (*Less than Significant with Mitigation Incorporated*)

Construction

Construction activities associated with implementation of the proposed Plan, such as site clearing, grading and excavation, site contouring, installation of improvements and structural development, and site clean-up, could temporarily alter the ground surface and drainage patterns. If drainage is not properly controlled and contained during construction activities, the adjacent drainage system capacity could be overloaded, resulting in corresponding flooding. Runoff generated on- and off-site during construction would have the potential to exceed the capacity of existing or planned

stormwater drainage systems or provide substantial additional sources of polluted runoff. Drainage patterns during project construction would generally be the same as compared to existing conditions. As a result, runoff conditions would not substantially change during construction activities. Construction BMPs would be in place during storm events, as required by the Construction General Permit, which would reduce the potential for stormwater to come into contact with pollutants and integrate it into surface water, to the maximum extent practicable. Such BMPs have proven effective at substantially reducing or eliminating runoff during construction. Therefore, construction activities would not result in runoff that would exceed the capacity of the adjacent existing drainage system capacity or provide substantial additional sources of polluted runoff, and impacts to existing stormwater drainage facilities during construction would be less than significant.

Operation

Changes in the extent of permeable or impermeable surfaces associated with new development under the proposed Plan would alter the direction and volume of overland flows during both wet and dry periods. While development in the Planning Area would result in an overall increase in impervious surfaces, future projects implemented under the proposed Plan would be required to implement hydromodification BMPs to reduce the volume of runoff, which would also reduce the potential for exceeding the capacity of existing or planned stormwater drainage systems. To minimize any adverse effects on hydrology due to stormwater runoff, stormwater management measures would be included as part of the design of each future project implemented under the proposed Plan. These would utilize LID techniques incorporated into project designs to capture and infiltrate stormwater runoff, consistent with Alameda County C.3 Stormwater Technical Guidance, Alameda County NPDES permit, MS4 permits, and/or General Waste Discharge Requirements as applicable. Applicable BMPs would be implemented on a case-by-case basis in accordance with Alameda County NPDES permit.

To ensure that future projects would not generate runoff to the extent that the capacity of existing or planned stormwater drainage systems would be exceeded, proposed Plan Policy P-ENV-33 would require preparation of a drainage study for future projects implemented under the proposed plan. The drainage study would identify existing conditions and verify the capacity of the existing receiving drainage facilities. If the receiving facilities are determined to under capacity, then detention would be considered. Implementation of Policy P-ENV-33 and adherence to the requirements found in the MS4 permit would ensure that no substantial increases in stormwater runoff would occur and that the existing capacity of stormwater drainage systems would not be exceeded. Impacts would be less than significant.

As discussed in Impact 3.9-1, the proposed project would not result in the generation of substantial sources of polluted runoff because development within the Planning Area would be required to comply with NPDES requirements, Phase I MS4 Permit, Provision C.3.c, for post-construction stormwater management including LID. With implementation of these requirements and adherence to the policies and design guidelines listed below, construction and operation of the proposed Plan would result in less than significant impacts related to the creation of runoff.

Proposed General Plan Goals and Policies that Reduce the Impact

Parks, Public Facilities, and Infrastructure Chapter

P-PF-39: Allow the use of rainwater harvesting systems, consistent with regional permit requirements.

P-PF-42: Require new development to incorporate low impact landscape design, such as natural drainage systems and groundwater recharge features, consistent with stormwater permit requirements.

Environmental Resources Chapter

P-ENV-33: Require that a final drainage study be prepared for projects in the Planning Area by a registered civil engineer and submitted to the City of Livermore with the initial grading plan check in accordance with City, County, and engineering standards, prior to issuance of a grading permit. The final study shall identify stormwater runoff quantities (to mitigate the 100-year storm event) from the development of the site and upstream of the site, and shall identify all existing or proposed drainage facilities intended to discharge this runoff. The final study shall include a capacity analysis verifying the adequacy of all facilities to convey runoff to an adequate outfall capable of receiving the stormwater runoff without damage to public or private property. If the receiving facilities are determined to be under capacity, then onsite detention would be considered.

Mitigation Measures

None required.

