

3.9 - Hydrology and Water Quality

3.9.1 - Introduction

This section describes the existing hydrology and water quality setting in the region and project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to hydrology and water quality that could result from implementation of the proposed project. Information in this section is based, in part, on the City of Antioch General Plan and General Plan Environmental Impact Report (EIR) as well as the project-specific Preliminary Stormwater Control Plan, and Water Supply Assessment (WSA), included in Appendix H.

The following comments were received during the EIR scoping period related to hydrology and water quality:

- Request for the provision of a hydrology report that examines the Sand Creek watershed.
- Statement that runoff flow volumes, peaks, and durations for 2-, 5-, 10-, 25-, 50-, and 100-year rainfall events should not exceed pre-project conditions.

3.9.2 - Environmental Setting

Surface Hydrology

Marsh Creek Watershed

The Contra Costa Clean Water Program (CCCWP) designates watersheds in Contra Costa County. The southern portion of the City of Antioch is located within the overarching Marsh Creek Watershed and its tributaries encompass 60,066 acres in East Contra Costa County. Marsh Creek is the longest tributary in the Marsh Creek Watershed and spans 34.57 miles before flowing into the San Joaquin River Delta at Big Break. All tributaries within the Marsh Creek Watershed eventually drain into the San Joaquin River Delta and ultimately the Pacific Ocean.¹

Project Site

The project site is located within the Lower Marsh Creek Sub-Watershed within the overarching Marsh Creek Watershed. Sand Creek, a tributary of Marsh Creek, flows from Empire Mine Road in the northwest corner of the site and through the central portion of the site to the southeastern corner. Sand Creek eventually drains north into Marsh Creek and onward to the San Joaquin River Delta.

Surface Water Quality

Central Valley Region Water Basin

The City of Antioch is located within the Central Valley Region, San Joaquin River Basin Planning Area, under the jurisdiction of the Central Valley Regional Water Quality Control Board (Central Valley RWQCB). The Central Valley Region (Region 5) Water Quality Control Plan outlines the beneficial water uses that the State Water Resources Control Board (State Water Board) will protect,

¹ Contra Costa Clean Water Program (CCCWP). Website: <https://www.cccleanwater.org/watersheds/watersheds-in-contra-costa-county>. Accessed June 12, 2019.

water quality objectives, and strategies for achieving the objectives. The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. It includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed.² The San Joaquin Delta is impacted by low dissolved oxygen, harmful algal blooms, mercury, and pesticides.³

The Central Valley RWQCB deferred oversight of the City of Antioch's permit to the San Francisco RWQCB. As a result, the San Francisco RWQCB oversees the implementation of applicable policies and regulations regarding water quality in the City of Antioch.⁴

Project Site

The project site is located within the North Diablo Range Hydrologic Unit under the jurisdiction of the Central Valley RWQCB.⁵ The United States Environmental Protection Agency (EPA) lists the following water quality impairments to Sand Creek: Chlorpyrifos, dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane (DDT), Dieldrin, E. Coli, Salinity, and unknown toxins.⁶

Ground Basin Hydrology

Tracy Subbasin

The City is located within the Tracy Subbasin of the overarching San Joaquin Valley Groundwater Basin. The Tracy Subbasin encompasses a surface area of 345,000 acres across and underlying portions of San Joaquin, Contra Costa, and Alameda counties. The Tracy Subbasin is bounded by the Solano Subbasin of the Sacramento Groundwater Basin to the north, the Eastern San Joaquin Subbasin to the east, and the Delta-Mendota Subbasin to the south. The primary source of groundwater recharge in the Tracy Subbasin is from seepage from streams and percolation of applied irrigation water.⁷ The City does not currently pump groundwater and does not intend to pump groundwater from the local groundwater basin in the future.⁸

Project Site

The project site contains two active groundwater wells: one for purposes of watering the livestock, and the other for the single-family residence. The site is located within the Tracy Subbasin of the San Joaquin Groundwater Basin.

Groundwater Water Quality

Tracy Subbasin

According to the California Department of Pesticide Regulations, groundwater quality in the Tracy Subbasin is affected by pesticides and inorganic constituents.⁹ The Department of Pesticide Regulation reported that between 1983 and 2003, of groundwater samples collected from 900 wells

² State of California Regional Water Quality Control Board (State Water Board). 2018. Water Quality Control Plan for the Central Valley RWQCB. Page 15.

³ Central Valley Regional Water Quality Control Board (RWQCB). Central Valley Water Board Program Fact Sheet 2018-2019.

⁴ Personal communication by Spencer Pignotti (FCS), Central Valley Regional Water Quality Control Board (RWQCB). October 8, 2019

⁵ Central Valley Regional Water Quality Control Board (RWQCB). 1976. San Joaquin Hydrologic Basin Planning Area map.

⁶ United States Environmental Protection Agency (EPA). 2019. Waterbody Quality Assessment Report.

⁷ Central Valley Regional Water Quality Control Board (RWQCB). 2006. Draft Existing Conditions Report: Groundwater Quality. Page 4-310.

⁸ LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.

⁹ LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.

in San Joaquin County 45 samples had verified detections of pesticides and 84 had unverified detections. These pesticides include 2-amino-4-chloro-6-ethylamino-s-triazine (ACET), atrazine, bromacil, 2,4-diamino-6-chloro-s-triazine (DACT), des-ethyl atrazine (DEA), 3-(3,4-dichlorophenyl)-1,1-dimethylurea (DCMU) [under the trade name of Diuron], norflurazon, and simazine. Elevated chloride concentrations exist in several areas of the Tracy Subbasin including along the San Joaquin River, the northwestern part of the Tracy Subbasin, and in the vicinity of the City of Tracy.¹⁰

Project Site

The California Division of Oil, Gas, and Geothermal Resources determined that the project site contains two known abandoned dry wells. The project site contains two groundwater wells. Further discussion is provided in in Section 3.8, Hazards, Hazardous Materials, and Wildfire.

Stormwater Runoff

City of Antioch

The Central Valley RWQCB administers the National Pollution Discharge Elimination System (NPDES) stormwater permitting program and regulates stormwater in the Central Valley region. Antioch is a permittee under the Phase I Municipal Separate Storm Sewer Systems (MS4) Municipal Stormwater Program (Order No. R5-2010-0102). As described previously, the City of Antioch deferred oversight of the NPDES program to the San Francisco RWQCB. The Antioch Clean Water Program implements the City of Antioch-specific components of the CCCWP. In addition, the City maintains storm drain pipes and catch basins.

Project Site

The project site is located in the Contra Costa County Flood Control and Water Conservation District Drainage Area (DA) 104 for Sand Creek. Currently, the project site is almost entirely undeveloped with open-space and grassland. Almost all existing drainage on the project site consists of overland sheet flow into Sand Creek, except as described below.

The first drainage pathway exception is a man-made ditch along the north central boundary of the project area that was constructed concurrently with the existing residential development to the north. This ditch currently conveys runoff from approximately 17.10 acres to the storm drain system located to the north of the project site. The second drainage pathway exception is an area along the north portion of the site that drains via sheet flow easterly to Deer Valley Road where it is intercepted by a ditch along the western edge of the roadway and conveyed into a 36-inch storm drain line that was constructed as part of the Kaiser medical complex. Runoff from this area (roughly 87.60 acres) is conveyed easterly along Wellness Way, to join an existing major trunk storm drain system (double 84-inch pipes) that runs south to discharge into the Upper Sand Creek Detention Basin.¹¹ Existing drainage in the off-site improvement area consists of sheet flow or pooling on-site.

Based on the project specific report, the project site soils are classified as hydrologic soil groups (HSG) 'C' and 'A' under the Natural Resources Conservation Services (NRCS) hydrologic soil group system. The majority of the project site is classified as HSG 'C' soils, which are composed of Capay

¹⁰ Central Valley RWQCB 2006. Draft Existing Conditions Report: Groundwater Quality, page 4-311.

¹¹ Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 8.

clay (CaA), Rincon clay loam (RbA), Altamont clay (AbE), and Altamont-Fontana complex (AcF). These HSG 'C' soils have a low soil permeability and have a very low potential for water to infiltrate the soil.¹² There is a small section of HSG 'A' soils located in the southwest corner of the southern section of the site consisting of Briones loamy sand (BdE), but this area comprises only 1.5 percent of the project site and would not be developed. The areas mapped for the primary stormwater basins are in soil class 'C'; Capay clay for the southern basin and Rincon clay loam for the northern basin. A 2.80-acre section of off-site land to the north along Dallas Ranch Road currently drains to the site.¹³

Flooding and Inundation

Contra Costa County

100-year Flood

Flood hazard areas—those areas susceptible to flooding—are mapped by the Federal Emergency Management Agency (FEMA). FEMA maps do not take into account future conditions. To protect such areas from flood hazards, FEMA administers the National Flood Insurance Program (NFIP). The NFIP is a federal program created to avert future flood losses through building and zoning ordinances and to provide federally backed flood insurance protection for property owners. The City is a participant in the NFIP.

