3.10 Hydrology and Water Quality

3.10.1 Introduction

This section describes the regulatory setting and environmental setting for hydrology and water quality in the vicinity of the Proposed Project (including all track variants, technology variants, and the Greenville and Mountain House initial operating segments [IOS]) and the alternatives analyzed at an equal level of analysis (i.e., the Southfront Road Station Alternative, Stone Cut Alignment Alternative, West Tracy Operation and Maintenance Facility [OMF] Alternative, Mountain House Station Alternative, and Downtown Tracy Station Parking Alternatives 1 and 2). It also describes the impacts on hydrology and water quality that would result and mitigation measures that would reduce significant impacts, where feasible.

There would be no differences in the physical impacts related to hydrology and water quality due to the diesel multiple unit (DMU), hybrid battery multiple unit (HBMU), battery-electric multiple unit (BEMU), or diesel locomotive haul (DLH) technology variants, so the discussion in this section does not discuss those variants. Potential impacts associated with implementation of the Proposed Project and the alternatives analyzed at an equal level of detail assume the larger environmental footprint at proposed and alternative stations associated with a potential IOS (i.e., Greenville IOS, Mountain House IOS, Southfront Road Station Alternative IOS, and Mountain House Alternative IOS) and/or the expanded parking in 2040. As such, the analysis of the Proposed Project and the alternatives analyzed at an equal level of detail below considers the potential impacts associated with a potential IOS and/or the expanded parking in 2040.

Cumulative impacts from identified projects on hydrology and water quality, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 4, *Other CEQA-Required Analysis.*

3.10.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to hydrology and water quality that are applicable to the Proposed Project and alternatives analyzed at an equal level of detail. This section also includes a list of key design standards and guidelines related to hydrology and water quality that will be used during design and construction of the Proposed Project.

3.10.2.1 Federal

Clean Water Act

The primary federal law governing water quality is the Clean Water Act (CWA) of 1972. The CWA provides for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The CWA emphasizes technology-based control strategies and requires discharge permits to allow use of public resources for waste discharge. The CWA also limits the amount of pollutants that may be discharged and requires wastewater to be treated with the best treatment technology economically achievable regardless of receiving water conditions. The control of pollutant discharge is established through National Pollutant Discharge Elimination System (NPDES) permits that contain effluent limitations and standards. The U.S. Environmental Protection

Agency (USEPA) has delegated responsibility for implementation of portions of the CWA, such as Sections 303, 401, and 402 (discussed in this section), to the State Water Resources Control Board (SWRCB) (see Section 3.10.2.2, *State*).

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 intent of these acts was to reduce the need for large, publicly funded flood-control structures and disaster relief by restricting development on floodplains. The National Flood Insurance Program (NFIP) was created as a result of the passage of the National Flood Insurance Act of 1968. The Federal Emergency Management Agency (FEMA) administers the NFIP to provide subsidized flood insurance to communities that comply with FEMA regulations by limiting development in floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) for communities participating in the NFIP. These maps delineate flood hazard zones in the community. A FIRM is the official map of a community prepared by FEMA to delineate both the special flood hazard areas (SFHAs) and the flood risk premium zones applicable to the community.

The NFIP applies to the Proposed Project because portions of the corridor are in FEMA-designated SFHAs, as discussed below. SFHAs are defined as the areas that will be inundated by a flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1 percent annual chance flood is also referred to as the *base flood* or *100-year flood*.

U.S. Army Corps of Engineers Section 404 Permit

The discharge of dredged or fill material into waters of the United States is subject to permitting under Section 404 (Discharges of Dredge or Fill Material) of the CWA. Section 404 of the CWA regulates the placement of fill material into the waters of the United States. Section 404 Permits are administered by the U.S. Army Corps of Engineers (USACE).

The Proposed Project improvements would be required to obtain a Section 404 Permit if structure foundations, other permanent features, or construction activities occur within federal jurisdictional waters.

3.10.2.2 State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control (Porter-Cologne) Act is the basic water quality control law for California. The Porter-Cologne Act authorizes the state to implement the provisions of the CWA and establishes a regulatory program to protect the water quality of the state and the beneficial uses of state waters.

Porter-Cologne Act requires project proponents whose projects would result in discharge of wastes that could affect the quality of the state's water to file a report of waste discharge with the appropriate Regional Water Quality Control Board (RWQCB). The Porter-Cologne Act also requires that the SWRCB or an RWQCB adopt basin plans for the protection of water quality. Basin plans are updated and reviewed every 3 years and provide the technical basis for determining waste discharge requirements (WDRs), taking enforcement actions, and evaluating clean water grant

proposals. As required by the Porter-Cologne Act and the CWA, basin plans include the following information.

- Designated beneficial water uses.
- Water quality objectives needed to protect the designated beneficial water uses.
- Strategies and time schedules for achieving the water quality objectives.

The Proposed Project lies within the jurisdictions of two RWQCBs: the San Francisco Bay RWQCB, and the Central Valley RWQCB. Waters in the Bay Area, including Alameda County, are under the jurisdiction of the San Francisco Bay RWQCB. The basin plan for this area is the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (San Francisco Bay Basin Plan), last updated in 2017 (San Francisco Bay Regional Water Quality Control Board 2017). Waters in the Sacramento River Basin and San Joaquin River Basin, including San Joaquin County, are under the jurisdiction of the Central Valley RWQCB. The basin plan for these areas is *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region* (Central Valley Basin Plan), last updated in 2018 (Central Valley Regional Water Quality Control Board 2018a).

RWQCBs designate beneficial uses for all water body segments in their jurisdictions, and then set 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. The San Francisco Bay Basin Plan and Central Valley Basin Plan specify region-wide and water body–specific beneficial uses. They have set numeric and narrative water quality objectives for several substances and parameters in numerous surface waters in their regions. Specific objectives for concentrations of chemical constituents are applied to bodies of water based on their designated beneficial uses (San Francisco Bay Regional Water Quality Control Board 2017; Central Valley Regional Water Quality Control Board 2018a).

Clean Water Act Section 303(d) and Total Maximum Daily Loads

California adopts water quality standards to protect beneficial uses of waters of the state as required by Section 303(d) of the CWA and the Porter-Cologne Act. The SWRCB identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If it is determined that waters of the state are impaired for one or more constituents, and the standards cannot be met through point-source or nonpoint-source controls (i.e., through NPDES permits or WDRs), the CWA requires the establishment of total maximum daily loads (TMDLs). Implementation of this program is conducted by the San Francisco Bay RWQCB and the Central Valley RWQCB. To identify candidate water bodies for TMDL analysis, a list of water quality-impaired segments is generated by the SWRCB. These stream or river segments are impaired by the presence of pollutants 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 assessing statewide surface water quality. For the current listing cycles, the SWRCB has combined its 303(d) list and the 305(b) report into the *2014 and 2016 California Integrated Report*. Only the 303(d) list portion of the *2014 and 2016 California Integrated Report* requires approval by the SWRCB and USEPA. The *2014 and 2016 California Integrated Report* was approved by the SWRCB on October 3, 2017, and was approved by USEPA on April 6, 2018 (State Water Resources Control Board 2017).

Clean Water Act Section 401—Water Quality Certification

Section 401 of the CWA requires that an applicant pursuing a federal permit to conduct an activity that may result in a discharge of a pollutant obtain a Water Quality Certification (or waiver). A Water Quality Certification requires the evaluation of water quality considerations associated with dredging or placement of fill materials into waters of the United States. Water Quality Certifications are issued by one of the nine geographically separated RWQCBs in California. Under the CWA, the RWQCB must issue or waive a Section 401 Water Quality Certification for a project to be permitted under CWA Section 404. Where a project would take place in two or more jurisdictional regions of the RWQCBs, the SWRCB would issue the Water Quality Certification.

As described in Chapter 2, *Project Description,* Proposed Project construction activities may require a Water Quality Certification if permanent facilities or construction disturbance is proposed within state jurisdictional waters.

Clean Water Act Section 402—National Pollutant Discharge Elimination System

The 1972 amendments to the Federal Water Pollutant Control Act established the NPDES permit program to control discharges of pollutants from point sources (Section 402). The 1987 amendments to the CWA created a new section of the CWA devoted to stormwater permitting (i.e., Section 402[p]). USEPA has granted primary administration and enforcement of the provisions of the CWA and NPDES to the SWRCB and RWQCBs. NPDES is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States. CWA Section 402 also includes WDRs for dewatering activities.

National Pollutant Discharge Elimination System Construction General Permit

The General NPDES Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2009-009-DWQ as amended by Order 2012-0006-DWQ) (Construction General Permit) regulates stormwater discharges for construction activities under CWA Section 402 (State Water Resources Control Board 2012a). Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the Construction General Permit. The Construction General Permit requires the development and implementation of a stormwater pollution prevention plan (SWPPP). The Construction General Permit also includes post-construction stormwater performance standards that address water quality and channel protection.

The construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation. The Proposed Project would require a Construction General Permit because they would involve disturbances to more than 1 acre of ground, including clearing, grading, and excavation activities.

The Central Valley RWQCB's NPDES Permit for Construction Dewatering Activity (Waste Discharge Requirements–Limited Threat Discharges to Surface Water, Order R5-2013-0074 as modified by Order R5-2016-0079-01), authorizes three different tiers of discharge to surface waters (Central Valley Regional Water Quality Control Board 2016a). Tier 1A includes direct discharges to surface waters up to 250,000 gallons per day for up to a 4-month period each year. Tier 1A effluent water must not be contaminated and must be properly filtered or treated, using appropriate technologies such as retention in settling ponds and filtration using gravel and sand filters. Dewatering activities

under Tiers 1B, 2, and 3 must include water quality testing and must meet certain Central Valley RWQCB water quality standards as defined in the order. In addition, Tier 2 and 3 discharge requirements include monitoring and performance standards that, when implemented, ensure that receiving water quality is not substantially degraded.

The discharge of dewatering effluent is authorized under Order R5-2013-0074 as modified by Order R5-2016-0079-01 if the following conditions are met.

- The discharge does not cause or contribute to a violation of any water quality standard.
- The discharge does not violate any other provision of the Construction General Permit.
- The discharge is not prohibited by the applicable basin plan.
- The discharger has included and implemented specific best management practices (BMPs) required by the Construction General Permit to prevent or reduce the contact of the non-stormwater discharge with construction materials or equipment.
- The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants.
- The discharge is monitored and meets the applicable numeric action levels.
- The discharger reports the sampling information in the annual report.

The discharger must notify the local RWQCB of any anticipated non-stormwater discharges not already authorized by the Permit for Construction Dewatering Activity, to determine whether a separate NPDES permit is necessary.

National Pollutant Discharge Elimination System Municipal Stormwater Permits

CWA Section 402 mandates programmatic permits for municipalities to address stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4) (MS4 Permit). Phase I MS4 regulations cover municipalities with populations greater than 100,000, and Phase II (Small MS4) regulations cover municipalities with populations smaller than 100,000. NPDES permits for regulated MS4s require permittees to develop stormwater management plans, which describe the stormwater control practices that will be implemented consistent with permit requirements to minimize the discharge of pollutants from the sewer system.

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

Stormwater runoff from stations and improvements associated with stations (e.g., station parking lots, platforms, roadways, walkways, and landscaped areas) would be regulated by various NPDES permits under the Municipal Storm Water Permitting Program. Currently, stormwater runoff from railroad track alignments within the Union Pacific Railroad (UPRR) right-of-way is not actively regulated under municipal NPDES permits because UPRR is not included on the list of non-traditional Small MS4 Permittees (State Water Resources Control Board 2013). The Proposed Project track alignment in San Joaquin County would be located within the UPRR right-of-way, and therefore the NPDES permits applicable to the Proposed Project in San Joaquin County would apply only to the proposed rail stations. The applicable NPDES permits are discussed in this section.

San Francisco Bay Region

Stormwater discharges in the Bay Area, which includes Alameda County, are regulated under regional Phase I MS4 NPDES Permit CAS612008, SWRCB Order R2-2015-0049 (San Francisco Bay Municipal Regional Permit [MRP]) (San Francisco Bay Regional Water Quality Control Board 2015). The San Francisco Bay MRP is locally overseen by the San Francisco Bay RWQCB. Provision C.3 of the MRP requires implementation of LID source control, site design, and stormwater treatment for new development and redevelopment regulated projects. Most Proposed Project improvements in the San Francisco Bay Region would be regulated projects based on the extent of new impervious surfaces that would be created. The following are examples of regulated projects.

- Uncovered parking lots that create or replace 5,000 square feet or more of impervious surface are regulated and categorized as a Special Land Use, unless drainage from the uncovered portion is connected to the sanitary sewer along with the covered portions of the parking structure.
- New development projects that create 10,000 square feet or more of impervious surface (collectively over the entire project site) are regulated and categorized as Other Development Projects.
- Redevelopment projects that create or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) are regulated and categorized as Other Development Projects. Redevelopment projects that include alteration of over 50 percent of the impervious surface of a previously existing development that was not subject to Provision C.3 require stormwater treatment systems to be designed and sized to treat stormwater runoff from the entire site. Where a redevelopment results in an alteration of less than 50 percent of the impervious surface of a previously existing development that was not subject to Provision C.3, only the new or replaced impervious surface of the project must be included in the treatment system design.
- Construction of new streets or roads, including sidewalks, that creates 10,000 square feet or more of newly constructed contiguous impervious surface is regulated and categorized as a Road Project. When widening existing streets or roads with additional traffic lanes, where the addition of traffic lanes results in an alteration of less than 50 percent of the impervious surface of an existing street or road within the project that was not subject to Provision C.3, only the new and/or replaced impervious surface of the project must be included in the treatment system design.

Provision C.3.g of the San Francisco Bay MRP pertains to hydromodification management.[1] Provision C.3.g requires that regulated projects that create or replace 1 acre or more of impervious surface do not cause an increase in stormwater discharges or an increase in the erosion potential of the receiving stream over the existing condition. Regulated projects are not subject to hydromodification requirements if one or more of the following conditions apply.

1. The post-project impervious surface area is less than, or the same as, the pre-project impervious surface area.

[1] Hydromodification or hydrograph modification can cause streambank erosion, channelization, increased flood flows, and other physical modifications that may adversely affect aquatic ecosystems due to increased sedimentation and reduced water quality (e.g., higher water temperatures, or lower dissolved oxygen concentrations).

2. The project is located in a catchment that drains to a hardened (e.g., continuously lined with concrete) engineered channel or channels or enclosed pipes that extend continuously to the Bay, Sacramento-San Joaquin Delta (Delta), or flow-controlled reservoir, or drains to channels that are tidally influenced.
3. The project is located in a catchment or subwatershed that is highly developed (i.e., 70 percent or more impervious).