Impact 3.9-6 Implementation of the proposed Plan would not otherwise substantially degrade water quality. (*Less than Significant*)

As discussed in Impact 3.9-1, construction and operational activities associated with development within the Planning Area would not violate water quality standards because specific projects developed under the proposed Plan would be required to implement the NPDES requirements, Phase I MS4 Permit, Provision C.3.c, for post-construction stormwater management including LID. Construction activities would be required to comply with the Construction General Permit or the construction site requirements of the MS4 Permit depending on the size of the project. This compliance would require implementation of BMPs to reduce impacts to water quality. Operational activities are required to comply with County LID Standards Manual requirements. These LID requirements would require stormwater runoff retainment onsite through the implementation of site design BMPs that would be maintained throughout development operation. Compliance with these requirements, along with adherence to applicable policies contained in the proposed Plan would prevent surface water runoff from the Planning Area from being degraded, and downstream water quality would be maintained. Therefore, the proposed Plan would result in a less than significant impact associated with degrading water quality.

Mitigation Measures

None required.

Impact 3.9-7 Implementation of the proposed Plan would not 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 or structures within a 100-year flood hazard area which would impede or redirect flood flows. (*Less than Significant*)

The Planning Area contains some areas that are within the 500-year and 100-year Floodplain zones, such as areas adjacent to Arroyo Las Positas and Collier Canyon Creek that are already developed with existing commercial land uses. Development in the floodplain is not necessarily prohibited, but it is discouraged in the City of Livermore's General Plan and in FEMA guidance. While no housing is proposed within these Floodplain zones, other types of development could occur within these zones in portions of the Planning Area situated within the vicinity of Arroyo Las Positas. Floodplain encroachment associated with future development within the Planning Area may increase the flood height because of physical barriers and may present a risk to human health and safety. However, adherence to the policies included in the proposed Plan listed below would ensure that impacts associated with floodplain encroachment would be avoided and/or minimized. In particular, the proposed Plan design guidelines reference Chapter 11 of the City's Design Guidelines, which require that new developments adjacent to arroyos be responsible for making necessary flood control improvements. The City's Design Guidelines also stipulate that development in a floodplain is not allowed without significant modification to the site or the building, and that development of buildings or landscaping within the vicinity of floodplains should be done in coordination with jurisdictional agencies, including the Army Corps of Engineers and the Zone 7 Water Agency. Adherence to Plan policies would ensure that impacts related to development within flood zones would be less than significant.

Mitigation Measures

None required.

Impact 3.9-8 Implementation of the proposed Plan would not 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. (*No Impact*)

Lake Del Valle is located south of the Planning Area, and Patterson Reservoir is located east of the Planning Area. However, according to dam failure inundation maps, although portions of the City are within the Del Valle and Patterson Dam inundation zones, the Planning Area is not located within a dam inundation zone (City of Livermore, 2014). There are no levees within or around the Planning Area. Therefore, the proposed Plan would not 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.

Mitigation Measures

None required.

Impact 3.9-9 Implementation of the proposed Plan would not result in inundation by seiche, tsunami, or mudflow. (*No Impact*)

The Planning Area is located approximately 38 miles east of the Pacific Ocean. According to the State of California Tsunami Inundation Map for Emergency Planning, the Planning Area is not located within a tsunami inundation area (CalEMA, n.d). Seiches occur in an enclosed or partially enclosed body of water, such as a lake or reservoir. There are no large bodies of freshwater, such as reservoirs or lakes, within the Planning Area. Therefore, there is no risk of seiches affecting the Planning Area. Although the Planning Area is relatively flat, regional landslide mapping indicated one area of landslide deposits, located mostly to the north of Portola Avenue (Association of Bay Area Governments, n.d). Most of this area is designated Open Space under the proposed Plan, and a portion is already developed with residential use (Shea Montage Homes). Other nearby landslide-susceptible land is located northwest of the Planning Area, which is designated as Open Space. There are also landslide deposits north of the Planning Area on the steeper slopes, but appear to be generally outside the Planning Area (Dyett & Bhatia, 2015). Therefore, no impacts related to inundation by seiche, tsunami, or mudflow would occur.

Mitigation Measures

None required.