To support the NFIP, FEMA publishes Flood Insurance Rate Maps (FIRMs) for participating communities, which are used for flood insurance and floodplain management purposes. The FIRMs delineate different special flood hazard area zones. Special flood hazard areas associated with the 1 percent probability of annual exceedance are zones that begin with the letter "A" (e.g., Zone A, Zone AE, and Zone AO). FEMA released a preliminary FIRM No. 06013C0291F for the County on June 16, 2009.

Mudflow

Mudflows typically occur on steep slopes where vegetation is not sufficient to prevent rapid erosion.

Dam-failure Inundation

The Contra Loma Dam is located at the southwest edge of the City of Antioch. A small portion of the City is located below the Contra Loma Dam and Reservoir.¹⁴ The Bureau of Reclamation Division of Dam Safety determined that "safe performance of the dam can be expected under all anticipated loading conditions, including the maximum credible earthquake and probable maximum flood events."¹⁵

Project Site

100-year Flood

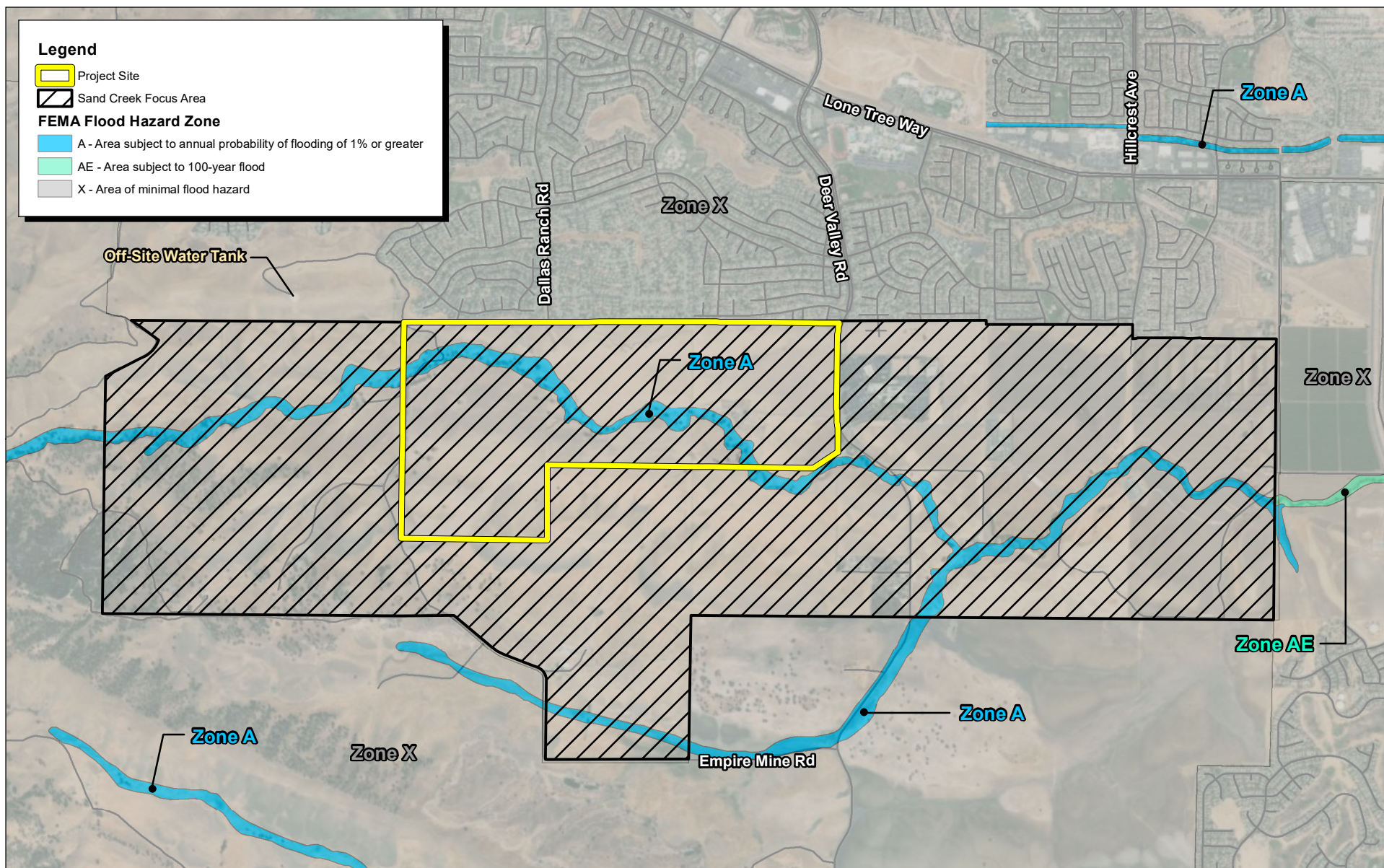
According to FEMA FIRM No. 06013C0331, portions of the project site are located within Flood Hazard Zones A and X (Exhibit 3.9-1). Flood Zone A is described by FEMA as an area subject to inundation by the 1 percent annual chance flood (also known as the 100-year Frequency Flood). The area of the site identified as Zone A follows the course of Sand Creek. The remaining areas of the project site are designated Zone X, which is described by FEMA as an area of minimal flood risk, between the 100-year to 500-year flood levels.

¹² Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 5.

¹³ Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 7.

¹⁴ LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.

¹⁵ LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.



Source: ESRI Aerial Imagery. ESRI National Flood Hazard Layer (NFHL) - FEMA Data.

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Mudflow

The topography of the site is varied, ranging from relatively level areas in the eastern and central portions of the site, to moderate to steep slopes in the western portion of the site. The elevation on the project site ranges from approximately 220 feet above mean seal level (MSL) along Deer Valley Road to more than 400 MSL in the western and southwestern portions of the site. The slopes adjacent to Sand Creek generally vary in height between 5 feet and 40 feet, and can be as steep as 1:1 (horizontal: vertical).

Dam-failure Inundation

The project site is located to the southeast of the Contra Loma Dam and Reservoir. As shown in Figure 4.7-3 of the Antioch General Plan Update, the Contra Loma Dam Inundation Zone would extend north to the San Joaquin River but would not impact any portion on the project site.¹⁶

3.9.3 - Regulatory Framework

Federal

Clean Water Act

The Clean Water Act (CWA) (33 United States Code [USC] § 1251, *et seq.*) is the major federal legislation governing the water quality aspects of construction and operation of the project. The CWA established the basic structure for regulating discharges of pollutants into waters of the United States (not including groundwater) and waters of the State. The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” The CWA establishes the basic structure for regulating the discharge of pollutants into waters of the United States.

The CWA authorizes the EPA to implement pollution control programs. Under the CWA, it is unlawful for any person to discharge any pollutant from a point source into navigable waters, unless an NPDES permit is obtained. In addition, the CWA requires each state to adopt water quality standards for receiving water bodies and to have those standards approved by the EPA. Water quality standards consist of designated beneficial uses for a particular receiving water body (e.g., wildlife habitat, agricultural supply, fishing), along with water quality objectives necessary to support those uses.

Responsibility for protecting water quality in California resides with the State Water Board and the nine RWQCBs. The State Water Board establishes Statewide policies and regulations for the implementation of water quality control programs mandated by federal and State water quality statutes and regulations. The RWQCBs develop and implement water quality control plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. Water quality standards applicable to the project are listed in the Central Valley (Region 5) RWQCB Basin Plan.

Section 303—Water Quality Standards and Total Maximum Daily Loads

Section 303(c)(2)(b) of the CWA requires states to adopt water quality standards for all surface waters of the United States based on the water body’s designated beneficial use. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric,

¹⁶ LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-5.

although narrative criteria based on biomonitoring methods may be employed where numerical standards cannot be established or where they are needed to supplement numerical standards.

CWA Section 303(d) requires states and authorized Native American tribes to develop a list of water quality impaired segments of waterways. The list includes waters that do not meet water quality standards necessary to support a waterway's beneficial uses even after the minimum required levels of pollution control technology have been installed. Listed water bodies are to be priority ranked for development of a Total Maximum Daily Load (TMDL). A TMDL is a calculation of the total maximum daily load (amount) of a pollutant that a water body can receive on a daily basis and still safely meet water quality standards. The TMDLs include waste load allocations for urban stormwater runoff as well as municipal and industrial wastewater discharges, with allocations apportioned for individual MS4s and wastewater treatment plants, including those in Contra Costa County. For stormwater, load reductions would be required to meet the TMDL waste load allocations within the 20 years required by the TMDLs.

The State Water Board, RWQCBs, and EPA are responsible for establishing TMDL waste load allocations and incorporating approved TMDLs into water quality control plans, NPDES permits, and Waste Discharge Requirements (WDRs) in accordance with a specified schedule for completion. The Central Valley RWQCB develops TMDLs for the City of Antioch.