Provision C.3.g requires that increases in runoff flow and volume be managed so that the post-project runoff does not exceed estimated pre-project rates and durations, where such increased flow or volume is likely to cause increased potential for erosion of creek beds and banks, silt pollutant generation, or other adverse impacts on beneficial uses due to increased erosive force. Proposed Project improvements in the San Francisco Bay Region are in areas where regulated projects are subject to hydromodification management (San Francisco Bay Regional Water Quality Control Board 2015). Accordingly, Proposed Project improvements would be required to comply with all applicable requirements and standards related to hydromodification.

Central Valley Region

A regional Phase I MS4 NPDES Permit for municipal stormwater discharges (NPDES Permit CAS0085324, SWRCB Order R5-2016-0040) (Central Valley MRP) became effective for the Central Valley Region (which includes San Joaquin County) on October 1, 2016 (Central Valley Regional Water Quality Control Board 2016b). The Central Valley MRP is administered by the Central Valley Regional Water Quality Control Board (Central Valley RWQCB). Owners and operators of large and medium MS4s (municipalities with populations greater than 100,000) are expected to enroll under the Central Valley MRP as their current individual Phase I MS4 Permits expire. Owners and operators of small regulated MS4s (municipalities with populations less than 100,000) that are currently enrolled under the SWRCB's Statewide General Phase II MS4 Permit may voluntarily enroll under the Central Valley MRP. The City of Stockton and San Joaquin County are enrolled in the Central Valley MRP.

The Central Valley MRP requires enrolled permittees to define the criteria and thresholds for the Priority Development Projects that will be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan for their respective project. The Central Valley MRP indicates that the following projects are Priority Development Projects.

- Parking lots with 5,000 square feet or more or with 25 or more parking spaces.
- Redevelopment projects that add or create at least 5,000 square feet of impervious surface to the original developments; if the addition constitutes less than 50 percent of the original development, the design standard only applies to the addition.

Although the permittee's Storm Water Management Plan may include its own definition of Priority Development Projects, that definition must be designed to achieve equivalent protection of water quality as that achieved with the above criteria (Central Valley Regional Water Quality Control Board 2016b). Proposed Project improvements associated with stations in the Central Valley Region would be Priority Development Projects under the Central Valley MRP because they would add or create more than 5,000 square feet of impervious surface.

California Department of Transportation National Pollutant Discharge Elimination System Permit

Stormwater discharges from California Department of Transportation (Caltrans) properties, including Caltrans rights-of-way, are regulated under the SWRCB's Statewide NPDES Permit CAS000003, SWRCB Order 2012-0011-DWQ as amended) (Caltrans NPDES Permit) (State Water Resources Control Board 2012b). The Caltrans NPDES Permit is locally overseen by Caltrans and the San Francisco Bay RWQCB in the San Francisco Bay Region, and by Caltrans and the Central Valley RWQCB in the Central Valley Region. Projects within the Caltrans right-of-way that are new development or redevelopment must comply with the requirements of the *Stormwater Quality Handbooks, Project Planning and Design Guide* (California Department of Transportation 2019), which includes the following standard project planning and design requirements for new development and redevelopments.

- Design pollution prevention BMPs.
- Post-construction stormwater treatment controls for highway facility projects that create 1 acre or more of new impervious surface or non-highway facility projects that create 5,000 square feet or more of new impervious surface.
- Hydromodification requirements.
- Stream crossing design guidelines to maintain natural stream processes.

Proposed Project improvements that would involve improvements within existing or potential future Caltrans rights-of-way would be required to comply with the standard project planning and design requirements discussed above.

Bay Area Rapid Transit National Pollutant Discharge Elimination System Permit

Stormwater discharges from Bay Area Rapid Transit (BART) facilities are regulated by the Small MS4 Permit as nontraditional permittees (State Water Resources Control Board 2013). The Small MS4 Permit is locally overseen by BART and the San Francisco Bay RWQCB for BART facilities. Proposed Project-related improvements to BART facilities in the Tri-Valley segment would be regulated projects because new impervious surfaces would be constructed as part of new BART stations and roadway modifications.

California Department of Pesticide Regulation

California Department of Pesticide 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 use of such pesticides. DPR has surface water and groundwater protection programs that address sources of pesticide residues in surface waters and has preventive and response components that reduce the presence of pesticides in surface water and groundwater. The preventive component includes local outreach and promotion of management practices that reduce pesticide runoff and prevent continued movement of pesticides to groundwater in contaminated areas. To promote cooperation and to protect water quality from the adverse effects of pesticides, DPR and the SWRCB signed a Management Agency Agreement (MAA). The MAA and its companion document, *The California Pesticide Management Plan for Water Quality* (California Environmental Protection Agency, California Department of Pesticide Regulation, and State Water Resources

Control Board 1997), are intended to coordinate interaction, facilitate communication, promote problem solving, and ultimately assure the protection of water quality.

Pesticides are used as a part of current operation and maintenance to maintain and clear vegetation from the UPRR right-of-way. The current and future use of pesticides for vegetation removal near the track alignment and other facilities as part of operation and maintenance activities must comply with DPR regulations.

Sustainable Groundwater Management Act

In 2014, the California Legislature enacted a three-bill law (Assembly Bill 1739, Senate Bill [SB] 1168, and SB 1319), known as the Sustainable Groundwater Management Act (SGMA). SGMA was created to provide a framework for the sustainable management of groundwater supplies, and to strengthen local control and management of groundwater basins throughout the state with little state intervention. SGMA is intended to empower local agencies to adopt groundwater sustainability plans that are tailored to the resources and needs of their communities, such that sustainable management would provide a buffer against drought and climate change, and ensure reliable water supplies regardless of weather patterns. SGMA and its corresponding regulations require that each high- and medium-priority groundwater basin is operated to a sustainable yield, balancing natural and artificial groundwater recharge with groundwater use to ensure undesirable results such as chronic lowering of groundwater levels, loss of storage, water quality impacts, land subsidence, and impacts to hydraulically connected streams do not occur. SGMA protects existing surface water and groundwater rights and does not affect current drought response measures.

California's 515 groundwater basins are classified into one of four categories: high-, medium-, low-, or very low priority based on components identified in the California Water Code Section 10933(b). Basin priority determines which provisions of the California Statewide Groundwater Elevation Monitoring (CASGEM) Program and SGMA apply in a basin. In 2019, the California Department of Water Resources (DWR) completed the first phase of responses to comments and final re-prioritization of groundwater basins in Phase I, along with draft prioritizations of groundwater basins included in Phase II (California Department of Water Resources 2019).

SGMA requires that local agencies form one or more groundwater sustainability agencies (GSAs) within 2 years (i.e., by June 30, 2017). Agencies located within high- or medium-priority basins must adopt a Groundwater Sustainability Plan (GSP) or Alternative GSP. The time frame for adoption of GSPs in basins determined by DWR to be in a condition of "critical overdraft" is by January 31, 2020; all other high and medium priority basins must adopt a GSP no later than January 31, 2022. Local agencies will have 20 years to fully implement GSPs after the plans have been adopted. Intervention by the SWRCB would occur if a GSA is not formed by local agencies, or if a GSP is not adopted or implemented. GSPs are not required for very low or low-priority groundwater basins.

GSPs must define the sustainable yield of the basin, identify what would constitute undesirable results in the basin, and identify the projects and actions (including monitoring) that will be implemented to ensure the basin is managed to avoid undesirable results. DWR evaluates a basin's GSP and provides the GSA with an assessment of the plan and any necessary recommendations every 5 years following its establishment. Reports by the GSA that include monitoring data and information are due annually to DWR. Alternative GSPs may consist of an existing groundwater management plan that demonstrates a reasonable expectation of achieving sustainability within 20 years. An Alternative GSP may also consist of a basin adjudication with existing governance and

oversight, or a 10-year analysis of basin conditions showing sustainable operation with no undesirable results such as subsidence, saltwater intrusion, or degraded water quality.

Central Valley Flood Protection Board and Central Valley Flood Protection Act of 2008

The Central Valley Flood Protection Board (CVFPB) regulates the alteration and construction of levees and floodways in the Central Valley, defined as part of the Sacramento Valley and San Joaquin Valley Flood Control Projects. The purpose and mission of the CVFPB, with authority granted under the California Water Code and Title 23 of the California Code of Regulations (Cal. Code Regs.), is threefold, as listed below.

- Control flooding along the Sacramento and San Joaquin rivers and their tributaries in cooperation with USACE.
- Cooperate with various agencies of the federal, state, and local governments in establishing, planning, constructing, operating, and maintaining flood-control works.
- Maintain the integrity of the existing flood-control system and designated floodways through the board's regulatory authority by issuing permits for encroachments.

CVFPB requires applications to be filed for all proposed encroachments within the floodways under its jurisdiction and any levees adjacent thereto, as well as on streams that may affect those floodways. Proposed Project improvements would require encroachment permits from the CVFPB as improvements to railroad tracks, new railroad tracks, and new/replacement bridges would be constructed across levees and across floodways under CVFPB's jurisdiction.

The Central Valley Flood Protection Act of 2008 directed DWR to prepare the Central Valley Flood Protection Plan (CVFPP), adopted by the CVFPB in 2012 and updated in 2017 (California Department of Water Resources 2017a). The Central Valley Flood Protection Act establishes that urban areas (i.e., any contiguous area in which more than 10,000 residents are protected by State Plan of Flood Control levees) require protection from flooding that has a 0.5 percent annual exceedance probability (i.e., a 200-year flood event). Portions of the Proposed Project in the Tracy to Lathrop Segment would be constructed in an area covered by the *Basin-Wide Feasibility Study, San Joaquin Basin* (California Department of Water Resources 2017b) and would encroach on levees and floodways under CVFPB's jurisdiction; therefore, compliance with the CVFPP would be required.

Delta Stewardship Council

The Delta Stewardship Council was created as a result of SB X7 1 (Delta Reform Act of 2009) to achieve the state-mandated coequal goals for the Delta. The Delta Reform Act's "coequal goals" consist of providing a more reliable water supply to California, and restoring and enhancing the Delta ecosystem. These coequal goals are to be achieved in a manner that protects the unique cultural, recreational, natural resource, and agricultural values of the Delta. The Delta Stewardship Council has seven members, along with an independent board of consulting scientists. The Delta Reform Act also required the Delta Stewardship Council to adopt a "legally enforceable" Delta Plan. The Council adopted the *Delta Plan* on May 16, 2013, and the implementing regulations (Cal. Code Regs. Title 23, Sections 5001 through 5016) became effective on September 1, 2013 (Delta Stewardship Council 2019).

Through the Delta Reform Act, the Delta Stewardship Council has specific regulatory and appellate authority over certain actions that take place in whole or in part in the Delta and Suisun Marsh, which are referred to as *covered actions*. State and local agencies are required to demonstrate consistency with 14 regulatory policies identified in the *Delta Plan* (per Cal. Code Regs. Title 20, Sections 5001 through 5012) when carrying out, approving, or funding a covered action. The following policies in the *Delta Plan* related specifically to hydrology are related to the Proposed Project.

- Policy RR P3 (Cal. Code Regs. Title 23, Section 5014).

  (a) No encroachment shall be allowed or constructed in a floodway, unless it can be demonstrated by appropriate analysis that the encroachment will not unduly impede the free flow of water in the floodway or jeopardize public safety.

- Policy RR P4 (Cal. Code Regs. Title 23, Section 5015).

  (a) No encroachment shall be allowed or constructed in any of the following floodplains unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant adverse impact on floodplain values and functions:

  (3) The Lower San Joaquin River Floodplain Bypass area, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, Reclamation District 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.

  (b) For purposes of Water Code Section 85057.5(a)(3) and Section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in any of the floodplain areas described in subsection (a).

  (c) This policy is not intended to exempt any activities in any of the areas described in subsection (a) from applicable regulations and requirements of the Central Valley Flood Protection Board.

3.10.2.3 Regional and Local

Appendix I, *Regional Plans and Local General Plans*, lists applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which Proposed Project improvements are located. Section 15125(d) of the CEQA Guidelines requires an EIR to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project would be consistent with the plans of relevant jurisdictions.[2] The Proposed Project would be generally consistent with the applicable goals, policies, and objectives related to hydrology and water quality identified in Appendix I.

[2] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA, unless it is related to a physical impact on the environment that is significant in its own right.

3.10.3 Environmental Setting

This section describes the environmental setting related to hydrology and water quality by segment for the Proposed Project. For the purposes of this analysis, the study area for hydrology and water quality includes the watersheds, tributaries, and receiving streams that are connected to the footprint for the Proposed Project, which may be affected by changes within the improvement footprint.

This section begins with a general discussion of regional hydrology, surface and groundwater quality, and flooding. Following this discussion, a detailed description of the hydrology for each segment is presented that includes information regarding watersheds, subwatersheds, and surface waters that may receive runoff; beneficial uses of surface water and water quality; groundwater basins and subbasins and water quality (including beneficial uses); and flooding hazards.

3.10.3.1 Regional Surface and Groundwater Hydrology and Water Quality

As shown in Appendix P, *Supporting Hydrology and Water Quality Information* (see Figure P-1), all of the Tri-Valley segment and the western half of the Altamont segment are in the San Francisco Bay Hydrologic Basin. The eastern half of the Altamont segment and all of the Tracy to Lathrop segment are in the San Joaquin Valley Hydrologic Basin. Each basin is discussed separately below.

San Francisco Bay Hydrologic Basin

The San Francisco Bay Hydrologic Basin occupies approximately 4,500 square miles from southern Santa Clara County to Tomales Bay in Marin County, and inland to the confluence of the Sacramento and San Joaquin Rivers near Collinsville. The Sacramento and San Joaquin Rivers, which enter the Bay system through the Delta at the eastern end of Suisun Bay, contribute most of the freshwater inflow to the Bay. Various other small freshwater inland streams, the largest of which is Alameda Creek, also discharge into the Bay. The Bay also receives salt water from the Pacific Ocean through the Golden Gate, a 1-mile-wide strait that flows between the northern tip of the San Francisco peninsula and the Marin headlands.

Surface water flows from inland streams in the San Francisco Bay Hydrologic Basin are highly seasonal, with more than 90 percent of the annual runoff occurring during the winter rainy season between October and April. Many streams go dry during mid- or late summer. Groundwater is an important component of the hydrologic system in the San Francisco Bay Hydrologic Basin because it provides natural storage, distribution, and treatment systems (San Francisco Bay Regional Water Quality Control Board 2017). Salinity in the Bay varies depending on time and location; most of the variations are caused by (1) patterns of freshwater discharge from tributary rivers, and (2) mixing of freshwater with seawater by both tidal action and wind-driven wave action (U.S. Geological Survey 2007).

