3 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

3.8 Hydrology and Water Resources

3.8.1 Introduction

Section 3.8, Hydrology and Water Resources, of the Los Angeles to Anaheim Project Section (project section) Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) discusses the potential impacts of the No Project Alternative and the High-Speed Rail (HSR) Project Alternatives, otherwise called Shared Passenger Track Alternative A and Shared Passenger Track Alternative B, and describes impact avoidance and minimization features (IAMF) that avoid, minimize, or reduce these impacts. Mitigation measures are proposed to further reduce, compensate for, or offset impacts of the Shared Passenger Track Alternatives. Section 3.8 also defines the hydrology and water resources in the region and describes the affected environment in the resource study areas (RSA).

PURPOSE

Hydrology and Water Resources

Water resources are important natural resources, and those considered waters of the United States are protected under the Clean Water Act. The Regional Water Quality Control Boards are charged with identifying beneficial uses and water quality objectives for the protection of surface and groundwaters within their jurisdiction. Water resources include surface waters, associated floodplains, and groundwater. The purpose of this analysis is to examine potential impacts on surface water hydrology, surface water quality, groundwater, and floodplains.

The following technical reports available on request serve as the basis for the information in this section:

- *Los Angeles to Anaheim Project Section Hydrology and Water Resources Technical Report* (Authority 2025a)
- *Los Angeles to Anaheim Project Section Aquatic Resources Impacts Memorandum* (Authority 2025b)
- *Los Angeles to Anaheim Project Section Draft Aquatic Resources Delineation Report* (Authority 2025c)

Additional details on hydrology and water resources are provided in the following appendices in Volume 2 of this Draft EIR/EIS.

- Appendix 2-A, Impact Avoidance and Minimization Features
- Appendix 2-B, Applicable Design Standards
- Appendix 3.1-A, Regional and Local Policy Inventory and Consistency Analysis

This section is based on the detailed analysis of environmental resources, affected environment, environmental consequences, mitigation measures, and the *Project Environmental Impact Report/Environmental Impact Statement Environmental Methodology Guidelines,* Versions 5.9 and 5.11 (Authority 2017, 2022) as amended, although updates based on Version 5.11 were made on a case-by-case basis. Five other resource sections in this Draft EIR/EIS provide additional information related to hydrology and water resources:

- **Section 3.6, Public Utilities and Energy:** Construction and operational impacts from the Shared Passenger Track Alternatives related to water infrastructure, such as stormwater systems, water districts, groundwater use, and water supply.
- **Section 3.7, Biological Resources and Wetlands:** Construction and operational impacts from the Shared Passenger Track Alternatives related to biological and aquatic resources including wetlands.
- **Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources:** Construction and operational impacts from the Shared Passenger Track Alternatives related to soil erosion

and stability, as well as the potential of inundation as a result of failure of a levee or dam, seiche, tsunami, or mudflow.

- **Section 3.10, Hazardous Materials and Wastes:** Construction and operational impacts from the Shared Passenger Track Alternatives related to contamination of soils and groundwater, spill prevention, and other best management practices (BMP).
- **Section 3.19, Cumulative Impacts:** Construction and operational impacts from the Shared Passenger Track Alternatives and other past, present, and reasonably foreseeable future projects.

3.8.1.1 Definition of Resources

The following are definitions for hydrology and water resources analyzed in this Draft EIR/EIS.

- **Surface Water Hydrology:** Surface water hydrology refers to the occurrence, distribution, and movement of surface water, including water found in rivers, creeks, and stormwater drainage systems. Stormwater runoff and drainage patterns are directed by the topography and the gradient of the land within a watershed, an area drained by a river, river system, or other body of water.
- **Surface Water Quality:** Water quality is a measure of the suitability of water relative to the requirements for a particular use based on selected physical, chemical, and biological characteristics. It is most frequently used by reference to a set of standards against which compliance can be assessed.
- **Groundwater:** Groundwater is the water found underground in the cracks and spaces in soil, sand, and rock. It is stored in and moves slowly through aquifers. Groundwater supplies are replenished, or recharged, by precipitation that seeps into the land's surface.
- **Floodplains:** Floodplains are areas of land susceptible to inundation by floodwaters from any source. Typically, they are low-lying areas adjacent to waterways and subject to flooding during storm events. A 100-year floodplain differs in that it is an area adjoining a river, stream, or other waterway that is covered by water in the event of a 100-year flood (a flood having a 1 percent chance of being equaled or exceeded in magnitude in any given year).

3.8.2 Laws, Regulations, and Orders

This section describes the federal, state, and local laws, regulations, orders, and plans that are relevant to hydrology and water resources. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in this resource section. NEPA and CEQA requirements specific to the evaluation of hydrology and water resources are, however, described in this section.

3.8.2.1 Federal

Federal Railroad Administration, Procedures for Considering Environmental Impacts (64 *Federal Register* 28545)

On May 26, 1999, the Federal Railroad Administration (FRA) released *Procedures for Considering Environmental Impacts* (FRA 1999). These FRA procedures describe the FRA's process for assessing the environmental impacts of actions and legislation proposed by the agency and for the preparation of associated documents (42 U.S. Code [U.S.C.] 4321 et seq.). The FRA *Procedures for Considering Environmental Impacts* states that "the EIS should identify any significant changes likely to occur in the natural environment and in the developed environment. The EIS should also discuss the consideration given to design quality, art, and architecture in project planning and development as required by U.S. Department of Transportation Order 5610.4." These FRA procedures state that an EIS should consider possible effects on water quality, flood hazards, and floodplains.