Section 401—Water Quality Certification

Section 401 of the CWA requires compliance with State water quality standards for actions within State waters. Under CWA Section 401, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate agency stating that the fill is consistent with the State's water quality standards and criteria. In California, the State Water Board delegates authority to either grant water quality certification or waive the requirements to the nine RWQCBs. The Central Valley RWQCB is responsible for the project site.

Section 402—National Pollution Discharge Elimination System Permits

The RWQCBs administer the NPDES stormwater permitting program, under Section 402(d) of the federal CWA, on behalf of the EPA. The objective of the NPDES program is to control and reduce levels of pollutants in water bodies from discharges of municipal and industrial wastewater and stormwater runoff. CWA Section 402(d) establishes a framework for regulating nonpoint-source stormwater discharges (33 USC 1251). Under the CWA, discharges of pollutants to receiving water are prohibited unless the discharge complies with an NPDES permit. The NPDES permit specifies discharge prohibitions, effluent limitations, and other provisions, such as monitoring deemed necessary to protect water quality based on criteria specified in the National Toxics Rule (NTR), the California Toxics Rule (CTR), and the Basin Plan.

Discharge prohibitions and limitations in an NPDES permit for wastewater treatment plants are designed to maintain public health and safety, protect receiving-water resources, and safeguard the water's designated beneficial uses. Discharge limitations typically define allowable effluent quantities for flow, biochemical oxygen demand, total suspended matter, residual chlorine, settleable matter, total coliform, oil and grease, pH, and toxic pollutants. Limitations also typically encompass narrative requirements regarding mineralization and toxicity to aquatic life. Under the NPDES permits issued to the City/County to operate the treatment plants, the City/County is required to implement a

pretreatment program. This program must comply with the regulations incorporated in the CWA and the General Pretreatment Regulations (Code of Federal Regulations [CFR] Title 40, Part 403).

Section 404—Disturbance of Waters of the United States Permit

Section 404 of the CWA regulates temporary and permanent fill and disturbance of wetlands and waters of the United States. Under Section 404, the discharge (temporary or permanent) of dredged or fill material into waters of the United States, including wetlands, typically must be authorized by the United States Army Corps of Engineers (USACE) through either the Nationwide Permit (general categories of discharges with minimal effects) or the Individual Permit.

National Pollutant Discharge Elimination Program

Pursuant to Section 402 of the CWA and the Porter-Cologne Water Quality Control Act, municipal stormwater discharges in the City of Antioch are regulated under the Central Valley Region Municipal Regional Stormwater Issuing Waste Discharge Requirements and NPDES Permit, Order No. R5-2010-0102, NPDES Permit No. CAS083313, adopted October 23, 2010. The City of Antioch's NPDES/MS4 permit is overseen by the San Francisco RWQCB.

The City of Antioch is a member agency of the CCCWP, which assists municipalities and other agencies in Contra Costa County with implementation of the NPDES Permit. NPDES Provision C.3 addresses post-construction stormwater management requirements for new development and redevelopment projects that add and/or replace 10,000 square feet or more of impervious area. Provision C.3 requires the incorporation of site design, source control, and stormwater treatment measures into development projects in order to minimize the discharge of pollutants in stormwater runoff and non-stormwater discharges and to prevent increases in runoff flows. Low Impact Development (LID) methods are to be the primary mechanism for implementing such controls. NPDES Provision C.3(g) pertains to hydromodification management requirements. This NPDES Permit provision requires five Control Design Criteria to be implemented: range of flows to control, goodness of fit criteria, allowable low flow rate, standard hydromodification modeling, and alternate hydromodification modeling and design. As noted above, projects disturbing more than 1 acre of land during construction are required to comply with the NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002 (Construction General Permit). Construction General Permit activities are regulated at a local level by the RWQCB.

To obtain coverage under the Construction General Permit, a project applicant must provide a Notice of Intent, a Storm Water Pollution Prevention Plan (SWPPP), and other documents required by Attachment B of the Construction General Permit. Activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as grubbing or excavation. This permit also covers linear underground and overhead projects such as pipeline installations.

The Construction General Permit uses a risk-based permitting approach and mandates certain requirements based on the project risk level (Level 1, Level 2, or Level 3). The project risk level is based on the risk of sediment discharge and the receiving water risk. The sediment discharge risk depends on project location and timing (such as wet season versus dry season activities). The receiving water risk depends on whether the project would discharge to sediment-sensitive receiving water. The

determination of the project risk level would be made by project applicants when the Notice of Intent is filed (and more details of the ultimate timing of the construction activity are confirmed).

The performance standard in the Construction General Permit is that dischargers minimize or prevent pollutants in stormwater discharges and authorized non-stormwater discharges through the use of controls, structures, and Best Management Practices (BMPs). A SWPPP must be prepared by a qualified SWPPP developer that meets the certification requirements in the Construction General Permit. The purpose of the SWPPP is (1) to help identify the sources of sediment and other pollutants that could affect the quality of stormwater discharges, and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges resulting from construction activity. Operation of BMPs must be overseen by a qualified SWPPP practitioner who meets the requirements outlined in the permit.

River and Harbors Act Section 10

Section 10 of the Rivers and Harbors Act of 1899 requires that regulated activities conducted below the ordinary high-water elevation of navigable waters of the United States be approved and permitted by the USACE. Regulated activities include the placement or removal of structures, work involving dredging, disposal of dredged material, filling, excavation, or any other disturbance of soils/sediments or modification of a navigable waterway. Navigable waters of the United States are those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high-water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. Section 10 also regulates tributaries and backwater areas that are associated with navigable waters of the United States and are located below the ordinary high-water elevation of the adjacent navigable waterway.

Federal Antidegradation Policy

The federal antidegradation policy (40 CFR § 131.12) is designed to protect existing water uses, water quality, and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing instream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

National Toxics Rule and California Toxics Rule

In 1992, the EPA promulgated the NTR under the CWA to establish numeric criteria for priority toxic pollutants for 14 states to bring all states into compliance with the requirements of CWA Section 303(c)(2)(B). The NTR established water quality standards for 42 pollutants not covered under

California's Statewide water quality regulations at that time. As a result of the court-ordered revocation of California's Statewide Basin Plans in September 1994, the EPA initiated efforts to promulgate additional federal water quality standards for California. In May 2000, the EPA issued the CTR, which includes all the priority pollutants for which the EPA has issued numeric criteria not included in the NTR.

Executive Order 11988

Executive Order 11988, "Floodplain Management," directs all federal agencies to avoid, to the extent possible, long- and short-term adverse impacts of occupancy and modification of floodplains, and to avoid supporting development in a floodplain either directly or indirectly wherever there is a practicable alternative. Compliance requirements are outlined in 23 Code of Federal Regulations 650, Subpart A, "Location and Hydraulic Design of Encroachment on Floodplains."

If a project involves significant encroachment into the floodplain, the final environmental document must include:

- The reasons why the proposed action must be located in the floodplain,
- Alternatives considered and the reasons they were not practicable, and
- A statement indicating whether the action conforms to applicable State or local floodplain protection standards.

National Flood Insurance Act of 1968 and Flood Disaster Protection Act of 1973

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were enacted to reduce the need for flood protection structures and limit disaster relief costs by restricting development in floodplains. FEMA, established in 1979, is responsible for predicting hazards from flooding events and forecasting the level of inundation under various conditions. As part of its duty to develop standards for delineating fluvial and coastal floodplains, FEMA provides information on FIRMs about the potential for flood hazards and inundation and, where appropriate, designates regions as special flood hazard areas. Special flood hazard areas are defined as areas that have a 1 percent chance of flooding in a given year.

National Flood Insurance Program

FEMA oversees floodplains and administers the NFIP adopted under the National Flood Insurance Act of 1968. This federal program enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. Areas of special flood hazard (those subject to inundation by a 100-year flood) are identified by FEMA through regulatory flood maps FIRMs. The NFIP mandates that development cannot occur within the regulatory floodplain (typically the 100-year floodplain) if that development results in more than a 1-foot increase in flood elevation. In addition, development is not allowed in delineated floodways within the regulatory floodplain.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is California's statutory authority for the protection of water quality. Under the Porter-Cologne Act, the State must adopt

water quality policies, plans, and objectives that protect the State's waters for the use and enjoyment of the people. Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The RWQCBs are required to formulate and adopt Basin Plans for all areas in the region and establish water quality objectives in the plans. The Porter-Cologne Act sets forth the obligations of the State Water Board and RWQCBs to adopt and periodically update Basin Plans. The Central Valley RWQCB is responsible for the project site.

Basin Plans are the regional water quality control plans required by both the CWA and the Porter-Cologne Act that establish beneficial uses, water quality objectives, and implementation programs for each of the nine regions in California. The Act also requires waste dischargers to notify the RWQCBs of their activities by filing reports of waste discharge and authorizes the State Water Board and RWQCBs to issue and enforce WDRs, NPDES permits, CWA Section 401 water quality certifications, or other approvals. The RWQCBs are also authorized to issue waivers to reports of waste discharge and WDRs for broad categories of "low threat" discharge activities that have minimal potential to cause adverse water quality effects when implemented according to prescribed terms and conditions.