The existing and potential beneficial uses of surface water in the San Francisco Bay Hydrologic Basin are listed in Table 3.10-1. The SWRCB has listed the San Francisco Bay as an impaired water body due to contamination from various pollutants (State Water Resources Control Board 2017). The San Francisco Bay RWQCB has been and continues to develop TMDL projects to address water bodies impaired by specific pollutants. Pollutants causing impairment and TMDLs that have been approved by USEPA and officially incorporated into the San Francisco Bay Basin Plan are listed in Table 3.10-1.

Existing and potential beneficial uses applicable to groundwater in the San Francisco Bay Basin are listed in Table 3.10-1. Unless otherwise designated by the RWQCB, all groundwater is considered suitable, or potentially suitable, for municipal or domestic water supply. A variety of historical and ongoing industrial, urban, and agricultural activities and their associated discharges can degrade groundwater quality. The primary pollutant sources and constituents of concern are listed in Table 3.10-1.

San Joaquin River Hydrologic Basin

The San Joaquin River Hydrologic Basin includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. The San Joaquin River discharges to the Delta, which discharges to San Francisco Bay.

The existing and potential beneficial uses of the Joaquin River are listed in Table 3.10-1. The SWRCB has listed various segments of the San Joaquin River as an impaired water body due to contamination from various pollutants (State Water Resources Control Board 2017). The Central Valley RWQCB has been and continues to develop TMDL projects to address water bodies impaired by specific pollutants (Central Valley Regional Water Quality Control Board 2018a). Pollutants causing impairment and TMDLs that have been approved by USEPA and officially incorporated into the Sacramento and San Joaquin River Basin Plan are listed in Table 3.10-1.

Unless otherwise designated by the Central Valley RWQCB, all groundwater in the San Joaquin River Basin is considered as suitable or potentially suitable, at a minimum, for beneficial uses listed in Table 3.10-1. A variety of historical and ongoing industrial, urban, and agricultural activities and their associated discharges can degrade groundwater quality. The primary pollutant sources and constituents of concern are listed in Table 3.10-1.

Table 3.10-1. Overview of Hydrologic Basin Traits

	Surface Water		Groundwater	
Hydrologic Basin	**Beneficial Uses**	**Pollutants and Established TMDLs**	**Beneficial Uses**	**Sources of Contamination and COCs**
San Francisco Bay	For inland streams: municipal and domestic supply, agricultural supply, commercial and sport fishing, freshwater replenishment, industrial process supply, groundwater recharge, preservation of rare and endangered species, water contact and noncontact water recreation, wildlife habitat, cold freshwater habitat, warm	Pesticides, heavy metals, dioxins, furans, and PCBs. TMDLs established for pesticide-related toxicity in urban creeks, as well as PCBs and mercury in San Francisco Bay.	Municipal and domestic supply, industrial supply, industrial process supply, agricultural supply, groundwater recharge, freshwater replenishment to surface waters.	Industrial and agricultural chemical spills, underground and aboveground tank and sump leaks, landfill leachate, septic tank failures, and chemical seepage via shallow drainage wells and abandoned wells. COCs include TDS, nitrate, boron, organic

Hydrologic Basin	Surface Water		Groundwater	
	Beneficial Uses	Pollutants and Established TMDLs	Beneficial Uses	Sources of Contamination and COCs
	freshwater habitat, fish migration, and fish spawning. The Bay itself supports all of the above-listed beneficial uses plus industrial service supply and navigation.			compounds.
San Joaquin River	Municipal and domestic supply, agricultural supply, industrial supply, contact and non-contact recreation, warm and cold freshwater habitat, fish migration and spawning, and wildlife habitat.	Pesticides and heavy metals. TMDLs established for pesticides including diazinon and chlorpyrifos, metals including selenium and boron, salt, and dissolved oxygen.	Municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply.	High salt concentrations from evaporation and poor drainage, disposal of human and animal waste products and fertilizer, agricultural pesticides and herbicides, and industrial organic contaminants. COCs include TDS, nitrate, boron, chloride, organic compounds.

Sources: San Francisco Bay Regional Water Quality Control Board 2017; Central Valley Regional Water Quality Control Board 2018a; California Department of Water Resources 2003; State Water Resources Control Board 2017; San Francisco Bay Regional Water Quality Control Board 2018; Central Valley Regional Water Quality Control Board 2018b.
TMDL = total maximum daily load; COCs = constituents of concern; PCBs = polychlorinated biphenyls; TDS = total dissolved solids.

Stormwater Drainage

Most soils can be categorized into hydrologic soil groups (which apply only to surface soil layers) based on runoff-producing characteristics. Hydrologic soil groups are factored into calculations of runoff from rainfall when drainage plans are prepared. The four hydrologic soil groups (A, B, C, and D) are briefly described below (NRCS 2018).

- Group A soils have a low runoff potential (i.e., a high infiltration rate) when wet, and consist mainly of deep, well-drained to excessively drained sands or gravelly sands.
- Group B soils have a moderately low runoff potential (i.e., a moderate infiltration rate) when wet, and consist mainly of moderately deep, or deep moderately well-drained soils that have a moderately fine texture to a moderately coarse texture.
- Group C soils have a moderately high runoff potential (i.e., a slow infiltration rate) when wet, and consist of soils with a layer that impedes the downward movement of water or soils of moderately fine or fine texture.

- Group D soils have a high runoff potential (i.e., very slow infiltration rate) when wet, and consist chiefly of clays that have a high shrink-swell potential, a high water table, a clay layer at or near the surface, or form a shallow layer over nearly impervious material.

3.10.3.2 Regional Flooding

Flooding hazards that might occur as a result of storms and dam or levee failure are evaluated in this section. Flooding hazards from tsunamis and seiches, which occur primarily as a result of seismic activity, are evaluated in Section 3.7, *Geology and Soils*.

Storm-Related Flooding

Storm-related flooding can occur as a result of heavy rainfall, which results in excessive sheet (i.e., overland) flow, river and stream overflow. Storm-related flooding can also occur when the capacity of stormwater drainage facilities are exceeded. Flooding hazards from rivers and streams are mapped by FEMA for 100-year floodplain areas throughout the United States, as discussed above. As required by SB 5, DWR provides Best Available Maps of areas of the Sacramento-San Joaquin Valley that would be inundated by a flood event having a 0.5 percent annual chance of being equaled or exceeded in any given year, also referred to as a 200-year flood event (California Department of Water Resources 2019); the Best Available Maps were prepared by USACE and the California State Reclamation Board in 2002, and were updated by DWR in 2008.

Dam and Levee Failure

Dam or levee failure can generally be caused by stormwater overflow during the winter rainy season (but can also result from earthquake damage), and can result in flooding of large areas down-gradient of a dam or levee. The safety of dams in California falls under the jurisdiction of DWR's Division of Safety of Dams, except for dams that are owned and operated by the federal government, which are under the jurisdiction of the U.S. Department of the Interior's Bureau of Reclamation. The safety of dams that produce hydroelectric power are also under the jurisdiction of the Federal Energy Regulatory Commission. Existing dams under state and federal jurisdiction are periodically inspected to ensure that they are adequately maintained and that identified deficiencies are corrected. Regular inspections and required maintenance of dams substantially reduces the potential for catastrophic failure.

As discussed above, levees are evaluated by FEMA as part of flood risk studies performed under the NFIP. For levee systems to continue being recognized by FEMA as providing protection from a 100-year flood, regular levee maintenance must be performed in accordance with an officially adopted maintenance plan that documents formal procedures for ensuring that a levee's stability, height, and overall integrity, and its associated structures and systems, are maintained. Levee construction and maintenance in California is generally under the jurisdiction and control of USACE, DWR, and, in some cases, local flood protection agencies (for maintenance activities). Levees under USACE jurisdiction are designed and constructed according to USACE standard engineering and design practices as detailed in USACE engineering technical memoranda. Most levees located in the Sacramento-San Joaquin Valley also fall under the jurisdiction of the CVFPB, which requires implementation of DWR's *Urban Levee Design Criteria* (ULDC) (California Department of Water Resources 2012). The ULDC provide engineering criteria and guidance for the design, evaluation, operation, and maintenance of levees and floodwalls that provide an urban level of flood protection (i.e., a 200-year level of flood protection) in California. The ULDC are also frequently used for levee

design in areas outside of the CVFPP. All levees are typically engineered with a calculated amount of freeboard, and bermed sides, heights, widths, and slopes that are specifically designed to contain and channel flood waters to reduce flooding in the surrounding areas.

3.10.3.3 Tri-Valley Segment

Watersheds

Proposed Project improvements in the Tri-Valley segment and the western portion of the Altamont segment are in the Alameda Creek Watershed. A watershed is the area of land drained by a stream or river system; it includes the surface water bodies, groundwater, and surrounding landscape. The Alameda Creek Watershed is the largest in the Bay Area, encompassing approximately 680 square miles. Alameda Creek is the third largest tributary to the San Francisco Bay (after the Sacramento and San Joaquin Rivers). The main stem of Alameda Creek flows for 40 miles, originating in the hills northeast of Mount Hamilton. Alameda Creek provides wildlife habitat, water supply, a conduit for flood waters, and recreational opportunities. The creek and three major reservoirs in the watershed are used as water supply by the San Francisco Public Utilities Commission, Alameda County Water District, and Zone 7 Water Agency. Planned restoration projects will allow steelhead trout and Chinook salmon to access up to 20 miles of spawning and rearing habitat in Alameda Creek and its tributaries (Alameda Creek Alliance 2018).

Subwatersheds and Surface Waters

Two major tributaries combine to form the main stem of Alameda Creek: Arroyo de la Laguna and South Fork Alameda Creek. Each of these two tributary streams are in turn fed by many smaller tributaries as shown on Figure P-3A. Table 3.10-2 lists subwatersheds intersected and surface waters crossed by or within 0.5 mile of the Tri-Valley segment that may receive runoff.

Table 3.10-2. Tri-Valley Segment—Subwatersheds and Surface Waters that May Receive Runoff

Subwatersheds Intersected	Surface Waters Crossed or within 0.5 Mile that May Receive Runoff
South San Ramon Creek	Alamo Canal, Dublin Creek, Laurel Creek, South San Ramon Creek
Alamo Creek	Alamo Creek
Lower Arroyo Mocho	Chabot Canal, Tassajara Creek, several unnamed tributaries to Arroyo Las Positas, channelized portion of unnamed stream tributary to Arroyo Mocho
Lower Arroyo Las Positas	Arroyo Las Positas, Cayetano Creek, Collier Canyon Creek, Cottonwood Creek,
Arroyo Seco	Arroyo Seco
Upper Arroyo Las Positas	Altamont Creek, South Bay Aqueduct

Source: U.S. Geological Survey National Hydrography Dataset 2011.

Beneficial Uses of Surface Waters and Water Quality

Table 3.10-3 lists the existing and potential beneficial uses designated in the San Francisco Bay Basin Plan for surface waters that could receive runoff from the Tri-Valley segment. Applying the San Francisco Bay RWQCB's "tributary rule," the beneficial uses of any specifically identified water

body generally apply to all its tributaries. In some cases, a beneficial use may not be applicable to the entire body of water; in these cases, the San Francisco Bay RWQCB's judgment regarding water quality control measures necessary to protect beneficial uses will be applied. In addition, beneficial uses of streams that only have intermittent flows must also be protected throughout the year (San Francisco Bay Regional Water Quality Control Board 2017).

Table 3-10.3. Tri-Valley—Beneficial Uses of Surface Waters

Waterbodies[a]	Groundwater Recharge	Cold Freshwater Habitat	Fish Migration	Rare & Endangered Species Preservation	Fish Spawning	Warm Freshwater Habitat	Wildlife Habitat	Water Contact Recreation	Non-Contact Water Recreation
Arroyo Mocho	E	E	E		E	E	E	E	E
Tassajara Creek	E	P	E	E	E	E	E	E	E
Arroyo las Positas	E	E	E	E	E	E	E	E	E
Cottonwood Creek				E		E	E	E	E
Collier Canyon Creek				E		E	E	E	E
Cayetano Creek				E		E	E	E	E
Arroyo Seco	E	E	E	E	E	E	E	E	E
Altamont Creek	E	E		E		E	E	E	E
Alamo Canal	E	P	E		E	E	E	E	E
Alamo Creek	E	P	E	E	E	E	E	E	E
Dublin Creek						E	E	E	E
Martin Canyon Creek						E	E	E	E
South San Ramon Creek						E	E	E	E

Source: San Francisco Bay Regional Water Quality Control Board 2017.
[a] Tributaries are indicated by indenting next to the name (for example, Cottonwood Creek is a tributary of Arroyo las Positas, which is in turn a tributary of Arroyo Mocho).
E = existing beneficial use; P = potential beneficial use

Table 3.10-4 lists impaired water bodies included on the SWRCB's 303(d) list that could receive runoff from the Tri-Valley segment, the pollutants of concern, and whether they have approved TMDLs. Even if a stream is not included on the SWRCB's 303(d) list, any upstream tributary to a 303(d)-listed stream could contribute pollutants to the listed segment (tributaries are indicated in Table 3.10-3 above).

Table 3-10.4. Tri-Valley—Impaired Water Bodies

Impaired Water Body	Pollutants	TMDL Status	Pollutant Source
Arroyo Mocho	Diazinon	Approved in 2007	Urban runoff/storm sewers
	Temperature	Required	Unknown
Arroyo las Positas	Diazinon	Approved in 2007	Urban runoff/storm sewers
	Nutrient eutrophication[a]	Required	Unknown

Source: State Water Resources Control Board 2017.
[a] Nutrient eutrophication occurs when excessive amounts of nutrients, particularly nitrogen and phosphate, are discharged into an aquatic ecosystem. The nutrients stimulate an explosive growth of algae (known as algal blooms). After the algae die, the subsequent bacterial degradation process consumes the oxygen in the water.
TMDL = total maximum daily load

Groundwater

The Tri-Valley segment is in the Livermore Valley Groundwater Basin (Basin ID 2-10), as illustrated on Figure P-2. Existing beneficial uses of groundwater in this basin consist of municipal and domestic water supply, industrial process and service water supply, and agricultural water supply (San Francisco Bay Regional Water Quality Control Board 2017).

The Livermore and Pleasanton Faults restrict lateral movement of groundwater in the Livermore Valley Groundwater Basin, but the general groundwater gradient in the basin is to the west, then south toward Arroyo de la Laguna. Dewatering activities related to mining of construction aggregate south of Interstate 580 in the Tri-Valley segment have changed the local groundwater flow patterns and locally limit the storage capacity of the basin. Groundwater-bearing deposits in the basin consist of Holocene-age alluvial deposits, the Livermore Formation, and the Tassajara Formation. Some areas within the basin have high boron concentrations. Boron is generally highest in shallow wells because of marine sediments adjacent to the basin. The most extensive elevated boron concentrations occur in the northeast part of the basin. Sources of groundwater inflow in the Livermore Valley Groundwater Basin consist primarily of natural recharge from rainfall and streamflow, artificially injected recharge, and percolation of applied agricultural and urban irrigation water. A small amount of subsurface inflow also occurs from other basins (California Department of Water Resources 2006a).

DWR has identified the Livermore Valley Groundwater Basin as a medium priority basin under SGMA (California Department of Water Resources 2019). Zone 7 Water Agency is the exclusive groundwater manager of the basin and also serves as the GSA. Zone 7 prepared an Alternative GSP in 2016 (Zone 7 Water Agency 2016), which was approved by DWR in 2019.

Stormwater Runoff

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) (2018) has assigned the soils in the Tri-Valley segment to hydrologic groups C and D (see above or Table 3.7-3 in Section 3.7, *Geology and Soils*). These soils have a slow to very slow water infiltration rate, and therefore have a high stormwater runoff rate.

Flooding Hazards

Mapped FEMA (2017) floodplains in the Tri-Valley segment are shown in Figure P-4A and described in Table 3.10-5, which also includes potential flooding from dam inundation zones. There are no

areas in the Tri-Valley segment that are within a CVFPB 200-year flood zone or that are protected from flooding hazards by levees.

Table 3.10-5. Tri-Valley Segment—Flooding Hazards

Project Footprint	1% Annual Exceedance Probability (100-year Flood)	Dam Inundation Zone
Tri-Valley Alignment, Dublin/Pleasanton Station Isabel Station	Zone AE[a]	--
Tri-Valley Alignment	Zone AH[b]	--
Tri-Valley Alignment east to Livermore Avenue Dublin/Pleasanton Station	--	Del Valle Dam
Tri-Valley Alignment at Livermore Avenue	--	Patterson Dam

Sources: Federal Emergency Management Agency 2017; California Department of Water Resources 2019; City of Pleasanton 2013; Alameda County 2014; City of Livermore 2013.
[a] Zone AE = a 100-year flood hazard zone for which the base flood elevation has been determined (varies by location).
[b] Zone AH = a 100-year flood hazard zone for which the base flood elevation has been determined, where the flood hazard usually occurs as a result of ponding; flood depths range from 1–3 feet.

3.10.3.4 Altamont Segment

Watersheds

The western half of the Altamont segment footprint is in the Alameda Creek Watershed, which is discussed above, and shown in Figure P-1.

The eastern half of the Altamont segment footprint is at the southern end of a large, undefined watershed that encompasses the Delta, as shown in Figure P-1. Most of the footprint in this area is in the Diablo Range. East of Interstate 580, a small portion of the footprint lies on the flat alluvial plain of the San Joaquin Valley.

Subwatersheds and Surface Waters

Table 3.10-6 lists subwatersheds intersected and surface waters crossed by or within 0.5 mile of the Altamont segment that may receive runoff. These subwatersheds and surface waters are shown on Figure P-3B.

Table 3.10-6. Altamont Segment—Subwatersheds and Surface Waters that May Receive Runoff

Subwatersheds Intersected	Surface Waters Crossed or Within 0.5 Mile that May Receive Runoff
Upper Arroyo Las Positas	Altamont Creek, Unnamed tributary to Altamont Creek, South Bay Aqueduct
Clifton Court Forebay	Unnamed tributary to Old River
Mountain House Creek	Mountain House Creek, various unnamed tributaries to Mountain House Creek
Lower Old River	Patterson Run, numerous unnamed streams, California Aqueduct, Delta Mendota Canal

Source: U.S. Geological Survey National Hydrography Dataset 2011.

Beneficial Uses of Surface Waters and Water Quality

The surface water bodies with beneficial uses designated in the San Francisco Bay Basin Plan and the Central Valley Basin Plan that could receive runoff from the Altamont segment footprint are listed in Table 3.10-7. Applying the San Francisco Bay RWQCB and Central Valley RWQCB's "tributary rule," the beneficial uses of any specifically identified water body generally apply to all its tributaries. In addition, the Central Valley RWQCB automatically attributes a beneficial use designation of "Municipal and Domestic Supply" to any water body that does not have a designated beneficial use.

Table 3.10-7. Altamont Segment—Beneficial Uses of Surface Waters

Waterbodies	Agricultural Water Supply	Groundwater Recharge[a]	Industrial Process & Service Supply	Commercial and Sport Fishing	Municipal & Domestic Water Supply	Cold Freshwater Habitat	Fish Migration	Rare & Endangered Species Preservation[a]	Fish Spawning	Warm Freshwater Habitat	Wildlife Habitat	Water Contact Recreation	Non-Contact Water Recreation	Navigation
San Francisco Bay Basin														
Altamont Creek		E				E		E		E	E	E	E	
Central Valley Basin														
Mountain House Creek/Old River as part of Delta Waterways[b]	E		E	E	E	E	E		E	E	E	E	E	E
California Aqueduct	E		E		E						E	E	E	
Delta-Mendota Canal	E				E					E	E	E	E	

Sources: San Francisco Bay Regional Water Quality Control Board 2017; Central Valley Regional Water Quality Control Board 2018a.

[a] Groundwater Recharge and Rare & Endangered Species Protection have not been assigned to any waterways as beneficial uses in the Basin Plan for the Central Valley Region.

[b] Mountain House Creek is a tributary of Old River, which drains into the Delta. Beneficial uses vary throughout the Delta and are evaluated on a case-by-case basis.

E = existing beneficial use

Table 3.10-8 lists impaired water bodies included on the SWRCB's 303(d) list that could receive runoff from the Altamont segment, the pollutants of concern, and whether they have approved TMDLs. Even if a stream is not included on the SWRCB's 303(d) list, any upstream tributary to a 303(d)-listed stream could contribute pollutants to the listed segment.

Table 3.10-8. Altamont Segment—Impaired Water Bodies

Impaired Water Body	Pollutant	TMDL Status	Pollutant Source
San Francisco Bay Basin			
Arroyo las Positas	Diazinon	Approved in 2007	Urban runoff/storm sewers
	Nutrient Eutrophication	Required	Unknown
Central Valley Basin			
Mountain House Creek (Altamont Pass to Old River)	Chloride	Required	Unknown
	Salinity	Required	Unknown
Old River	Chlorpyrifos	Approved in 2007	Unknown
	Electrical Conductivity	Required	Unknown
	Low Dissolved Oxygen	Required	Unknown
	Total Dissolved Solids	Required	Unknown

Source: State Water Resources Control Board 2017.
TMDL = total maximum daily load

Groundwater

The eastern half of the Altamont segment is in a large, undefined groundwater basin that encompasses the Diablo Range (Figure P-2). Little is known about the groundwater in this basin, partly because of the general lack of development, which in turn results in very few groundwater studies. The Diablo Range consists of fractured bedrock; therefore, the groundwater quantity and quality varies greatly from well site to well site due to the small and unpredictable yields of the fractured rock system that typifies the geology in the Altamont segment. Sources of groundwater inflow in this basin consist primarily of natural recharge from rainfall and streamflow. The Interim OMF, which is located in this undefined groundwater basin, would require a new groundwater well to serve as the source of water supply for this facility. This basin does not have an assigned basin number, and has been identified by DWR as a very low priority basin under SGMA (California Department of Water Resources 2019). Furthermore, in this undefined basin, there is no identified GSA. GSPs are not required for very low and low priority groundwater basins, and a GSP for this undefined basin has not been prepared nor are there currently any known plans to prepare one.

The western half of the Altamont segment is in the San Joaquin Valley Groundwater Basin-Tracy Subbasin (Figure P-2), which is discussed in further detail in the Tracy to Lathrop segment below. The West Tracy OMF Alternative, which would be located in the Tracy Subbasin, would require a new groundwater well to serve as the source of water supply for this facility. DWR has identified the Tracy Subbasin has a medium-priority basin under SGMA (California Department of Water Resources 2019). In medium-priority basins, GSPs are required by January 31, 2022. There are seven GSAs in the Tracy Subbasin: Banta-Carbona Irrigation District, Byron-Bethany Irrigation District, City of Lathrop, City of Tracy, County of San Joaquin, Stewart Tract, and West Side Irrigation District. These GSAs are working cooperatively to develop one GSP for the Tracy Subbasin, which is in the process of being prepared (GEI Consultants 2020).

Stormwater Runoff

NRCS (2018) has assigned the soils in the Altamont segment to hydrologic groups C and D (see Table 3.7-6 in Section 3.7, *Geology and Soils*). These soils have a slow to very slow water infiltration rate, and therefore have a high stormwater runoff rate.

Flooding Hazards

As shown in Figure P-3B, there are no mapped FEMA (2017) or DWR (2019) flood hazard zones, nor are there any dam inundation zones (Alameda County 2014; San Joaquin County 1992) in the Altamont segment.

3.10.3.5 Tracy to Lathrop Segment

Watersheds

As shown in Figure P-1, most of the Tracy to Lathrop segment is in a large, undefined watershed that encompasses the Delta. The northern end of the Tracy to Lathrop Segment is in the Manteca Watershed. The entirety of the Proposed Project footprint in the Tracy to Lathrop segment lies on the flat alluvial plain of the San Joaquin Valley.

Subwatersheds and Surface Waters

Table 3.10-9 lists subwatersheds intersected and surface waters crossed by or within 0.5 mile of the Tracy to Lathrop segment footprint that may receive runoff. These subwatersheds and surface waters are shown on Figure P-3C.

Table 3.10-9. Tracy to Lathrop Segment—Subwatersheds and Surface Waters that May Receive Runoff

Subwatersheds Intersected	Surface Waters Crossed or Within 0.5 Mile that May Receive Runoff
Lower Old River	Various unnamed canals
Upper Old River	Tom Paine Slough, Paradise Cut, unnamed tributaries, and canals to Delta Waterways
Oakwood Lake-San Joaquin River	San Joaquin River, several unnamed canals
Town of French Camp-San Joaquin River	Several unnamed waterbodies and canals

Source: U.S. Geological Survey 2011.

Beneficial Uses of Surface Waters and Water Quality

Table 3.10-10 lists the existing and potential beneficial uses designated in the Central Valley Basin Plan for surface waters that could receive runoff from the Tracy to Lathrop segment. Applying the Central Valley RWQCB's "tributary rule," the beneficial uses of any specifically identified water body generally apply to all its tributaries. In addition, the Central Valley RWQCB automatically attributes a beneficial use designation of "Municipal and Domestic Supply" to any water body that does not have a designated beneficial use.

Table 3.10-10. Tracy to Lathrop Segment—Beneficial Uses of Surface Waters

Waterbodies	Agricultural Water Supply	Industrial Process & Service Supply	Commercial and Sport Fishing	Municipal & Domestic Water Supply	Cold Freshwater Habitat	Fish Migration	Fish Spawning	Warm Freshwater Habitat	Wildlife Habitat	Water Contact Recreation	Non-Contact Water Recreation	Navigation
Sacramento-San Joaquin Delta[a]	E	E	E	E	E	E	E	E	E	E	E	E

Sources: San Francisco Bay Regional Water Quality Control Board 2017; Central Valley Regional Water Quality Control Board 2018a.
[a] Includes Tom Paine Slough, Paradise Cut, San Joaquin River, and unnamed tributaries. Beneficial uses vary throughout the Delta and are evaluated on a case-by-case basis.
E = existing beneficial use

Table 3.10-11 lists impaired water bodies included on the SWRCB's 303(d) list that could receive runoff from the Tracy to Lathrop segment, the pollutants of concern, and whether they have approved TMDLs. Even if a stream is not included on the SWRCB's 303(d) list, any upstream tributary to a 303(d)-listed stream could contribute pollutants to the listed segment.

Table 3.10-11. Tracy to Lathrop Segment—Impaired Water Bodies

Impaired Water Body	Pollutants	TMDL Status	Pollutant Source
Tom Paine Slough	Chloride	Required	Unknown
	Dissolved Oxygen	Approved in 2005	Unknown
	Salinity	Required	Unknown
Delta Waterways, Southern Portion	Chlorpyrifos	Approved in 2007	Unknown
	DDT	Required	Unknown
	Diazinon	Approved in 2007	Unknown
	Electrical Conductivity	Required	Unknown
	Group A Pesticides	Required	Unknown
	Invasive Species	Required	Unknown
	Mercury	Approved in 2011	Unknown
	Toxicity	Required	Unknown

Source: State Water Resources Control Board 2017.
TMDL = total maximum daily load; DDT = dichlorodiphenyltrichloroethane

Groundwater

The Tracy to Lathrop segment is within the San Joaquin Valley Groundwater Basin-Tracy Subbasin (Basin ID 5-22.15), as illustrated on Figure P-2. As designated by the Central Valley RWQCB, all groundwater in the region is considered suitable or potentially suitable, at a minimum, for municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply (Central Valley Regional Water Quality Control Board 2018a).

The Tracy Subbasin is drained by the San Joaquin River and one of its major west side tributaries: Corral Hollow Creek. The San Joaquin River flows northward into the Delta, which discharges into the San Francisco Bay. Most groundwater wells in the Tracy Subbasin obtain water from Holocene alluvial deposits and the Tulare Formation. Areas of elevated chloride occur in several areas including along the western side of the subbasin, in the vicinity of the City of Tracy, and along the San Joaquin River. Areas of elevated nitrate occur in the northwestern part of the subbasin and in the vicinity of the City of Tracy. Areas with elevated boron occur over a large portion of the subbasin from an area south of Tracy extending to the northwest side of the subbasin. Sources of groundwater inflow in the Tracy Subbasin consist primarily of natural recharge from rainfall and streamflow, artificially injected recharge, and percolation of applied agricultural and urban irrigation water. Subsurface inflow also occurs from other basins (California Department of Water Resources 2006b).

DWR has identified the Tracy Subbasin as a medium-priority basin under SGMA (California Department of Water Resources 2019). In medium-priority basins, GSPs are required by January 31, 2022. As discussed previously in the Altamont segment, there are seven GSAs in the Tracy Subbasin that are working cooperatively to develop one GSP for the Tracy Subbasin (GEI Consultants 2020). None of the proposed facilities in the Tracy to Lathrop segment would require new groundwater wells for water supply.