National Pollutant Discharge Elimination System (See analysis above)

The NPDES permits all involve similar processes, which include submitting notices of intent for discharging to water in areas under the Central Valley RWQCB's jurisdiction and implementing BMPs to minimize those discharges.

General Construction Activity Permit

The State Water Board stormwater general permit for construction activity (Order 2009-009-DWQ, as amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ) applies to all construction activities that would disturb 1 acre of land or more. Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters.

Through the NPDES and WDR processes, the State Water Board seeks to ensure that the conditions at a project site during and after construction do not cause or contribute to direct or indirect impacts on water quality (i.e., pollution and/or hydromodification) upstream and downstream. To comply with the requirements of the construction general permit, the project Applicant must file a notice of intent with the State Water Board to obtain coverage under the permit; prepare a SWPPP; and implement inspection, monitoring, and reporting requirements appropriate to the project's risk level as specified in the SWPPP. The SWPPP includes a site map, describes construction activities and potential pollutants, and identifies BMPs that will be employed to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources, such as petroleum products, solvents, paints, and cement. The permit also requires the discharger to consider using post-construction permanent BMPs that will remain in service to protect water quality throughout the life of the project. All NPDES permits also have inspection, monitoring, and reporting requirements.

Industrial General Stormwater Permit

The Statewide Stormwater NPDES permit for general industrial activity (Order 2014-0057-DWQ, superseding Order 97-03-DWQ) regulates discharges associated with 10 broad categories of

industrial activities, such as operation of wastewater treatment works, and with recycling facilities. The industrial general permit requires the implementation of Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology to achieve performance standards. The permit also requires development of a SWPPP that identifies the site-specific sources of pollutants and describes the measures at the facility applied to reduce stormwater pollution. A monitoring plan is also required.

NPDES Stormwater Permit

In November 1990, the EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase I of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase II of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects disturbing 1–5 acres. Phase II of the municipal permit system (known as the NPDES General Permit for Small MS4s, Order No. 2003-0005-DWQ as amended by 2013-0001-DWQ) required small municipalities of fewer than 100,000 persons to develop stormwater management programs. This permit authorizes discharges of stormwater and some categories of non-stormwater that are not “significant contributors of pollutants.”

Provision C.3 in the Municipal Regional Permit 2.0 requires site designs for new developments and redevelopments to minimize the area of new roofs and paving and treat runoff, and in some cases, control the rates and durations of site runoff. Where feasible, pervious surfaces should be used instead of paving so that runoff can infiltrate to the underlying soil. Runoff should be dispersed to landscaping where possible. Remaining runoff from impervious areas must be treated using bioretention. In some developments, the rates and durations of site runoff must also be controlled.

The C.3 requirements are separate from, and in addition to, requirements for erosion and sediment control and for pollution prevention measures during construction. In addition, project applicants must execute agreements to allow municipalities to verify that stormwater treatment and flow-control facilities that are approved as part of new development are maintained in perpetuity.

California Toxics Rule and State Implementation Policy

The CTR, presented in 2000 in response to requirements of EPA’s NTR, establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The CTR criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are on the CWA Section 303(c) list for contaminants. The CTR includes criteria for the protection of aquatic life and human health. Human health criteria (water- and organism-based) apply to all waters with a municipal and domestic water supply beneficial use designation as indicated in the Basin Plans. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Policy, was adopted by the State Water Board in 2000. It establishes provisions for translating CTR criteria, NTR criteria, and Basin Plan water quality objectives for toxic pollutants into:

- NPDES permit effluent limits,
- Effluent compliance determinations,
- Monitoring for 2,3,7,8-tcdd (dioxin) and its toxic equivalents,

- Chronic (long-term) toxicity control provisions,
- Site-specific water quality objectives, and
- Granting of effluent compliance exceptions.

The goal of the State Implementation Plan is to establish a standardized approach for permitting discharges of toxic effluent to inland surface waters, enclosed bays, and estuaries throughout the State.

Sustainable Groundwater Management Act

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package, composed of Assembly Bill 1739 (AB 1739) (Dickinson), Senate Bill 1168 (SB 1168) (Pavley), and SB 1319 (Pavley), collectively known as the Sustainable Groundwater Management Act (SGMA). SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline.

SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and requires those GSAs to adopt Groundwater Sustainability Plans (GSPs) for crucial groundwater basins in California. Portions of the City are located in the East Contra Costa County Subbasin. The City has become a GSA and entered into a Memorandum of Understanding (MOU) with eight other local agencies to collaborate and develop a single GSP for the Tracy Subbasin.

Regional

Central Valley Regional Water Quality Control Plan

The Central Valley RWQCB implements the San Joaquin/Sacramento Rivers Basin Plan, a master policy document for managing water quality in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region. The San Joaquin River Basin Plan applies to the project site because the project site is located within the San Joaquin Hydrologic Basin Planning Area. The Central Valley RWQCB has jurisdiction over the City of Antioch; the Central Valley RWQCB has deferred oversight of the MS4 requirements under its NPDES permit for the City of Antioch to the San Francisco RWQCB. No other authority has been granted.

Contra Costa Clean Water Program

The CCCWP is within the jurisdiction of the Central Valley RWQCB. The CCCWP works to protect local creeks, reservoirs, watersheds, and San Francisco Bay from contamination and pollution required by federal and State clean water regulations.

Local

City of Antioch General Plan

The following objectives and policies of the Antioch General Plan, including policies from Section 4.4.6.7 specific to the Sand Creek Focus Area, are applicable to the hydrology and water quality aspects of the proposed project.

Land Use Element

- **Policy 4.4.6.7s:** Sand Creek, ridgelines, hilltops, stands of oak trees, and significant landforms shall be preserved in their natural condition. Overall, a minimum of 25 percent of the Sand Creek Focus Area shall be preserved in open space, exclusive of lands developed for golf course use.
- **Policy 4.4.6.7t:** Adequate buffer areas adjacent to the top of banks along Sand Creek to protect sensitive plant and amphibian habitats and water quality shall be provided. Adequate buffer areas shall also be provided along the edge of existing areas of permanently preserved open space adjacent to the Sand Creek Focus Area, including but not limited to the Black Diamond Mines Regional Park. Buffers established adjacent to existing open space areas shall be of an adequate width to minimize light/glare, noise, fire safety, public safety, habitat, public access impacts within the existing open space areas, consistent with the provisions of Section 10.5, Open Space Transitions and Buffers Policies of the General Plan.

Public Services and Facilities Element

- **Objective 8.7.1:** Conduct all stormwater via adequately sized storm drains and channels.
- **Policy 8.7.2a:** Continue working with the Contra Costa County Flood Control District to ensure that runoff from new development is adequately handled.
- **Policy 8.7.2b:** Require adequate infrastructure to be in place and operational prior to occupancy of new development, such that:
 - New development will not negatively impact the performance of storm drain facilities serving existing developed areas and
 - The performance standards set forth in the Growth Management Element will continue to be met.
- **Policy 8.7.2c:** Design flood control within existing creek areas to maximize protection of existing natural settings and habitat.
- **Policy 8.7.2d:** Provide retention basins in recreation areas where feasible to reduce increases in the amount of runoff resulting from new development.
- **Policy 8.7.2e:** Require new developments to provide erosion and sedimentation control measures to maintain the capacity of area storm drains and protect water quality.
- **Policy 8.7.2f:** Require implementation of Best Management Practices in the design of drainage systems to reduce discharge of nonpoint source pollutants originating in streets, parking lots, paved industrial work areas, and open spaces involved with pesticide applications.

Resource Management Element

- **Objective 10.3.1:** Maintain, preserve, and acquire open space and its associated natural resources by providing parks for active and passive recreation, trails, and by preserving natural, scenic, and other open space resources.
- **Policy 10.3.2d:** Where significant natural features are present (e.g., ridgelines, natural creeks and other significant habitat areas, rock outcrops, and other significant or unusual landscape features), require new development to incorporate natural open space areas into project design. Require dedication to a public agency or dedication of a conservation easement,

preparation of maintenance plans, and provision of appropriate maintenance in perpetuity of such open space areas.

- **Policy 10.3.2f:** Encourage public access to creek corridors through the establishment of trails adjacent to riparian resources, while maintaining adequate buffers between creeks and trails to protect sensitive habitats, special-status species and water quality to the maximum extent feasible.
- **Policy 10.7.2b:** Require new development to be equipped with drought tolerant landscaping and water conservation devices.
- **Policy 10.7.2d:** Protect, where possible, groundwater recharge areas, including protection of stream sides from urban encroachment.
- **Policy 10.7.2e:** Oppose proposals with the potential to increase the salinity of the Delta and/or endanger the City's rights to divert water from the San Joaquin River.
- **Policy 10.7.2f:** Participate in the Contra Costa Clean Water program to reduce stormwater pollution and protect the water quality of the City's waterways.
- **Policy 10.7.2g:** Require public and private development projects to be in compliance with applicable National Pollution Discharge Elimination System (NPDES) permit requirements, and require the implementation of best management practices to minimize erosion and sedimentation resulting from new development.
- **Policy 10.7.2i:** Design drainage within urban areas to avoid runoff from landscaped areas and impervious surfaces from carrying pesticides, fertilizers, and urban and other contaminants into natural streams.