Stormwater Runoff

NRCS (2018) has assigned the soils in the Tracy to Lathrop segment to hydrologic groups A and C (see above and Table 3.7-7 in Section 3.7, *Geology and Soils*). Soils in this segment generally are deeper, more permeable, and better drained compared to the other two segments. In general, soils from the western end of the Tracy to Lathrop segment footprint to the east side of the San Joaquin River have a moderately high stormwater runoff rate due to their high clay content, and soils in the remaining portion of the footprint to the northeastern end have a low stormwater runoff rate.

Flooding Hazards

Mapped FEMA (2017) and DWR (2019) floodplains in the Tracy to Lathrop segment are shown in Figure P-4C and are described in Table 3.10-12, which also includes areas that are protected from flooding hazards by levees and potential flooding from dam inundation zones.

Table 3.10-12. Tracy to Lathrop Segment—Flooding Hazards

Project Footprint	1% Annual Exceedance Probability (100-year Flood)	0.5% Annual Exceedance Probability (200-year Flood)	Areas Protected by Levees	Dam Inundation Zone
Tracy to Lathrop Alignment Variant 1, Single Track				
Tracy to Lathrop Alignment Variant 2, Double Track	Zone AE[a]	--	--	--
River Islands Station				
Tracy to Lathrop Alignment Variant 1, Single Track	--	Yes	--	--

Project Footprint	1% Annual Exceedance Probability (100-year Flood)	0.5% Annual Exceedance Probability (200-year Flood)	Areas Protected by Levees	Dam Inundation Zone
Tracy to Lathrop Alignment Variant 2, Double Track River Islands Station North Lathrop Station				
Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track North Lathrop Station	--	--	Yes	--
Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track River Islands Station	--	--		Lake McClure, Pine Flat Lake, Tulloch Dam
Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track River Islands Station North Lathrop Station	--	--		San Luis Dam, New Melones Dam

Sources: Federal Emergency Management Agency 2017; California Department of Water Resources 2019; San Joaquin County 1992.
[a] Zone AE = a 100-year flood hazard zone for which the base flood elevation has been determined (varies by location).

3.10.4 Impact Analysis

This section describes the environmental impacts of the Proposed Project and alternatives analyzed at an equal level of detail (i.e., the Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Station Tracy Parking Alternative 2) on hydrology and water quality, including the station alternatives, the West Tracy OMF Alternative, and the Stone Cut Alignment Alternative. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate significant impacts are provided, where appropriate.

3.10.4.1 Methods for Analysis

Potential impacts related to hydrology and water quality were evaluated based on a review of available information regarding watersheds, surface waters, groundwater, flooding hazards, and stormwater control and treatment requirements within the study area. Impacts related to tsunamis and seiches are evaluated in Section 3.7, *Geology and Soils*.

3.10.4.2 Thresholds of Significance

CEQA Guidelines Appendix G (Cal. Code Regs. Title 14, Section 15000 et seq.) has identified significance criteria to be considered for determining whether a project could have significant impacts on existing hydrology and water quality as described below.

An impact would be considered significant if construction or operation of the Proposed Project (including all track and technology variants), the station alternatives (Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative, would have any of the following consequences.

- Violate any water quality standards or Waste Discharge Requirements or otherwise substantially degrade surface or groundwater quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- 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:
    - result in substantial erosion or siltation, on or off site;
    - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;
    - create or contribute runoff water which would exceed the capacity of the existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

In addition to the thresholds above, for the purposes of this EIR, an impact would be considered significant if construction or operation of the Proposed Project (including all track and technology variants), the station alternatives (i.e., the Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative, would impede or redirect flood flows.

3.10.4.3 Impacts and Mitigation Measures

Impact HYD-1a: Construction of the Proposed Project could violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade surface or ground water quality.

Level of Impact Prior to Mitigation	**Potentially significant** Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station

	Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Interim OMF Mountain House Station Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station <u>Alternatives Analyzed at an Equal Level of Detail</u> Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	HAZ-2.2: Implement construction risk management plan.
Level of Impact after Mitigation	**Less than Significant**

Impact Characterization

The Proposed Project (including all track variants, technology variants, and the Greenville and Mountain House IOS), the station alternatives (Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative would involve disturbing and handling existing soil and imported fill materials, and the use and storage of hazardous materials (e.g., fuels and lubricants for construction equipment) during construction activities. The improper handling and management of disturbed soil and imported fill could result in pollution of stormwater runoff with sediment and contaminants that may be in the existing soil or imported fill materials, potentially reducing the quality of the receiving waters. If spilled or improperly stored, substances such as fuels and oils could directly enter nearby surface waters or be transported to nearby surface waters in stormwater runoff, potentially reducing the quality of the receiving waters. Polluted stormwater runoff and spills of hazardous materials could also infiltrate through pervious surfaces and degrade groundwater quality. Construction work involving bridges and culverts over and through waterways could result in violation of WDRs through increased sediment transport or accidental spills of pollutants. Furthermore, contaminated groundwater could also be encountered during construction activities, resulting in an accidental release to the environment and a violation of WDRs.

Impact Detail and Conclusions

Proposed Project

The handling and management of existing soil, imported fill material, and hazardous materials in upland construction areas would be performed in accordance with a SWPPP, as required by the Construction General Permit, to ensure that stormwater runoff, surface waters, and groundwater are not polluted by these construction activities.

The Construction General Permit uses a risk-based permitting approach and mandates certain requirements based on the project risk level (i.e., 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 the project location and timing (i.e., wet season versus dry season activities). The receiving water risk depends on whether the project would discharge to a sediment-sensitive receiving water. A sediment-sensitive water body is one that appears on the most recent 303(d) list for water bodies impaired for sediment; has a USEPA-approved TMDL implementation plan for sediment; or has the beneficial uses of cold freshwater habitat, fish migration, and fish spawning. The determination of the project risk level would be made by the project applicant when the Notice of Intent is filed (and more details of the timing of the construction activity are known).

The performance standard in the Construction General Permit is that dischargers would be required to minimize or prevent pollutants in stormwater discharges and authorized non-stormwater discharges through the use of controls, structures, and BMPs that achieve Best Available Technology for treatment of toxic and non-conventional pollutants and Best Conventional Technology for treatment of conventional pollutants. Examples of the types of BMPs that could be implemented include the following.

- Installing gravel bags, silt fences, straw wattles.
- Limiting equipment washing and soils piles to specified locations.
- Covering stockpiles.
- Establishing soil stabilization, sediment control, and wind control measures.

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.

A SWPPP must also include a construction site monitoring program. Depending on the project risk level, the monitoring program for the Proposed Project would involve visual observations of site discharges, water quality monitoring of site discharges (e.g., pH, turbidity, and non-visible pollutants, if applicable), and receiving water monitoring (e.g., pH, turbidity, suspended sediment concentration, and bioassessment, if applicable) (State Water Resources Control Board 2012a).

The Proposed Project would also include construction activities adjacent to, within, or crossing over surface waters (see Figures P-3A, P-3B, and P-3C). As discussed in Chapter 2, *Project Description*, wherever possible, the construction of bridges would involve placement of a single span across the waterway by cranes operating on both banks, with the new pier foundations located just outside the

waterway, which would minimize potential impacts on water quality. For longer spans, bridge pier foundations within waterways may be accessed from the ground by pushing clean fill into the waterway on top of temporary pipe culverts or narrowing or diverting the waterway, then restoring the original condition when done. An alternative method for accessing pier foundations in waterways would be to build a temporary trestle bridge from which the construction equipment can work. Bridge supports within waterways would consist of either concrete columns or standard railroad trestle bents with steel H-piles. Concrete columns would be constructed by driving steel pile shafts into the bottom of the waterway, drilling through the pile shaft, and forming and casting the reinforced concrete columns and pier caps. Temporary limited dewatering of the pile shafts would be required to form and cast the concrete columns. For standard railroad trestle bents, steel H-piles would be driven directly into the bottom of the waterway, which would not require dewatering (except as needed for equipment access). Where applicable, existing bridge piers, footings, and piles would be removed down to 3 feet below the finished grade, which may require dewatering and/or diverting of surface water for equipment access.

These construction activities could violate water quality standards or WDRs because disturbance of soil along the banks of surface waters or sediment within surface waters could result in increased turbidity and potentially release contaminants entrained in soil or sediments. Construction materials that are not appropriately handled and installed could potentially be released into surface waters, which could increase turbidity and contribute pollutants to the surface water. Also, surface waters could be polluted by spills or leaks of hazardous materials (e.g., fuels and lubricants for construction equipment) directly into or adjacent to surface waters.

As discussed in detail in Section 3.4, *Biological Resources*, all construction activities within the banks of surface waters would require a USACE Section 404 permit and an SWRCB Section 401 Water Quality Certification, and work within a stream or on a streambank would require a California Department of Fish and Wildlife Streambed Alteration Agreement. Applications for these items applications must include a discussion of construction BMPs, including erosion and sediment control BMPs, which would minimize impacts on water quality. Examples of the types of BMPs that could be implemented include the following.

- Silt curtains
- Cofferdams
- Slope stabilization
- Bank stabilization
- Revegetation

The permits, certification, and executed agreement would include any additional requirements for protection of water quality as deemed necessary by the reviewing agencies. Compliance with the requirements of these items would reduce potential impacts on water quality during construction activities both along the banks of and within surface waters.

The improper handling and management of groundwater or dewatering discharges, or accidental encounters with contaminated groundwater during project-related excavation, could result in the discharge of contaminated water or water-containing sediments into nearby surface waters, which could violate water quality standards or WDRs.

For the Proposed Project however, groundwater and dewatering effluent generated by temporary construction dewatering activities would be contained by the construction contractor(s) in an appropriately sized storage tank and tested to determine whether effluent is contaminated prior to discharging. Testing and discharging of effluent would be performed in accordance with the Construction General Permit, the Permit for Construction Dewatering Activity (Order R5-2013-0074 as modified by R5-2016-0079-01), the risk management plan (RMP), and applicable resource agency permit requirements, including treating the effluent prior to discharge, if necessary.

If groundwater or dewatering effluent would be discharged to storm drainage systems (e.g., storm drains, conveyance pipes, canals, ditches, creeks, and rivers) in accordance with permit requirements, discharge flow rates would be limited to ensure that the capacity of storm drainage systems would not be exceeded by the discharge. The construction contractor(s) would determine the capacity of storm drainage systems that would receive discharges by coordinating with the local government agencies that have jurisdiction over the protection and maintenance of the storm drainage systems. The capacity of storm drainage systems would be determined for various times of year and various storm events. If the capacity of the storm drainage systems could not be determined through coordination with local government agencies, an evaluation of the storm drainage system capacity for receiving discharges would be performed and certified by a professional engineer. The discharge flow rates would not exceed the capacity determined for various times of year and various storm events, as required by the local jurisdictional agency.

If effluent was not suitable for discharge to storm drains or directly to receiving waters, as discussed above, effluent would be discharged to sanitary sewer systems or transported for disposal at an appropriate offsite treatment or disposal facility. If the effluent would be discharged to a sanitary sewer, the appropriate permit would be obtained from the local utility agency with jurisdiction over discharges to the sanitary sewer system, and permit criteria for discharging to the sewer would be followed. These criteria require testing of the effluent, application of treatment technologies that would result in achieving compliance with the wastewater discharge limits, and discharging at or below the maximum allowable flow rate.

Furthermore, the construction contractor(s) would be required to obtain applicable resource agency permits and approvals and comply with permit requirements to prevent impacts on water quality, and demonstrate that water quality standards and/or WDRs were not violated. The California Department of Fish and Wildlife, USACE, and/or the SWRCB may require the following permit-related compliance and avoidance measures.

- Install temporary physical barriers (e.g., coffer dams and/or silt curtains) in water around construction activities to prevent potential localized impacts on water quality (e.g., increase in turbidity) from spreading within the surface water.
- Install temporary physical barriers (e.g., elevated platforms and/or netting, or floating platforms) over surface waters and beneath elevated construction activities to prevent construction materials from being released into the surface water below.
- Design and install temporary physical barriers as part of permit requirements and avoidance measures to ensure that stream flow (including storm flows) would not be impeded to the degree that adverse flooding impacts could occur.
- Perform water quality monitoring including sampling and analysis for constituents required by resource agency permits, which may include total suspended solids, pH, temperature, conductivity, pollutants of concern identified in soil or sediment during preconstruction

sampling and analysis, and pollutants with TMDLs established for the surface water if construction activities could result in the release of these pollutants.

- Compare results of water quality monitoring tests to performance standards established by the SWRCB in the CWA Section 401 Water Quality Certification. If water quality monitoring test results indicate that performance standards are not being achieved, additional avoidance measures (e.g., installation of additional silt curtains) would be implemented until water quality monitoring test results indicate performance standards are achieved.

Alternatives Analyzed at an Equal Level of Detail

Construction of the alternatives analyzed at an equal level of detail would result in similar impacts to water quality as those described above for the Proposed Project. Impacts would be potentially significant.

Mitigation Measures

Mitigation Measure HAZ-2.2 will be implemented to avoid the violation of WDRs from encountering contaminated groundwater during construction. Mitigation Measure HAZ 2.2 will be applied to the Proposed Project and the alternatives analyzed at an equal level of detail.

Mitigation Measure HAZ-2.2: Implement construction risk management plan.

Refer to measure description under Impact HAZ-2 in Section 3.9, *Hazardous Materials*.

Significance with Application of Mitigation

Mitigation Measure HAZ-2.2 requires implementation of a construction RMP, which will provide a framework for proper characterization and management of contaminated groundwater that could be disturbed during construction activities. With implementation of this mitigation measure, this impact would be less than significant for the Proposed Project.

For the same reasons listed above, implementation of Mitigation Measure HAZ-2.2 will avoid violation of WDRs from encountering contaminated groundwater during construction due to the construction of the alternatives analyzed at an equal level of detail, and the impact would be less than significant.

Comparison of Alternatives

Construction of the alternatives analyzed at an equal level of detail would require adherence to the same federal and state regulations, and would require implementation of the same mitigation measure (i.e., HAZ-2.2: Implement construction risk management plan) to reduce potential impacts on water quality, which would also be required for operation of the Proposed Project elements. Thus, impacts related to violation of water quality standards or WDRs, substantial additional sources of polluted runoff, or otherwise substantially degrade surface or ground water quality, would be the same among the alternatives analyzed at an equal level of detail and the Proposed Project (i.e., less than significant after implementation of mitigation).

Impact HYD-1b: Operation and maintenance of the Proposed Project would violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade surface or ground water quality.