Environmental Hazards Element

- **Objective 11.4.1:** Minimize the potential for loss of life, physical injury, property damage, and social disruption resulting from flooding.
- **Policy 11.4.2a:** Prohibit all development within the 100-year floodplain, unless mitigation measures consistent with the National Flood Insurance Program are provided.
- **Policy 11.4.2b:** Minimize encroachment of development adjacent to the floodways in order to convey flood flows without property damage and risk to public safety. Require such development to be capable of withstanding flooding and to minimize the use of fill.
- **Policy 11.4.2c:** Prohibit alteration of floodways and channelization of natural creeks if alternative methods of flood control are technically and financially feasible. The intent of this policy is to balance the need for protection devices with land use solutions, recreation needs, and habitat preservation.
- **Policy 11.4.2d:** Require new development to prepare drainage studies to assess storm runoff impacts on the local and regional storm drain and flood control system, along with implementation of appropriate detention and drainage facilities to ensure that the community's storm drainage system capacity will be maintained and peak flow limitations will not be exceeded.
- **Policy 11.4.2e:** Where construction of a retention basin is needed to support new development, require the development to provide for the perpetual funding and ongoing maintenance of the basin.
- **Policy 11.4.2f:** Eliminate hazards caused by local flooding through improvements to the area's storm drain system or creek corridors as resources allow.

City of Antioch Municipal Code

Section 8-13.01: Storm Water Control Plan Required

Because construction activity during land development has the potential to result in pollution of nearby waterways, City of Antioch Municipal Code Section 8-13.01 requires the implementation of stormwater pollution control measures during all construction phases.

Title 6; Chapter 9: Stormwater Management and Discharge Control

Chapter 9 of the Municipal Code aims to protect and enhance water quality in the City's waterways consistent with the Porter-Cologne Water Quality Control Act and the CWA. The chapter implements the conditions of the City's NPDES permit in order to ensure proper source pollutant control. Additionally, the chapter contains site design and stormwater treatment measures for projects that create one or more acres of impervious surface. The stormwater treatment measures are intended to minimize non-stormwater discharges, minimize nonpoint sources of pollution, control discharges to the City's stormwater system from spills, dumping or disposal, and reduce stormwater runoff rates and volumes.

3.9.4 - Impacts and Mitigation Measures

Significance Criteria

According to the 2019 Guidelines for Implementing the California Environmental Quality Act (CEQA) Appendix G, to determine whether impacts related to hydrology and water quality are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?
- b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
- c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
 - (i) result in substantial erosion or siltation on- or off-site;
 - (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
 - (iii) 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; or
 - (iv) impede or redirect flood flows?
- d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?
- e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Approach to Analysis

Impacts related to hydrology and water quality were determined by reviewing information regarding regional and local hydrology, climate, topography, and geology contained in the City of Antioch General

Plan and EIR, Central Valley RWQCB Sacramento/San Joaquin Rivers Basin Plan, FEMA FIRMs, and project-specific Preliminary Stormwater Control Plans. Evaluation of impacts is based on comparison of existing conditions to the project's built condition, such as changes in impervious area and facilities located within flood zones. Specifically, the impact evaluation focuses on effects on surface and groundwater quality, groundwater supply, and drainage (in terms of erosion, siltation, flooding, stormwater system exceedance, and polluted runoff). Water quality conditions are compared with water quality standards and WDRs by identifying potential contaminants and pollution pathways, amount of impervious area, and runoff treatment requirements. Finally, as part of the analysis, inundation and flooding on the project site is assessed by reviewing potential inundation zone elevations relative to the final grade elevations of facilities and features for the project.

Impact Evaluation

Surface and Groundwater Quality

Impact HYD-1: **The proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.**

Construction

Construction activities could expose soils on the project site to potential water erosion and construction equipment-related pollutants. Runoff carrying eroded soils and pollutants could enter storm drainage systems and enter Sand Creek, increasing sedimentation and degrading downstream water quality. These sediments could also be carried downstream and discharged into the San Joaquin River Delta leading to the San Francisco Bay and Pacific Ocean, degrading surface water quality, or allowed to seep into the associated groundwater table. However, Chapter 9 of the City's Municipal Code, Storm Water Management and Discharge Control, requires projects that would disturb more than 1 acre of land to comply with the City's NPDES permit. Consequently, given that proposed construction would disturb more than 1 acre of land, the proposed project would be required by the State to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit). Compliance with the Construction General Permit requires the project Applicant to file a Notice of Intent (NOI) with the State Water Board and prepare a SWPPP prior to construction. The SWPPP would incorporate BMPs to reduce pollutants from construction activities potentially entering surface waters.

As described in the Preliminary Stormwater Control Plan, the majority of project site soils have a very low potential for infiltration and would prevent most pollutants from seeping into groundwater.¹⁷ Furthermore, implementation of the SWPPP would also prevent pollutants from entering the Tracy Subbasin by implementing BMPs, such as dust-control watering and fiber rolls, which would prevent pollutants from moving off-site. Although construction activities have the potential to generate increased sedimentation, compliance with applicable policies and regulations of would minimize the potential to degrade water quality in downstream water bodies to the maximum extent possible. Therefore, construction impacts related to surface and groundwater and respective water quality would be less than significant and no mitigation is required.

¹⁷ Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 5.

Operation

Operation of the proposed project would result in an increase of impervious surfaces on the project site and in turn generate stormwater runoff, which may carry pollutants such as pesticides, fertilizers, and deposits of fluids and metals from motor vehicles into Sand Creek or allow seepage of such pollutants into the associated groundwater table. However, the project site has soils with a very low potential for infiltration, and, thus, potential project operation impacts to groundwater quality would be low.

As shown in Exhibit 3.9-2, the project site would be divided into five main drainage management areas (DMAs). Within each DMA, the proposed project would include Integrated Management Practices (IMPs) that provide full bioretention treatment of stormwater runoff. In addition, each DMA would include a gravity-flow storm drainage system that would collect stormwater and convey it to an IMP feature, such as a stormwater retention basin, specifically designed for the pertinent amount of impervious and pervious surfaces. As discussed further under Impact HYD-3, the proposed stormwater retention basins would contain stormwater cisterns, which would include full water-quality treatment per C.3 criteria. In addition, stormwater entering the stormwater cisterns would percolate through a bioretention medium, or filter, that would provide water quality treatment to stormwater prior to discharge into Sand Creek. Stormwater pollutants would be contained within the retention basins further reducing potential surface or groundwater quality impacts. Additionally, the proposed project would include several permanent and operational BMPs that would further reduce the project's potential to generate pollutants that could degrade surface or groundwater quality. The proposed project's potential sources of runoff pollutants and permanent source controls BMPs are summarized in Table 3.9-1.

Table 3.9-1: Operational Stormwater Source Control BMPs

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
On-site dumping into storm drain inlets	All accessible inlets will be marked with the words "No Dumping! Drains to Sand Creek" or similar wording.	Markings will be periodically repainted or replaced. Inlets and pipes conveying stormwater to all IMPs will be inspected and maintained as part of the Project Operations and maintenance Plan. Provide stormwater pollution prevention information to new site homeowners.
Indoor and structural pest control	—	Provide Integrated Pest Management (IPM) information to owners, lessees, and operators
Landscape/outdoor pesticide use	Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Minimize irrigation and runoff and promote infiltration where appropriate. Minimize the use of fertilizers and pesticides. Use pest-resistant plants, especially adjacent to hardscape, when possible. Use plantings appropriate to the site soils, slopes, climate, sun, wind land use, air movement, ecological consistency, and plant interactions.	—