Level of Impact Prior to Mitigation	**Potentially significant** Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Interim OMF Mountain House Station Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	HAZ-2.2: Implement construction risk management plan.
Level of Impact after Mitigation	**Less than Significant**

Impact Characterization

For the Proposed Project (including all track and technology variants), the station alternatives (i.e., the Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative, construction of improvements would require earthwork. If contaminants are present in reused existing soil or imported fill materials that are exposed to stormwater, contaminants could leach into stormwater runoff from the reused existing soil or imported fill and result in pollution of stormwater runoff and surface water, potentially reducing the quality of the receiving water.

Impact Detail and Conclusions

Proposed Project

Construction of the Proposed Project would involve grading and reuse of existing soil and use of imported fill materials. If contaminants are present in reused existing soil or in fill materials that are

placed in a location exposed to stormwater, contaminants could leach into stormwater runoff from the reused existing soil or imported fill and result in pollution of stormwater runoff and surface water, potentially reducing the quality of the receiving water.

Pesticides would be used (similar to current operation) to maintain and clear vegetation from track areas. The future use of pesticides for vegetation removal near the tracks would be required to comply with DPR regulations that are intended to protect human health and the environment (see discussion under *California Department of Pesticide Regulation* in Section 3.10.2.2). DPR puts special controls on pesticides that can be especially dangerous to human health or the environment if not used correctly, limiting their use to trained individuals and only at times and places approved by a permit from the County Agricultural Commissioners (California Department of Pesticide Regulation 2008). Use of pesticides for vegetation removal near the tracks in compliance with DPR regulations would therefore result in a less-than-significant impact on water quality.

Trains can be sources of pollutants such as petroleum products (i.e., oil, grease, and diesel) and metals. Under normal operating conditions, the amount of these pollutants released by modern trains is minimal (i.e., only minor drips) because trains undergo regular inspections and maintenance to prevent and fix leaks. Impacts from minor drips would be limited to the area immediately below the railroad tracks, and the track ballast material would minimize stormwater runoff from the area of localized impacts and prevent significant impacts on water quality. Therefore, operation of the Proposed Project improvements within track areas would not contribute new significant sources of pollutants to stormwater runoff unless an accidental release of hazardous materials occurs along the tracks. Operation of the Proposed Project would comply with stringent federal and state protocols and regulations intended to reduce the likelihood of accident conditions. Accident conditions, including the accidental release of hazardous materials and the potential effects on water quality, are not expected to increase with Proposed Project operation.

The Proposed Project improvements within track areas would include altering drainage patterns (e.g., altering or creating drainage systems) along tracks. If appropriate stormwater control and treatment systems are not designed and constructed as part of these improvements, pollutants that may be entrained in sediments could be transported from track areas to surface waters in stormwater runoff. The Construction General Permit includes post-construction stormwater performance standards that address water quality and channel protection for construction projects that are not in an area subject to post-construction standards of an active Phase I or Phase II MS4 permit with an approved Storm Water Management Plan. The Construction General Permit requires post-construction runoff to match preconstruction runoff in quality, which would not only reduce the risk of impact on the receiving water's channel morphology but would also provide some protection of water quality. The Construction General Permit also requires implementation of post-construction BMPs to reduce pollutants in stormwater discharges that are reasonably foreseeable after all construction phases have been completed. Compliance with the post-construction requirements of the Construction General Permit must be demonstrated by submitting a map and post-construction runoff calculation worksheets with the Notice of Intent.

Detailed design-level studies may conclude that increases in the post-construction runoff would exceed the Construction General Permit criteria in some locations. If estimated post-construction runoff volumes are found to exceed the criteria, improvements within track areas would be required to incorporate hydromodification management to control flows to reduce post-construction flow rates and durations for management of erosion and sediment. Hydromodification management may include facilities to retain, detain, bypass, split, or infiltrate runoff to mimic preconstruction flows,

durations, and associated sediment transport. Stormwater control and treatment BMPs would be designed and constructed for Proposed Project improvements within track areas in accordance with the S*torm Water Quality Handbooks, Project Planning and Design Guide* (PPDG) developed by Caltrans (California Department of Transportation 2019), and may include biofiltration swales, biofiltration strips, infiltration devices, detention devices, media filters, wet basins, and dry weather diversion. Design and construction of stormwater control and treatment BMPs as required by the PPDG would ensure that operation of improvements to track areas would have a less-than-significant impact on water quality.

Stations to be constructed as part of the Proposed Project would include construction of new paved surfaces for station platforms, parking lots, parking structures, roadways, and walkways. These improvements would alter drainage patterns (e.g., increase runoff from new impervious surfaces) and provide new sources of polluted runoff associated with motor vehicle traffic. Increasing runoff can cause erosion of unlined drainage courses (e.g., natural creeks and earthen canals/ditches) that would receive runoff from Proposed Project improvements, which can increase the turbidity of surface waters and cause sedimentation downstream. Pollutants that may be transported in runoff from parking lots and roadways include sediment; metals; organic compounds including diesel, gasoline, and oil; and trash and debris. For the Proposed Project improvements associated with stations that meet the criteria of regulated projects under local MS4 Permits, design and construction of stormwater controls and treatment systems would be performed in accordance with local MS4 Permit requirements, including hydromodification requirements. As discussed under *National Pollutant Discharge Elimination System Municipal Stormwater Permits*, the criteria for determining regulated projects under local MS4 Permits includes the amount of new impervious surface area that would be created and proposed land uses (e.g., parking lots). Design and construction of stormwater controls and treatment systems in accordance with local MS4 Permit requirements (e.g., use of infiltration features, vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to manage stormwater to maintain predevelopment runoff rates, volumes, and quality) would ensure that stormwater runoff would not contain significant levels of pollutants or cause erosion and sedimentation in receiving waters.

New station platforms that would be located within the UPRR or Caltrans rights-of-way would not be regulated under local MS4 Permits, because these agencies have separate stormwater discharge permits issued by the SWRCB. Stormwater runoff from station platforms would not generate significant levels of pollutants as the station platforms would have only foot traffic. Compliance with the post-construction stormwater performance standards of the Construction General Permit would be required for new station platforms, and would ensure that stormwater runoff from station platforms would not cause erosion and sedimentation in receiving waters.

However, if contaminants are present in reused existing soil or imported fill materials that are exposed to stormwater, contaminants could leach into stormwater runoff from the reused existing soil or imported fill and result in pollution of stormwater runoff and surface water, potentially reducing the quality of the receiving water. This is a potentially significant impact for the Proposed Project.

Alternatives Analyzed at an Equal Level of Detail

Operation and maintenance of the alternatives analyzed at an equal level of detail would result in similar impacts to water quality as those described above for the Proposed Project. Impacts would be potentially significant.

Mitigation Measures

Mitigation Measure HAZ-2.2 would apply to the Proposed Project and the alternatives analyzed at an equal level of detail.

Mitigation Measure HAZ-2.2: Implement construction risk management plan.

Refer to measure description under Impact HAZ-2 in Section 3.9, *Hazardous Materials*.

Significance with Application of Mitigation

Implementation of Mitigation Measure HAZ-2.2, as described in Section 3.9, *Hazardous Materials*, requires preparation of an RMP. The RMP will include guidelines for testing and reuse of existing soil to ensure that potentially contaminated existing soil would not be reused in a manner that could pollute stormwater runoff, surface waters, or groundwater. The RMP will include guidelines for testing and use of imported fill material to ensure that contaminated fill materials are not used in a manner that could pollute stormwater runoff, surface waters, or groundwater. Implementation of Mitigation Measure HAZ-2.2 will ensure that operation of the Proposed Project would have a less-than-significant impact on water quality.

For the same reasons listed above, implementation of Mitigation Measure HAZ-2.2 would ensure that operation of the alternatives analyzed at an equal level of detail would have a less-than-significant impact on water quality.

Alternatives Analyzed at an Equal Level of Detail

Operation of the alternatives analyzed at an equal level of detail would require adherence to the same federal and state regulations as the Proposed Project, and would require implementation of the same mitigation measure (i.e., HAZ-2.2: Implement construction risk management plan) to reduce potential impacts on water quality, which would also be required for operation of the Proposed Project. Thus, impacts related to violation of water quality standards or waste discharge requirements, substantial additional sources of polluted runoff, or otherwise substantially degrade surface or ground water quality, would be the same among the alternatives analyzed at an equal level of detail and the Proposed Project (i.e., less than significant after implementation of mitigation).

Impact HYD-2a: Construction of 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.

Level of Impact	**Less than Significant**
	Proposed Project
	Tri-Valley Alignment
	Dublin/Pleasanton Station
	Isabel Station
	Greenville Station
	Altamont Alignment
	Owens-Illinois Industrial Lead Variant 1, Single Track
	Owens-Illinois Industrial Lead Variant 2, Double Track
	Interim OMF
	Mountain House Station

	Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station <u>Alternatives Analyzed at an Equal Level of Detail</u> Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	**None required**

Impact Characterization

As discussed under Impact HYD-1a, temporary and limited dewatering would be required for improvements associated with the Proposed Project (including all track variants, technology variants, and the Greenville and Mountain House IOS), the station alternatives (i.e., the Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative, that are located in areas where the groundwater table is high. This includes construction of facilities in or across streambeds, such as new bridges and culverts. Other facilities may also require dewatering, depending on the depth to groundwater. Effluent from dewatering activities would be treated and discharged in accordance with provisions of the Construction General Permit, RMP, and the Permit for Construction Dewatering Activity (Order R5-2013-0074 as modified by R5-2016-0079-01).

Impact Detail and Conclusions

Proposed Project

Diversion of surface water performed during construction in all segments for the Proposed Project would have a less-than-significant impact on groundwater recharge, as the extent of surface water diversion would be limited to the area immediately surrounding areas where the groundwater table is high enough to result in contact with Project-related excavation. Furthermore, dewatering effluent generated during construction of Proposed Project improvements would be treated and discharged (in accordance with provisions of the Construction General Permit, RMP, and the Permit for Construction Dewatering Activity [Order R5-2013-0074 as modified by R5-2016-0079-01]) and would eventually make its way back to surface water either through direct discharge or through the storm drainage system, where it would percolate back to the groundwater. Finally, because dewatering activities would be of short duration and would only occur in limited areas, and the discharged water would eventually be returned to surface waters where it would percolate through to the aquifer, construction dewatering in all segments for the Proposed Project would have a less-than-significant impact on groundwater resources and groundwater recharge.

Alternatives Analyzed at an Equal Level of Detail

Construction of the alternatives analyzed at an equal level of detail would occur in the same manner as the Proposed Project. Thus, impacts related to a substantial decrease groundwater supplies or substantial interference with groundwater recharge such that sustainable groundwater management of the basin would be impeded, would be the same between the alternatives analyzed at an equal level of detail and the Proposed Project (i.e., less than significant).

Impact HYD-2b: Operation and maintenance of 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.

Level of Impact	**Less than Significant** Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Interim OMF Mountain House Station Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	**None required**

Impact Characterization

Operation of the Proposed Project (including all track variants, technology variants, and the Greenville and Mountain House IOS), the station alternatives (Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative, would not involve dewatering that could deplete groundwater resources. Improvements associated with stations and parking areas would involve the creation of new impervious surfaces that could impede groundwater recharge because stormwater would run off of the impervious surfaces rather than infiltrating the ground surface and recharging aquifers. The

Interim OMF and the West Tracy OMF Alternative would require the installation of new groundwater wells to supply water for these facilities.

As discussed under Impact HYD-2a, improvements associated with station platforms would be required to comply with the post-construction requirements of the Construction General Permit, which requires post-construction runoff to match preconstruction runoff; and all other station improvements (e.g., parking lots, parking structures, roadways, and walkways) would be required to comply with local MS4 Permit requirements for stormwater control and treatment, which include LID source control, site design, stormwater treatment, and hydromodification management. Stormwater control and treatment systems may include vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to maintain predevelopment runoff rates, volumes, and quality and enhance infiltration and groundwater recharge.

The Interim OMF, which is located in a large undefined groundwater basin that runs north-south in the Diablo Range, would require a new groundwater well to serve as the source of water supply for this facility. This basin has been identified by DWR as a very low priority basin under the SGMA (California Department of Water Resources 2019). Furthermore, in this undefined basin that consists primarily of fractured bedrock in the Diablo Range, there is no identified groundwater sustainability agency. GSPs are not required for very low and low priority groundwater basins, and a GSP for this undefined basin has not been prepared nor are there currently any known plans to prepare one. The Interim OMF would require a very small amount of groundwater—approximately 2,000 gallons per day.

The Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2 would be required to comply with the same post-construction standards and local MS4 Permit requirements to minimize impermeable surfaces and enhance infiltration and groundwater recharge as the Proposed Project.

The West Tracy OMF, which would be located in the Tracy Subbasin, would require a new groundwater well to serve as the source of water supply for this facility. The West Tracy OMF Alternative would require approximately 16,450 gallons per day of groundwater. DWR has identified the Tracy Subbasin has a medium priority basin under the SGMA (California Department of Water Resources 2019). The seven GSAs in the Tracy Subbasin are working cooperatively together to develop one GSP for the Tracy Subbasin, which is in the process of being prepared (GEI Consultants 2020).

Impact Detail and Conclusions

Proposed Project

Design and construction of stormwater controls and treatment systems in accordance with the PPDG, compliance with the post-construction requirements of the Construction General Permit, and compliance with the local MS4 Permit requirements to minimize impermeable surfaces and enhance infiltration and groundwater recharge would ensure that operation of the Proposed Project in all segments would have a less-than-significant impact on groundwater recharge.

Because the new groundwater well for the Interim OMF would require only a very small amount of water, and would be located in an undefined basin where a GSA has not been identified and where a GSP is not required, operation of the Interim OMF would not substantially reduce groundwater

resources, and would not impede sustainable groundwater management of the basin. This impact would be less than significant.

Alternatives Analyzed at an Equal Level of Detail

As with the Proposed Project, improvements associated with the alternatives analyzed at an equal level of detail would be required to comply with the PPDG, the post-construction requirements of the Construction General Permit, and the MS4 Permit requirements to minimize impermeable surfaces and enhance infiltration and groundwater recharge, which would ensure that operation of the alternative stations and parking would have a less-than-significant impact on groundwater recharge.

The new groundwater well for the West Tracy OMF Alternative would be located in an area where a GSP is not required to be adopted until January 31, 2022, and therefore is still in the process of being prepared. The purpose of adopting a GSP is to define the sustainable yield of the basin, identify what would constitute undesirable results in the basin, and identify the projects and actions (including monitoring) that will be implemented to ensure the basin is managed to avoid undesirable results. The necessary groundwater supply for the West Tracy OMF Alternative (if implemented) would be included in the planning process for the Tracy Subbasin GSP that is currently being prepared. Therefore, operation of the West Tracy OMF Alternative would not substantially reduce groundwater resources, and would not impede sustainable groundwater management of the basin. This impact would be less than significant.