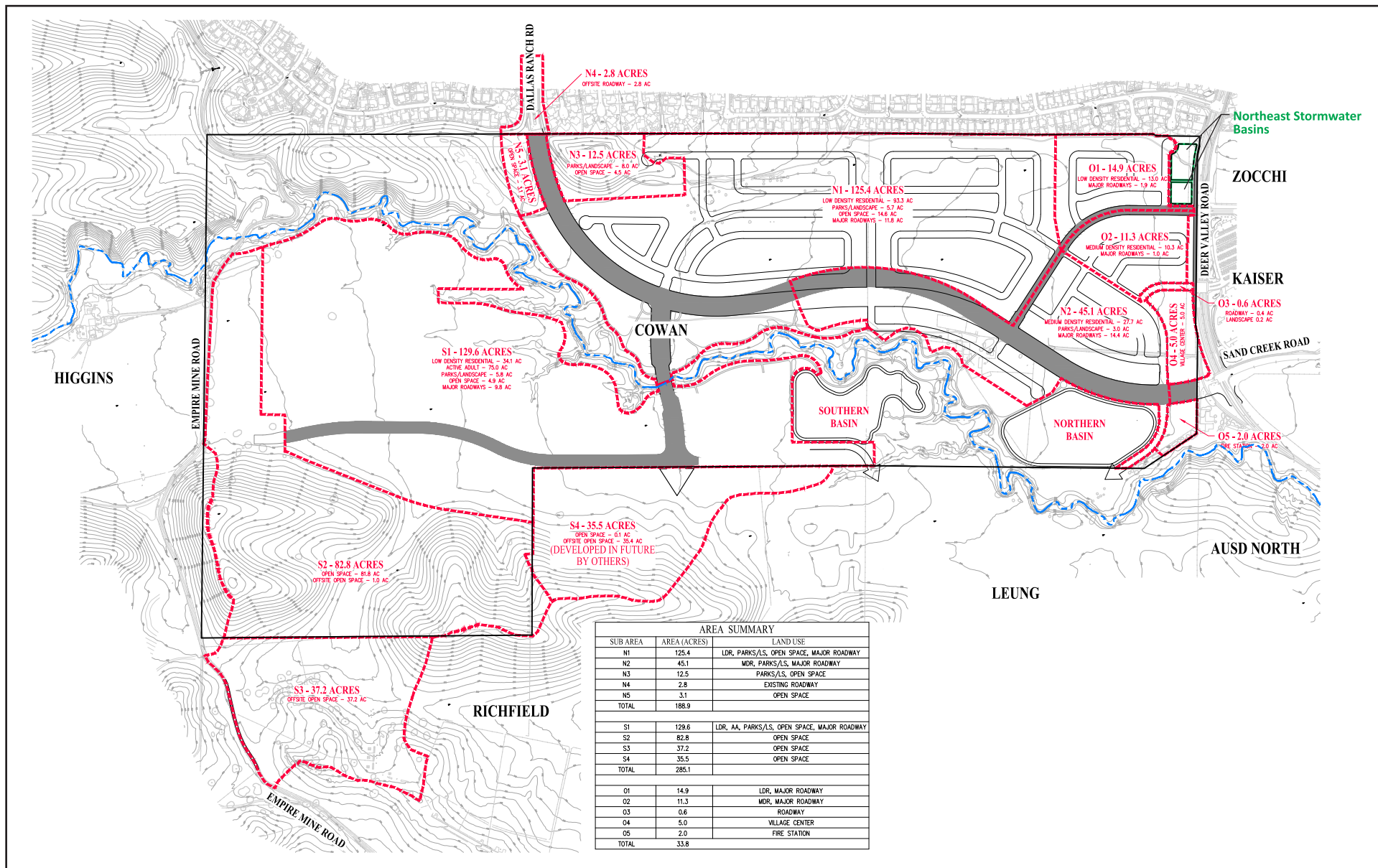
Table 3.9-1 (cont.): Operational Stormwater Source Control BMPs

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
Vehicle washing	Stormwater pollution prevention information will be distributed to homeowners.	—
Roofing, gutters, and trim	Do not utilize roofing, gutter, or architectural trim materials made of copper or other unprotected metals that would leach into the storm water runoff.	—
Fire Sprinkler Test Water	Provide means to drain fire sprinkler test water to sanitary sewer system.	See note in Fact Sheet SC-41, “Building and Grounds Maintenance,” in the California Stormwater Quality Association (CASQA) Stormwater Quality Handbooks at www.cabmphandbooks.com
Air Conditioning	Air conditioner condensation shall be directed to landscaped areas or plumbed to the sanitary sewer	—
Plazas, sidewalks, and parking lots	—	Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm draining to prevent entry into the storm drain system.
Source: Carlson, Barbee & Gibson, Inc. Preliminary Stormwater Control Plan. 2019.		

As a result, the combination of very-low infiltration soils, on-site stormwater treatment facilities, and source control BMPs would prevent project operation from significantly degrading surface or groundwater quality. Therefore, operational impacts related to surface and groundwater and respective water quality would be less than significant and no mitigation is necessary.

Level of Significance

Less Than Significant



Source: CBG Civil Engineers, September 2019.



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Groundwater Supply/Recharge

Impact HYD-2: **The proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.**

Construction/Operation

The proposed project would develop 373.60 acres of the 551.50-acre project site and result in 7,731,723 square feet of impervious surfaces. While the tenant currently pumps groundwater for watering livestock and the single-family home use, the proposed project does not propose to pump groundwater from the local groundwater basin in the future for operational activities. Thus, the project would not result in increased withdrawals from, or depletion of, groundwater supplies.

The proposed project would result in an increase in impervious surfaces (e.g., roads, driveways, and roofs), which would reduce the infiltration of groundwater to the underlying groundwater basin. The majority of the project site's on-site soils are characterized as having low soil permeability as only 1.5 percent of the project site contains HSG A soils. The HSG A soils are located in the southern section of the site that would not be developed.¹⁸ Therefore, on-site soils have limited potential for direct infiltration of stormwater. Thus, the proposed project would not be expected to impact groundwater supplies or recharge due to the low possibility of stormwater infiltration on the project site.

The majority of stormwater runoff from the site currently flows into Sand Creek, where waters are allowed to percolate and contribute to groundwater recharge in the area. The proposed stormwater facilities include basins where percolation into the underlying groundwater could occur. In addition, the proposed stormwater facilities, IMPs 4 and 5, would continue to drain into Sand Creek. Accordingly, implementation of the proposed project would continue to allow runoff to contribute to groundwater recharge. Thus, development of the proposed project would not interfere substantially with groundwater recharge.

In conclusion, the proposed project would not interfere substantially with groundwater supply, recharge, or groundwater management. Therefore, impacts related to groundwater recharge and supply would be less than significant.

Level of Significance

Less Than Significant

¹⁸ Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 5.

Stormwater Drainage Leading to Erosion/Siltation, Flooding, Additional Sources of Polluted Runoff, or Impedance of Flood Flows

- Impact HYD-3:** The proposed project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
- i) result in substantial erosion or siltation on- or off-site;
 - (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
 - (iii) 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; or
 - (iv) impede or redirect flood flows?
-

Construction*Erosion and Siltation*

Construction of the proposed project would have a significant impact if it were to substantially alter the existing drainage pattern of the site in a manner that would result in substantial erosion or siltation on- or off-site. Such drainage effects could occur from grade changes at the project site and the off-site improvement area, exposure of soils for periods of time during stormwater discharge, or alterations to creek beds. Project construction would involve grading, earth-moving activity, and soil disturbance that would take place over 373.60 acres of the acre project site and the off-site improvement area. Chapter 9 of the City's Municipal Code, Storm Water Management and Discharge Control, requires projects that will disturb more than 1 acre of land, such as the proposed project, to comply with the City's NPDES permit. Consequently, the Applicant would be required by the State to obtain coverage under the State General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit), which pertains to erosion- and siltation-related pollution from grading and project construction. Compliance with the Permit requires the project Applicant to file an NOI with the State Water Board and prepare a SWPPP prior to construction. The SWPPP would incorporate BMPs in order to prevent, or reduce to the greatest feasible extent, adverse impacts to water quality from erosion and sedimentation. Therefore, construction impacts related to alteration of drainage patterns resulting in erosion or siltation would be less than significant.

Increased Runoff Resulting in Flooding

Impacts related to the potential for the project's change in impervious surfaces to increase the rate or amount of surface runoff and result in flooding are limited to operational impacts. As such, no construction impacts related to increased runoff resulting in flooding would occur.

Additional Source of Polluted Runoff or Exceedance of Storm Drainage System Capacity

The proposed project would be required to implement a SWPPP as part of its Construction General Permit to ensure that additional sources of polluted runoff is prevented during construction. Thus, construction of the project would not create or contribute runoff water that would provide substantial additional sources of polluted runoff. Project construction includes the creation of expanded storm drain capacity along Dallas Ranch Road to convey stormwater that currently sheet flows across the sites, as well as the creation of bioretention basins capable of holding runoff during

storm events and prevent any exacerbation of flooding on- or off-site. Therefore, project construction would improve existing conditions and would not result in exceedance of storm drain capacity or create additional sources of runoff. Impacts would be less than significant.

Impedance or Redirection of Flood Flows

Impacts related to the potential for the project's placement of new structures or earth to impede or redirect flood flows are limited to operational impacts. As such, no construction impacts related to impedance or redirection of flood flows impacts would occur.

Operation

Erosion and Siltation

The project site is located in an urbanized area and primarily consists of pervious surfaces. Development of the project site would result in 7,731,723 square feet of new impervious surfaces compared to existing conditions. Thus, project operation could result in increased amounts of stormwater runoff that could cause the increased erosion of soils and carry pollutants into Sand Creek.

The proposed project would include stormwater facilities that would be designed to treat stormwater on-site and prevent erosion and siltation from increasing pollutant loads in Sand Creek. As described in the Project Description, the proposed project would include five DMAs that would convey stormwater into stormwater bioretention basins. Bioretention basins are shallow basins used to slow and treat on-site stormwater runoff. All stormwater bioretention basins would include a cistern designed according to the Stormwater C.3 Guidebooks and would include a bioretention soil medium. Stormwater that would be collected in the cisterns would either evaporate, infiltrate surrounding soils, or drain through a bioretention soil medium to be conveyed to a discharge point. The soil medium would act as a filter to allow stormwater to pass through an underdrain that carries runoff to a discharge point while pollutants would remain behind in the cisterns. Additionally, the proposed project would preserve 253.50 acres of open space, which includes existing grasses and vegetation that prevent significant erosion or siltation from occurring. Furthermore, Mitigation Measure (MM) HYD-3 would ensure a Final Stormwater Control Plan and Stormwater Control Operations and Maintenance (O&M) Plan is submitted to the City and County for review and approval prior issuance of building permits.

The proposed project would include two new outfalls to discharge stormwater from the northern (IMP 4) and southern (IMP 5) bioretention basins into Sand Creek. The bioretention basins in the northeast corner of the project site (IMP 1-2 and IMP 3) would be connected to the existing 36-inch trunk storm drain that runs east from Deer Valley Road along the alignment of Wellness Way. The two new outfalls discharging stormwater into Sand Creek would require a 401 Water Quality Certification from the Central Valley RWQCB. The project Applicant would be required by State law to acquire this certification prior to construction and further measures required by the Central Valley RWQCB would improve stormwater quality impacts. As a result, the proposed project would not substantially increase erosion or siltation with mitigation incorporated. Therefore, impacts would be less than significant.

Increased Runoff Resulting in Flooding

Project operation involves a total net increase of 7,731,723 square feet of new of impervious surfaces compared to existing conditions. The addition of new impervious surfaces could increase stormwater runoff rates and volumes.

The proposed project would provide new stormwater treatment and conveyance along an existing 2.80-acre portion of Dallas Ranch Road. In addition, the proposed project would include five new separate DMAs that would convey stormwater into separate stormwater detention basins each sized for the appropriate stormwater runoff that would be generated by that DMA. In addition, these stormwater systems would be designed according to the County's hydrograph modification performance requirements. As shown in Table 3.9-2, the proposed project's detention basins would discharge stormwater into Sand Creek and the 36-inch storm drain connection at a rate that is lower than pre-project discharges during short 10-year and 100-year storm events.

Table 3.9-2: Proposed Project Stormwater Detention Modeling Results

Proposed On-site Stormwater Point of Connection (POC)	Storm Design Level	Peak Discharge at Outlet (cfs)	
		Pre-project	Post-project (detained)
POC 1 (IMPs 1, 2, and 3)	10-year 3-hour	43.2	0.9
	10-year 24-hour	41.4	2.9
	100-year 3-hour	72.3	2.6
	100-year 24-hour	80.1	6.8
POC 2 (IMP 4)	10-year 3-hour	54.6	4.4
	10-year 24-hour	52.3	6.8
	100-year 3-hour	92.6	5.6
	100-year 24-hour	102.3	33.3
POC 3 (IMP 5)	10-year 3-hour	164.7	9.8
	10-year 24-hour	158.0	10.7
	100-year 3-hour	270.4	41.6
	100-year 24-hour	296.5	68.7

Source: Carlson, Barbee & Gibson, Inc. Preliminary Stormwater Control Plan. 2019.

However, longer storm durations or greater year storm events could still increase stormwater runoff rates and volumes. As a result, the proposed project would increase stormwater runoff rates and volumes compared to existing conditions that could result in flooding on- or off-site, exceedance of storm drainage capacity, or redirection of flood flows.

However, the City would require the project Applicant to submit a Final Stormwater Control Plan and related Stormwater Control O&M Plan to the City for review and approval prior to issuance of grading permits. The Final Stormwater Control Plan would be conducted to assess consistency with

all NPDES rules, regulations, and procedures for municipal, construction, and industrial activities as promulgated by the State Water Board or the Central Valley RWQCB. The Final Stormwater Control Plan and related Stormwater Control O&M Plan would be submitted to the City Public Works Department for review and approval related to compliance with the City's NPDES Permit and the CCCWP Stormwater C.3 Guidebook. Grading, construction, and operational site plans would also be reviewed to verify consistency with the final Stormwater Control Plan and compliance with Provision C.3 of the CCCWP's NPDES Permit and the City's Stormwater Management and Discharge Control Ordinance Title 6 Chapter 9, Stormwater Management.

As a result, operation of the proposed project would not substantially increase the rate or amount of surface runoff such that flooding would occur on- or off-site. Therefore, operational impacts related to increased runoff resulting in flooding would be less than significant.

Substantial Additional Sources of Polluted Runoff

The proposed project would install five DMAs with IMPs, such as bioretention basins, that would provide stormwater treatment and flow control (Exhibit 3.9-2). DMA 1 and 2 would cover 1,117,676 square feet of the project site and would convey stormwater to IMP 1-2. IMP 1-2 would be a bioretention facility proposed for the northeast corner of the project site that would drain to an existing 36-inch trunk storm drain that runs east from Deer Valley Road. DMA 3 would cover 25,037 square feet and would convey stormwater to IMP 3. IMP 3 would be a bioretention facility proposed for the northeast corner of the project site that would drain to an existing 36-inch trunk storm drain that runs east from Deer Valley Road. DMA 4 would cover 8,783,957 square feet of the project site and would include low- and medium-density residential areas as well as parks, open space, and a portion of the existing Dallas Ranch Road that drains into the project site. DMA 4 would convey stormwater to IMP 4, which would be a stormwater bioretention basin located south of Sand Creek Road and north of Sand Creek that would eventually discharge into Sand Creek via a new outfall. DMA 5 would cover 12,825,610 square feet of the project site and include uses such as, low-density residential, age-restricted areas, parks, and open space. DMA 5 would convey stormwater to IMP 5, a stormwater bioretention basin that would be located south of Sand Creek and discharge into Sand Creek via a new outfall. All IMPs would be sized to accommodate full hydrograph modification performance compliance of all stormwater. As shown in Table 3.9-2, both drainage areas would avoid excessive ponding depths in the bioretention areas except under very large storm events (greater than 10-year design storm). Furthermore, as shown in Table 3.9-2 the combined volumes of all bioretention areas would be able to limit peak stormwater flow rates into points of connection with Sand Creek and the 36-inch storm drain trunk east of Deer Valley Road during very large storm events (100-year design storm) to a level below existing conditions. As a result, the proposed project would provide adequate stormwater drainage facility capacity to serve the project and surrounding area.

The proposed stormwater facilities would be designed according to the Stormwater C.3 Guidebooks and would include a bioretention soil medium that would provide stormwater treatment. Additionally, the proposed project would include operational BMPs, such as native landscaping, preservation of open space to maximize ground cover, and maintenance of inlets to ensure debris does not block stormwater flows, which could reduce the amount of pollutants entering Sand Creek. However, increased stormwater runoff from project site development could still increase sources of polluted runoff.

As described previously, implementation of a City-approved Final Stormwater Control Plan and related Stormwater Control O&M Plan would ensure the proposed project includes BMPs designed to prevent the significant release of stormwater pollutants consistent with all NPDES rules, regulations and procedures for municipal, construction, and industrial activities as promulgated by the State Water Board or the Central Valley RWQCB. Thus, with implementation of a City-approved stormwater control plan, operation of the proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Therefore, operational impacts related to additional sources of polluted runoff or exceedance of storm drainage system capacity would be less than significant.

Impedance or Redirection of Flood Flows

As shown in Exhibit 3.9-1, the majority of the project site is located in Zone X—Area of Minimal Flood Hazard. However, the areas directly adjacent to Sand Creek are designated as Zone A—Area subject to inundations by the 1 percent annual chance flood event. The proposed project would include the construction of a vehicle bridge and a separate bicycle/pedestrian bridge across Sand Creek; the bridges would also accommodate required water and sewer line crossings. Ultimately, the vehicular bridge may be up to four lanes, but construction may be phased such that a 2-lane bridge would be built first, and then widened in the future into the ultimate 4-lane configuration. The vehicular bridge would be constructed on top of bridge abutments located outside the banks of Sand Creek, spanning the jurisdictional areas and ordinary high water mark (OHWM) of Sand Creek. As a result, due to the placement of the bridge above the jurisdiction areas and the OHWM, the vehicle bridge would not have the possibility to impede flood flows because it would be located outside of a known flood hazard zone.

The bicycle/pedestrian bridge could potentially include supports within the Sand Creek OHWM, and could therefore potentially impede or redirect flood flows. Consistent with General Plan policies 8.7.2 and 11.4.2, the proposed project would prepare a hydraulic study to assess the current flow of Sand Creek and to demonstrate the effect of any bridge supports on the creek flow and/or the 100-year floodplain. If needed, modifications to the bridge design, up to and including clear spanning of the creek would be implemented at the City's direction to ensure compliance. If bridge supports are proposed within the creek, applicable regulatory permits including a streambed alteration agreement from California Department of Fish and Wildlife and water quality certification from the RWQCB would impose additional protective measures to ensure water quality.