Operation of most of the alternatives analyzed at an equal level of detail would occur in the same manner as the Proposed Project. Thus, impacts related to a substantial decrease groundwater supplies or substantial interference with groundwater recharge such that sustainable groundwater management of the basin would be impeded, would be the same among the alternatives analyzed at an equal level of detail and the Proposed Project (i.e., less than significant).

Operation of the West Tracy OMF Alternative would require installation of a new groundwater well with groundwater use totaling approximately 16,450 gallons per day. In contrast, the Tracy OMF (Proposed Project), would be supplied with water by the City of Tracy from its existing water supplies. As discussed in Section 3.18, *Utilities and Service Systems*, the City of Tracy is projecting a surplus of water supply in all water year types and therefore would be expected to be able to provide the amount of water needed annually at the Tray OMF. Because the West Tracy OMF Alternative would require the development and usage of additional groundwater from the Tracy Subbasin, this alternative would have a greater level of impact as compared to the Proposed Project. However, since the additional groundwater supply required for the West Tracy OMF Alternative would be included in the current planning for the GSP, the impacts of both the West Tracy OMF Alternative and the Tracy OMF (Proposed Project) related to a substantial decrease groundwater supplies or substantial interference with groundwater recharge such that sustainable groundwater management of the basin would be impeded, would be less than significant.

Impact HYD-3a: Construction of the Proposed Project would substantially alter the existing drainage patterns, in a manner that would result in substantial erosion or siltation on- or off-site; or provide substantial additional sources of polluted runoff; or risk release of pollutants due to Project inundation.

Level of Impact Prior to Mitigation	**Potentially Significant** Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track River Islands Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail Stone Cut Alignment Alternative **Less than Significant** Proposed Project Interim OMF Mountain House Station Tracy OMF Downtown Tracy Station Alternatives Analyzed at an Equal Level of Detail Southfront Road Station Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	HYD-3a.1: Prevent construction materials from being exposed to storm flooding hazards.
Level of Impact after Mitigation	**Less than Significant**

Impact Characterization

Proposed Project-related construction that would substantially alter the existing drainage patterns in a manner that could result in substantial erosion or siltation on- or off-site is evaluated under Impact HYD-1a.

Construction activities associated with the Proposed Project (including all track and technology variants), the station alternatives (Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking

Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative would alter the existing drainage patterns and could result in additional sources of polluted runoff or risk release of pollutants due to Proposed Project inundation. In particular, Proposed Project improvements would require construction activities within drainage courses during construction of bridges and culverts within 100-year and 200-year floodplains (see Figures P-4A, P-4B, and P-4C). In addition, Proposed Project-related construction activities would be required within or across small urban or rural streams that could flood during winter storm events, even if those small streams are not designated as 100- or 200-year floodplains. If flooding of construction areas occurs, stockpiles of construction materials could be inundated and result in pollution of onsite or offsite downstream surface waters.

As discussed above, levee systems accredited by USACE and FEMA to provide protection from a 100-year flood and by USACE and CVFPB for 200-year floods require regular maintenance to ensure that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. The potential for inundation of Proposed Project improvements from failure of a levee accredited by USACE, FEMA, and/or CVFPB is therefore considered low.

Proposed Project improvements would also cross through dam failure inundation areas.

Impact Detail and Conclusions

Proposed Project

Proposed Project improvements in the Tri-Valley segment and Tracy to Lathrop segment would include construction activities within drainage courses and/or 100- and 200-year flood zones. In the Altamont segment, construction activities would also occur within small-stream watercourses and Mountain House Creek that are subject to high flow events during winter rainstorms. If storm-related flooding of construction areas occurs, stockpiled construction materials could be inundated and carried into onsite or offsite waterbodies, which could result in pollution of surface waters. This is a potentially significant impact.

Catastrophic dam failure is considered a very low likelihood event, because regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure. Dam failure inundation areas intersected by Proposed Project improvements would occur in areas where slow-moving, shallow, floodwater would be spread over a large area. Existing dams under state and federal jurisdiction are periodically inspected to ensure that they are adequately maintained and that identified deficiencies are corrected. Regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure. Therefore, potential flooding impacts (associated with pollutant transport) from with dam failure during construction of the Proposed Project would be less than significant.

Tri-Valley Segment

Portions of the Tri-Valley Alignment, Dublin/Pleasanton Station, Isabel Station, and Greenville Station are located in a FEMA 100-year floodplain. In addition, portions of the Tri-Valley Alignment are within the dam failure inundation zone for Del Valle Dam and Patterson Dam; the Dublin/Pleasanton Station is within the dam failure inundation zone for Del Valle Dam (see Table 3.10-5). If implemented, portions of the Greenville Station IOS would also be located in a FEMA 100-year floodplain.

Altamont Segment

There are no mapped flood hazard zones or dam inundation areas in the Altamont segment. However, construction of the Altamont Alignment, Owens-Illinois Industrial Lead Variant 1, Single Track, and Owens-Illinois Industrial Lead Variant 2, Double Track would require crossing over several small watercourses as shown in Figures P-3A and P-3B. These portions of the Altamont Alignment, Owens-Illinois Industrial Lead Variant 1, Single Track, and Owens-Illinois Industrial Lead Variant 2, Double Track could result in construction-related pollutants being carried into the watercourses and washed downstream during high flow winter rain events.

Tracy to Lathrop Segment

Portions of the Tracy to Lathrop Alignment Variant 1, Single Track; Tracy to Lathrop Alignment Variant 2, Double Track; River Islands Station; and North Lathrop Station are located in a FEMA 100-year floodplain and a CVFPB 200-year flood zone. The Tracy to Lathrop Alignment Variant 1, Single Track; Tracy to Lathrop Alignment Variant 2, Double Track; and River Islands Station are in the dam failure inundation zones for Lake McClure, Pine Flat Lake, Tulloch Dam, San Luis Dam, and New Melones Dam. The North Lathrop Station is in the dam failure inundation zones for San Luis Dam and New Melones Dam (see Table 3.10-12).

Alternatives Analyzed at an Equal Level of Detail

Similar to the Proposed Project, construction of the Stone Cut Alignment Alternative could result in construction-related pollutants being carried into the watercourses and washed downstream during high flow winter rain events within the Altamont segment resulting in a potentially significant impact. Impacts due to the Southfront Road Station Alternative, West Tracy OMF Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, or Downtown Tracy Station Parking Alternative 2 would be less than significant.

Mitigation Measures

Mitigation Measure HYD-3a.1 would apply to the Tri-Valley Alignment; Dublin/Pleasanton Station; Isabel Station; Greenville Station; Altamont Alignment; Owens-Illinois Industrial Lead Variant 1 Single Track; Owens-Illinois Industrial Lead Variant 2, Double Track; Tracy to Lathrop Alignment Variant 1 Single Track; Tracy to Lathrop Alignment Variant 2, Double Track; River Islands Station; and North Lathrop Station.

Mitigation Measure HYD-3a.1 would also apply to the Stone Cut Alignment Alternative.

Mitigation Measure HYD-3a.1: Prevent construction materials from being exposed to storm flooding hazards.

Construction materials (particularly soil stockpiles and hazardous materials such as fuels, lubricants, and oils) will not be stored in areas of potential storm flooding inundation (i.e., 100-year or 200-year flood zones and within drainage courses) during the winter rainy season (i.e., November 1 through April 31).

Significance with Application of Mitigation

Implementation of Mitigation Measure HYD-3a.1, which would prevent construction materials from being exposed to storm flooding hazards, would reduce potential construction-related impacts from

substantial sources of additional polluted runoff and the release of pollutants due to Proposed Project inundation to a less-than-significant level.

For the same reasons listed above, implementation of Mitigation Measure HYD-3a.1 Prevent construction materials from being exposed to storm flooding hazards, would reduce potential construction-related impacts from substantial sources of additional polluted runoff and the release of pollutants due to the Stone Cut Alignment Alternative to a less-than-significant level.

Comparison of Alternatives

Tri-Valley Segment

The Southfront Road Station Alternative is not located in a FEMA 100-year flood zone or a dam failure inundation zone and would not involve work in any watercourses. Because the Southfront Road Station Alternative would not be located in a FEMA 100-year flood hazard zone, construction of this alternative would result in a lesser level of impact as compared to the Greenville Station (Proposed Project). However, impacts associated with the Greenville Station (Proposed Project) would be reduced to a less-than-significant level with implementation of mitigation.

Altamont Segment

The Mountain House Station Alternative, the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative are not located in a FEMA 100-year flood zone or a dam failure inundation zone. However, construction of the Stone Cut Alignment Alternative would require crossing over Mountain House Creek as shown in Figure P-3B. Impacts from construction of the Stone Cut Alignment Alternative would be the same as the Altamont Alignment, and both would be reduced to a less-than-significant level with implementation of mitigation.

Impacts from construction of the West Tracy OMF Alternative and the Mountain House Station Alternative would be the same as the Tracy OMF and Mountain House Station (Proposed Project), because none of these facilities would be located in a FEMA 100-year flood hazard zone, a CVFPP 200-year flood zone, a dam failure inundation zone, or require crossing over streambeds. Therefore, the impacts of all of these facilities would be less than significant.

Tracy to Lathrop Segment

Impacts from construction of the Downtown Tracy Station Parking Alternatives 1 and 2 would be the same as the Downtown Station (Proposed Project), because none of these facilities would be located in a FEMA 100-year flood hazard zone, a CVFPP 200-year flood zone, a dam failure inundation zone, or require crossing over streambeds. Therefore, the impacts of all of these facilities would be less than significant.

The Downtown Tracy Station Parking Alternatives 1 and 2 are not located in a FEMA 100-year flood zone, a CVFPP 200-year flood zone, or a dam failure inundation zone and would not involve work in any watercourses.

Impact HYD-3b: Operation of the Proposed Project would substantially alter the existing drainage patterns, including through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on- or off-site; 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.

Level of Impact Prior to Mitigation	**Potentially Significant** Proposed Project: Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Interim OMF Mountain House Station Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail: Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	HYD-3b.1: Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport.
Level of Impact after Mitigation	**Less than Significant**

Impact Characterization

Proposed Project-related operation that would substantially alter the existing drainage patterns in a manner that could result in substantial erosion or siltation on- or off-site is evaluated in Impact HYD-1b.

Operation of the Proposed Project (including all track and technology variants), the station alternatives (Southfront Road Station Alternative, Mountain House Station Alternative, Downtown Tracy Station Parking Alternative 1, and Downtown Tracy Station Parking Alternative 2), the Stone Cut Alignment Alternative, and the West Tracy OMF Alternative would increase runoff from new impervious surfaces, which has the potential to exceed stormwater drainage capacity and/or result in increased potential for transport of onsite and offsite downstream pollutants.

Impact Detail and Conclusions

Proposed Project

Improvements associated with the Proposed Project would include operation of new impervious surfaces, which would alter drainage patterns and create new sources of runoff. If stormwater control systems are not appropriately designed for these improvements, stormwater runoff could exceed the capacity of stormwater drainage systems and result in downstream pollutant transport.

Based on a review of NRCS (2018) soil survey data, soils in the Tri-Valley segment and the Altamont segment have a high stormwater runoff potential, while soils in the Tracy to Lathrop segment have a moderately high to low stormwater runoff potential. The required design storm interval for new stormwater drainage systems and improvements over drainage courses would depend on the location (rural or urban) and type of drainage systems. The necessary engineering and design of these Proposed Project features has not yet been performed.

Trackside drainage ditches may not connect to downstream drainage systems to act as retention and infiltration basins, and therefore excess runoff from the ditches may flow overland into adjacent properties during extreme storm events. In developed urban areas, the Proposed Project improvements cross several major arterial roads with existing storm drain systems, and new drainage systems may be connected to the existing local roadway drainage system. In rural areas, drainage systems may be connected to adjacent creeks or rivers after implementing appropriate stormwater management systems.

To meet Caltrans and BART NPDES permit requirements, all new ditches/stormwater drainage systems adjacent to tracks are required to be designed to pass a 25-year flood for rural areas and a 50-year flood for urban areas. Stormwater controls would be designed and constructed for near-term improvements within track areas in accordance with the PPDG, and may include biofiltration swales, biofiltration strips, infiltration devices, detention devices, media filters, wet basins, and dry weather diversion. Compliance with the post-construction stormwater performance standards of the Construction General Permit would make certain that the stormwater controls are designed so that runoff from track areas would match existing runoff conditions (as required by the SWRCB).

Improvements associated with Proposed Project stations would include construction of new paved surfaces for station platforms, parking lots, parking structures, roadways, and walkways. These near-term improvements would alter drainage patterns (e.g., increase runoff from new impervious surfaces). For the improvements associated with stations that meet the criteria of regulated projects under local MS4 Permits, design and construction of stormwater controls would be performed in accordance with local MS4 Permit requirements, including hydromodification requirements. These designs may include the use of vegetated swales, retention basins, and biofiltration, and minimizing impermeable surfaces to manage stormwater to maintain predevelopment runoff rates and volumes.

New station platforms that would be located in UPRR and Caltrans right-of-ways would not be regulated under local MS4 Permits, because these agencies have their own stormwater discharge permits issued by the SWRCB. Stormwater controls within track areas (which would be designed and constructed in accordance with the PPDG) would handle runoff from station platforms, and compliance with the post-construction stormwater performance standards of the Construction General Permit would ensure that the stormwater controls are designed so that runoff from station platforms would match existing runoff conditions (as required by the SWRCB).

Compliance with the applicable MS4/NPDES Permit requirements, including post-construction requirements of the Construction General Permit, would ensure that operation of all Proposed Project improvements would minimize increases in stormwater runoff compared to the existing conditions. However, increases in stormwater runoff could still result from improvements such as creation of new pavement surfaces and connection of trackside drainage ditches to existing storm drainage systems where previously no such connections existed. The new surfaces and connection to existing storm drainage systems could contribute toward exceeding the capacity of existing storm drainage systems and/or result in increased pollutant transport. This is a potentially significant impact.

Alternatives Analyzed at an Equal Level of Detail

Implementation of the alternatives analyzed at an equal level could result in increases in stormwater runoff due to the creation of new pavement surfaces and connection of trackside drainage ditches to existing storm drainage systems where previously no such connections existed. The new surfaces and connection to existing storm drainage systems could contribute toward exceeding the capacity of existing storm drainage systems and/or result in increased pollutant transport. This would also be a potentially significant impact.