Compliance with applicable local, State, and federal laws would ensure that the design of the pedestrian/bicycle bridge would not adversely affect the creek flow and/or the 100-year floodplain. Therefore, operational impacts related to impedance or redirection of flood flows would be less than significant.

Level of Significance

Less Than Significant

Risk of Pollutant Release Due to Inundation

Impact HYD-4: **The proposed project could be located in a flood hazard zone, tsunami, or seiche zone, or risk release of pollutants due to project inundation.**

Construction/Operation

As shown in Exhibit 3.9-1, the majority of the project site is located within FEMA Flood Zone X, which is outside of the 100-year flood hazard area. However, portions of the project site are located within Zone A, which is an area subject to inundation by the one percent annual chance flood event. The areas designated as Zone A are limited to the portions of the site immediately adjacent and encompassing Sand Creek. The proposed project would include a 250-foot-wide corridor along Sand Creek (approximately 125 feet on either side of the Creek). Additionally, no housing is proposed to be located within the 100-year flood hazard zone.

Construction of the proposed bridges, water line, and 15-inch sewer line would occur within Zone A. The pedestrian/bicycle bridge would be anticipated to be built under either a clear-span design option or a design option using supporting piles. A clear-span pedestrian bridge would allow the bridge to span the 100-year floodplain without requiring construction of structures within the 100-year flood zone. Alternatively, a pedestrian bridge design including support piles would require placement of structures within the 100-year flood zone. Should such structures be placed within the 100-year flood zone, flood waters could be redirected, which would have the potential to result in a change to the FEMA flood hazard zones for the project area. Potential changes to the 100-year flood zone caused by construction of the pedestrian bridge or sewer line could lead to areas identified for residential development or areas designated for use as stormwater treatment, which are currently outside of the 100-year flood zone, being redesignated as within a 100-year flood zone. As a result, the project site could be a risk for inundation from flooding.

However, the City's code requires that a hydraulic study be prepared for City review and would ensure the proposed project acquires and implements the necessary permits and actions to avoid impacts within a designated flood hazard zone. As described previously, should support piles be necessary for the pedestrian bridge, construction of the proposed bridge would require several permits. Compliance with the aforementioned permits, agreements, and certifications would ensure that the proposed project would comply with Central Valley RWQCB Basin Plan policies related to risk of pollutant release within waters.

Tsunamis typically affect coastlines and areas up to one quarter of a mile inland. The project site is located over 50 miles from the Pacific Ocean. Due to the project site's distance from the coast, potential flooding effects related to a tsunami would be minimal. The nearest enclosed body of water to the project site is the Contra Loma Reservoir, which is located over 4.2 miles northwest of the project site. Due to the project site's distance from the nearest enclosed body of water and regional topography, the project site would not be susceptible to flooding resulting from a seiche. As a result, the project site would not be a risk for inundation from tsunami or seiche.

Therefore, overall operational impacts related to risk of pollutant release due to inundation would be less than significant.

Level of Significance

Less Than Significant

Water Quality Control or Sustainable Groundwater Management Plans Consistency

Impact HYD-5: **The proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.**

Construction

The proposed project would not conflict with the CCCWP or the City's Stormwater NPDES permit. Given that proposed construction would disturb more than 1 acre of land, the proposed project would be required to comply with the terms of the Construction General Permit, which would require the preparation and implementation of a SWPPP to include BMPs to ensure reduction of pollutants from construction activities potentially entering surface waters or groundwater. In addition, the project site is not located within a groundwater basin that is subject to a sustainable groundwater management plan.¹⁹ As discussed under Impact UTIL-1, the City of Antioch does not utilize groundwater as a source of potable water. Therefore, construction impacts related to water quality control plan or groundwater management plan consistency would be less than significant.

Operation

The project site is located within the Tracy Subbasin. The project site has a very low potential for groundwater recharge, because the project site contains predominantly HSG 'C' type soils that have a very-low soil permeability, preventing significant groundwater infiltration. In addition, the City does not currently pump groundwater and does not plan to use groundwater as a water source for project operation in the future. Furthermore, the proposed project would be consistent with General Plan Policy 10.7.2d, because the proposed project would include a 250-foot-wide corridor (generally 125 feet on either side) along Sand Creek, which would ensure the protection of groundwater recharge areas. Since the City does not use groundwater as a water source, the proposed project would not conflict with or obstruct a sustainable groundwater management plan. Therefore, operational impacts related to a water quality control plan or groundwater management plan consistency would be less than significant.

Level of Significance

Less Than Significant

3.9.5 - Cumulative Impacts**Hydrology**

Cumulative impacts related to hydrology and water quality typically occur within a defined watershed. The project site and all properties on the cumulative projects list in Table 3-1 are located within the Marsh Creek or the adjacent West Antioch Watershed; notably, all respective surface water in the watershed eventually discharges into the San Joaquin Delta. Some cumulative projects are located within the City of Antioch, including the proposed project, and would be required to comply with the

¹⁹ East Contra Costa County Integrated Regional Water Management. Website. <https://www.eccc-irwm.org/about-sigma>. Accessed March 2, 2020.

CCCWP and City of Antioch General Plan policies, which prevent a project from increasing off-site surface water flow from existing conditions and ensure that projects adhere to best practices during construction to prevent pollutants from being carried off-site. Some cumulative projects are located in the City of Brentwood. Cumulative development in the City of Brentwood would be required to demonstrate consistency with the City of Brentwood General Plan and applicable codes, ordinances, and policies related to preventing pollutants from being conveyed off site. The combination of these policies and best practices would prevent significant cumulative impacts related to hydrology. Thus, the proposed project would have a less than significant cumulative impact related to hydrology.

Water Quality

The geographic context for consideration of cumulative impacts related to surface water quality is the Marsh Creek Watershed and West Antioch Watershed. All cumulative projects, including the proposed project, would involve short-term construction and long-term operational activities that would have the potential to degrade water quality in downstream water bodies, including Sand Creek and the San Joaquin Delta. All cumulative project construction would be required to obtain coverage under the State's Construction General Permit from the State Water Board, which would require preparation of a SWPPP that would control potential discharges of contaminants into Sand Creek and the San Joaquin Delta. Operations of these cumulative projects would also be required to comply with the CCCWP, the East County MS4 permit (which covers are cumulative project sites), the City of Antioch Municipal Code regarding stormwater, and the City of Brentwood applicable codes, ordinances, and policies related to water quality. Thus, the proposed project would have a less than significant cumulative impact related to surface water quality.

The geographic context for consideration of cumulative impacts related to groundwater quality and management is the San Joaquin Valley Groundwater Basin. No cumulative projects, including the proposed project, would involve short-term construction and long-term operational activities would have the potential to impact groundwater quality and management as local, State, and federal laws require extensive BMPs be made part of the proposed project *prior* to any ground disturbance, and ensure that post-construction runoff is free from pollutants. As discussed above, these laws would reduce any potential for pollutants to make their way into surface and groundwaters. All cumulative project construction would be required to obtain a Construction General Permit from the State Water Board, which would require preparation of a SWPPP that would control pollutants that could seep into groundwater. Operations of cumulative projects in the City of Antioch would be required to comply with the CCCWP and the Antioch Municipal Code regarding groundwater. Operations of cumulative projects in the Cities of Brentwood would be required to comply with the CCCWP and the City of Brentwood Municipal Code regarding groundwater. Thus, the proposed project would have a less than significant cumulative impact related to groundwater quality.

Flooding

The geographic context for consideration of cumulative impacts related to flooding is the City of Antioch south of State Route 4 (SR-4). According to the Antioch General Plan, portions of the City are located within 100-year and 500-year flood zones as determined by FEMA. The Antioch General Plan determined that the majority of the City is located within an area of minimal flood hazard as

identified by FEMA. The cumulative projects listed in Chapter 3, Environmental Impact Analysis, Table 3-1, Cumulative Projects, are located throughout the City of Antioch.

Flooding within the City occurs mainly near the San Joaquin River and along tributary creeks. The Antioch General Plan identifies 100-year flood zones in the areas in the southern portion of the City located adjacent to Markley Creek, Los Medanos Wasteway, and Sand Creek. Cumulative development within southern Antioch (South of SR-4) would increase the amount of impervious surface cover and later landscape drainage conditions, which could increase stormwater runoff. The proposed project would contain five DMAs and include three detention basins, which would retain flood waters, if any, during a large storm event. As discussed in this section, all developments are required to install stormwater systems to ensure post-project peak flows do not exceed pre-project flows (see the NPDES permit and MS4 requirements). Furthermore, during design review, the City would ensure all applicable standards related to on- and off-site flooding would be met through project design. Finally, the proposed project would not construct any housing within a floodplain. Thus, the proposed project would have a less than significant cumulative impact related to flooding.

Level of Cumulative Significance

Less Than Significant