Mitigation Measures

Mitigation Measure HYD-3b.1 would apply to the operation of the Proposed Project and the alternatives analyzed at an equal level of detail in all segments.

Mitigation Measure HYD-3b.1: Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport.

Detailed hydraulic evaluations will be performed and completed during the Project design phase for improvements that include alteration of drainage patterns such as alteration and construction of trackside ditches, construction of new impervious pavement and stormwater drainage systems at stations and parking lots, and construction of new connections to existing stormwater drainage systems, to ensure that the new stormwater control infrastructure is appropriately designed and that runoff from near-term improvements would not exceed the capacity of storm drainage systems or result in substantial additional pollutant transport. The detailed hydraulic evaluations will be performed in accordance with the requirements of the latest edition of the Caltrans *Highway Design Manual* for track areas and station platforms, and in accordance with regulations and design requirements of local municipalities for other improvements associated with stations. A professional engineer will perform and certify the following detailed hydraulic evaluations.

- Improvements comply with regulations and design requirements of local municipalities for discharges to storm drainage systems within those jurisdictions.
- Improvements are designed to accommodate storm frequencies, precipitation data, and runoff calculations.
- The capacity of existing or proposed storm drainage systems that would receive discharges is adequate.

If improvements could result in exceedance of existing or proposed storm drainage systems and subsequent downstream pollutant transport, modification of onsite stormwater control designs or offsite storm drainage systems will be performed to reduce and control runoff and potential for flooding. These modifications may include the following measures.

- Reducing impervious surfaces through use of permeable pavement surfaces for station improvements.
- Increasing the size of drainage ditches, swales, retention basins, infiltration basins, trenches, and cross-drainage facilities within track and station areas.
- Increasing the capacity of downstream stormwater drainage systems by increasing the size of offsite storm drains, drainage canals, and retention and infiltration basins.

In general, the drainage design for Proposed Project improvements would involve the following features.

- Construct trackside swales or ditches to collect runoff from the track areas.
- Allow infiltration and detention onsite and offsite, if feasible.
- Evaluate or improve the capacity of the existing drainage system to carry runoff from near-term improvements, if required.
- Construct cross-culverts under the existing or new tracks to carry runoff across the trackway system to maintain the flow pattern.
- Construct catch basins as required to convey excess flows from the near-term improvements to the local drainage system, and install and operate appropriate BMPs to reduce and/or treat (as required by the appropriate jurisdiction) pollutants washed from new, Project-related impervious surfaces.

Significance with Application of Mitigation

Implementation of Mitigation Measure HYD-3b.1 would require detailed hydraulic evaluations, and modification of stormwater controls as required and would reduce potential impacts related to creation of new impervious surfaces that would in turn increase the rate or volume of stormwater runoff, which could result in exceeding storm drainage system capacity and/or downstream pollutant transport, to a less-than-significant level due to the Proposed Project.

For the same reasons listed above, implementation of Mitigation Measure HYD-3b.1 would reduce potential impacts related implementation of the alternatives analyzed at an equal level to a less-than-significant level.

Comparison of Alternatives

Operation of the alternative analyzed at an equal level would require implementation of the same mitigation measure (HYD-3b.1: Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport) as the Proposed Project. Thus, impacts related to creation or contribution of additional stormwater runoff that would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff, would be the same between the alternatives analyzed at an equal level and the Proposed Project (i.e., less than significant after implementation of mitigation).

HYD-4: Construction and operation of the Proposed Project would 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 that could result in onsite or offsite flooding, and could impede flood flows.

Level of Impact Prior to Mitigation	**Potentially Significant** <u>Proposed Project</u> Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Interim OMF Mountain House Station Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station <u>Alternatives Analyzed at an Equal Level of Detail</u> Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	HYD-3b.1: Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport. HYD-4.1: Perform hydrologic and hydraulic studies for project improvements to be located in floodplains, coordinate with regulatory agencies, and obtain required permits.
Level of Impact after Mitigation	**Less than Significant**

Impact Characterization

The Proposed Project (including all track and technology variants) would include construction and operation of new facilities across small drainages and watercourses as shown in Figures P-4A, P-4B, and P-4C; and in FEMA 100-year flood zones as shown on Figures P-4A and P-4B. In addition, Proposed Project facilities would also be constructed and operated in CVFPP 200-year flood zones in the Tracy to Lathrop segment, as shown in Figure P-4B.

The Proposed Project would include construction of new bridges and culverts across drainage courses, and improvements within flood zones. If these improvements are not appropriately designed, their operation could potentially impede or redirect flood flows during Project operation.

This could result in downstream offsite flooding, as well as onsite inundation of railroad tracks. Railroad tracks that are damaged by inundation would increase the risk of derailment. Derailment can result in serious injuries or deaths and spills of pollutants that can impact surface water or groundwater. However, under existing standard procedures, if tracks were to be inundated by flooding, the line would be shut down, the tracks would be inspected, repairs and removal of debris would be performed (if needed), and operation would begin again once the water has receded and the tracks are determined to be safe and free of debris. Therefore, damage to tracks from flooding inundation would not expose people or structures or property to significant risk of loss, injury, or death. Potential impacts related to flooding of tracks during operation would be less than significant and are not discussed further.

Operation of the Proposed Project would generate new impervious surfaces, which could also result in an increased rate and/or volume of stormwater runoff that could result in onsite or offsite downstream flooding.

The CVFPP is intended to guide 200-year flood reduction efforts in the Central Valley. Portions of the Proposed Project in the Tracy to Lathrop segment would be located in an area covered by the *Basin-Wide Feasibility Study, San Joaquin Basin* (California Department of Water Resources 2017b) and would encroach on levees and floodways under CVFPB's jurisdiction; therefore, compliance with the CVFPP would be required. From the Stanislaus River to near Bear Creek and Disappointment Slough in the Delta, existing flood management facilities include a leveed conveyance system on the main stem of the San Joaquin River.

Paradise Cut diverts flows out of the San Joaquin River to channels in the South Delta. The feasibility study for the lower San Joaquin River (California Department of Water Resources 2017b) identifies several potential flood improvements for this area, including an expansion of the Paradise Cut Bypass, which is located on the southwestern side of Stewart Tract in Lathrop. Paradise Cut is a federal flood control bypass that diverts flows from the San Joaquin River during high flows. Due to sedimentation and other factors, the current capacities of Paradise Cut and the lower San Joaquin River just downstream of Paradise Cut weir do not meet their original design capacities. The purpose of the Paradise Cut Bypass Expansion is to increase the flow in the Paradise Cut Bypass to reduce peak flood stages along the San Joaquin River downstream and help maintain a potential 200-year level of protection with respect to climate change for Lathrop and Manteca. As shown on Figure P-4C, portions of the Proposed Project (Tracy to Lathrop Alignment Variant 1, Single Track; Tracy to Lathrop Alignment Variant 2, Double Track; and the River Islands Station) would be constructed in and would require construction and operation of culverts and bridges in the Paradise Cut area, and would also require a bridge crossing over the San Joaquin River. If these improvements are not appropriately designed, their operation could potentially impede or redirect flood flows during Proposed Project operation and could potentially interfere with flood reduction efforts that are planned by DWR and CVFPB San Joaquin Basin-Wide Feasibility Study.

Impact Detail and Conclusions

Proposed Project

New impervious surfaces in all segments of the Proposed Project (including all track and technology variants) could generate increased rates and volumes of stormwater runoff, which could result in onsite or offsite downstream flooding. Compliance with the applicable MS4/NPDES Permit requirements, including post-construction requirements of the Construction General Permit, require

that Proposed Project improvements be designed to minimize increases in stormwater runoff compared to the existing conditions. However, Proposed Project operation in all three segments could still result in stormwater runoff that results in downstream flooding. This impact is considered potentially significant.

Construction of Proposed Project facilities in 100- and 200-year floodplains in the Tri-Valley segment and Tracy to Lathrop segment could impede flood flows, increase upstream or downstream flooding, and potentially reduce the effectiveness of flood improvements planned as part of the CVFPP under the San Joaquin Basin-Wide Feasibility Study. Delta Plan Policy RR P4 (23 Cal. Code Regs. § 5015) prohibits encroachment in the Lower San Joaquin River Floodplain Bypass area, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing, unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant adverse impact on floodplain values and functions. Delta Plan Policy RR P3 (23 Cal. Code Regs. § 5014) prohibits construction of an encroachment in a floodway unless it can be demonstrated by appropriate analysis that the encroachment will not unduly impede the free flow of water in the floodway or jeopardize public safety. The necessary engineering and design of these Proposed Project features has not yet been performed. This impact is considered potentially significant.

Alternatives Analyzed at an Equal Level of Detail

New impervious surfaces in all segments for the Southfront Road Station Alternative (Tri-Valley segment); Stone Cut Alignment Alternative, West Tracy OMF Alternative, and Mountain House Station Alternative (Altamont segment); and Downtown Tracy Station Parking Alternative 1 and Downtown Tracy Station Parking Alternative 2 (Tracy to Lathrop segment) could generate increased rates and volumes of stormwater runoff, which could result in onsite or offsite downstream flooding. Compliance with the applicable MS4/NPDES Permit requirements, including post-construction requirements of the Construction General Permit, require that improvements be designed to minimize increases in stormwater runoff compared to the existing conditions. However, operation of these alternatives, in all three segments, could still result in stormwater runoff that results in downstream flooding. This impact is considered potentially significant.

The Southfront Road Station Alternative (Tri-Valley segment); Stone Cut Alignment Alternative, Mountain House Station Alternative and West Tracy OMF Alternative (Altamont segment); and Downtown Tracy Station Parking Alternative 1 and Downtown Tracy Station Parking Alternative 2 (Tracy to Lathrop segment) are not located in a FEMA 100-year flood zone or a CVFPP 200-year flood zone. Therefore, the Alternatives would not impede flood flows, increase upstream or downstream flooding, or potentially reduce the effectiveness of flood improvements planned as part of the CVFPP under the San Joaquin Basin-Wide Feasibility Study. This impact is considered less than significant.

Mitigation Measures

Mitigation Measure HYD-3b.1 Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport, would apply to the Proposed Project and the alternatives analyzed at an equal level of detail. Mitigation Measure HYD-4.1 would apply to all Proposed Project facilities in the Tri-Valley segment; and to the Tracy to Lathrop Alignment Variant 1 Single Track; Tracy to Lathrop

Alignment Variant 2 Double Track; River Islands Station; and North Lathrop Station as well as the Southfront Road Station Alternative.

Mitigation Measure HYD-3b.1: Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport.

The actions described under Impact HYD-3.b1, Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport, would also reduce potential flooding impacts, because systems designed to convey Proposed Project-related stormwater runoff would be designed to limit the rate and volume of operational discharge.

Mitigation Measure HYD-4.1: Perform hydrologic and hydraulic studies for project improvements to be located in floodplains, coordinate with regulatory agencies, and obtain required permits.

During the detailed Proposed Project design phase, the Authority will prepare site-specific detailed hydrologic and hydraulic studies for improvements that are proposed within the 100- and 200-year floodplains. The results of these studies will be used to inform the design of Proposed Project-related facilities, such that they are specifically designed to pass 100- and 200-year flows without impedance as required by FEMA, DWR, USACE, and CVFPB standards so that upstream, onsite, and downstream flooding would not occur. Furthermore, during the detailed Proposed Project design phase, the Authority will consult with DWR and CVFPB regarding Proposed Project-related work that is proposed in the Paradise Cut area, to ensure that Proposed Project facilities are designed so they will not impair any of the flood improvements that are planned by DWR and CVFPB as part of the CVFPP and the San Joaquin Basin-Wide Feasibility Study. Finally, prior to the start of any earthmoving activities, the Authority will obtain all necessary permits and will provide copies of engineering plans and consult with any necessary agencies with levee jurisdiction, such as DWR, CVFPB, USACE, or local reclamation districts, for all Proposed Project-related work that would be required in or through existing levees. Proposed Project-related work in or through existing levees will be performed in accordance with the terms of the permits, which would contain site-specific measures to protect public safety and water quality, as issued by the applicable regulatory agency.

Significance with Application of Mitigation

Implementation of Mitigation Measure HYD-3b.1 (Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport) would require detailed hydraulic evaluations and design of new, or modification of existing, stormwater controls for new impervious surfaces to minimize the rate and volume of stormwater runoff. Implementation of Mitigation Measure HYD-4.1 (Perform hydrologic and hydraulic studies for project improvements to be located in floodplains, coordinate with regulatory agencies, and obtain required permits) requires that detailed, site-specific hydrologic and hydraulic studies be conducted and used to design Proposed Project facilities such that flood flows would not be impeded or redirected; requires that the Authority consult with DWR and CVFPB to ensure that Proposed Project facilities are designed so they will not interfere with flood protection efforts under the San Joaquin Basin-Wide Feasibility Study; and requires the Authority to consult with, design, and obtain all necessary permits from

agencies with regulatory authority over construction through levees. Implementation of these mitigation measures would reduce potential impacts related to flooding from creation of new impervious surfaces and alteration of drainages and the potential impacts related to structures that would impede flood flows to a less than significant level.

For the same reasons listed above, implementation of Mitigation Measure HYD-3b.1 and Mitigation Measure HYD-4.1 would reduce potential impacts associated with the construction of the alternatives analyzed at an equal level to a less than significant level.

Comparison of Alternatives

The potential impacts regarding flooding from stormwater generated by new impervious surfaces would be the same for the alternatives analyzed at an equal level of detail and the Proposed Project. The same mitigation measure (HYD-3b.1: Perform detailed hydraulic evaluations and implement new or modify existing stormwater controls as required to prevent storm drainage system capacity exceedance and reduce pollutant transport) would be implemented for the Proposed Project and the alternatives analyzed at an equal level of detail and would be equally effective at reducing impacts from stormwater generated by new impervious surfaces to a less-than-significant level.

The potential impacts regarding flooding as related to construction in 100- and 200-year flood zones would be less for the Southfront Road Station Alternative as compared to the Proposed Project (Greenville Station). However, implementation of mitigation (HYD-4.1 Perform hydrologic and hydraulic studies for project improvements to be located in floodplains, coordinate with regulatory agencies, and obtain required permits) would reduce the Proposed Project (Greenville Station) impacts to a less-than-significant level. The potential impacts for the Stone Cut Alignment Alternative, Mountain House Station Alternative, West Tracy OMF Alternative, and Downtown Tracy Station Parking Alternatives 1 and 2, would be the same as the Proposed Project (Altamont Alignment, Mountain House Station, Tracy OMF, and Downtown Tracy Station), and would all be less than significant.