Clean Water Act (33 U.S.C. Section 1251 et seq.)

The Clean Water Act (CWA) is the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. The CWA prohibits any discharge of pollutants into the nation's waters unless specifically authorized by a permit. The applicable sections of the CWA are further discussed below:

- Section 102 (33 U.S.C. 1289) requires the planning agency of each state to prepare a basin plan that sets forth regulatory requirements for the protection of surface water quality, including designated beneficial uses for surface waterbodies, as well as specified water quality objectives to protect those uses. The water quality in the project section is regulated under the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties and the Water Quality Control Plan for the Santa Ana River Basin.
- Section 303(d) (33 U.S.C. 1313 (d)) requires each state to provide a list of impaired surface waters that do not meet or are expected not to meet state water quality standards, as defined by that section. It also requires each state to develop total maximum daily loads (TMDL) of pollutants for impaired waterbodies. The TMDL must account for the pollution sources causing the water to be listed.
- Under Section 401 (33 U.S.C. 1341), applicants for a federal license or permit to conduct activities that may result in the discharge of a dredged or fill material into waters of the U.S. must obtain certification from the state in which the discharge originates that the discharge of fill would not violate water quality standards, including water quality objectives and beneficial uses.
- Under Section 402 (33 U.S.C. 1342), all point source discharges, including, but not limited to, construction-related runoff discharges to surface waters and some post-development discharges, are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Project sponsors must obtain an NPDES permit from the State Water Resources Control Board (SWRCB). Applicable NPDES permits that are relevant to the project section are summarized in Section 3.8.2.2, State.
- Under Section 404, the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency regulate the discharge of dredged and fill materials into the waters of the U.S. Project sponsors must obtain a permit from USACE for discharges of dredged or fill materials into jurisdictional waters over which USACE determines that it will exert jurisdiction. The project section is anticipated to be permitted through multiple Nationwide Permits—one for each water crossing—rather than an individual Section 404 permit.

Rivers and Harbors Act of 1899 (33 U.S.C. Section 401 et seq.)/General Bridge Act of 1946 (33 U.S.C. Section 525 et seq.)

The Rivers and Harbors Act is the primary federal law for regulating activities that may affect navigation on the nation's waterways, including:

- Section 9 of the Rivers and Harbors Act and Section 9 of the General Bridge Act require a U.S. Coast Guard permit for the construction of bridges and causeways over certain navigable waters of the U.S. to ensure marine traffic is not adversely affected. Section 9 bridge permits are required only for waters that are currently or potentially navigable for commerce; general recreational boating is typically not enough to establish jurisdiction. Navigable waters are defined as those waterbodies that are subject to the ebb and flow of the tide or that are used currently, potentially, or historically in their natural condition or, by reasonable improvements, a means to transport interstate or foreign commerce.
- Section 10 of the Rivers and Harbors Act requires authorization from USACE for the construction of any structure in, over, or under any navigable waters of the U.S.
- Section 14 of the Rivers and Harbors Act requires USACE permission for the use, including modification or alteration, of any flood control facility work built by the U.S. to ensure that the usefulness of the federal facility is not impaired. The permission for occupation or use is to be

granted by an appropriate real estate instrument in accordance with existing real estate regulations. USACE permission is granted through the issuance of a Section 408 permit. Section 408 provides that USACE may grant permission for another party to alter a USACE flood control facility on a determination that the alteration proposed would not be injurious to the public interest, and would not impair the usefulness of the facility.

Watershed Protection and Flood Prevention Act (16 U.S.C. 1001 et seq.)

The Watershed Protection and Flood Prevention Act allows the U.S. Department of Agriculture's Natural Resources Conservation Service to provide planning assistance and funding to local sponsors, often flood control districts, for the implementation of flood protection projects. The use, modification, or alteration of any flood protection project built under this act requires coordination and permission from the local sponsor and the Natural Resources Conservation Service. The permitting process under the Watershed Protection and Flood Prevention Act is similar to the process of obtaining Section 408 permission under the Rivers and Harbors Act.

Floodplain Management (U.S. Presidential Executive Order 11988) and U.S. Department of Transportation Order 5650.2 (Floodplain Management and Protection)

U.S. Presidential Executive Order 11988 requires that federal agency construction, permitting, or funding of a project must avoid incompatible floodplain development, be consistent with the standards and criteria of the National Flood Insurance Program, restore and preserve natural and beneficial floodplain values, and avoid direct and indirect support of floodplain development wherever there is a practicable alternative. U.S. Department of Transportation Order 5650.2 contains policies and procedures for the transportation agencies to implement U.S. Presidential Executive Order 11988 on transportation projects. U.S. Presidential Executive Order 11988 stipulates that if the proposed action involves a significant encroachment on a base floodplain, the EIS shall contain a finding that there is no other practicable alternative that avoids significant encroachment on a base floodplain. This finding is required to be supported by a description of why the proposed action must be in the floodplain (including the alternatives considered and why they were not practicable) and accompanied by a statement that the action conforms to applicable state and local floodplain protection standards. Requirements for compliance are outlined in 23 Code of Federal Regulations Part 650(a).

Protection of Wetlands (Executive Order 11990)

Executive Order 11990 aims to avoid direct or indirect impacts on wetlands from federal or federally approved projects when a practicable alternative is available. If wetland impacts cannot be avoided, all practicable measures to minimize harm must be included.

National Flood Insurance Act (42 U.S.C. Section 4001 et seq.) and Flood Disaster Protection Act (42 U.S.C. Sections 4001 to 4128)

The purpose of the National Flood Insurance Act is to identify flood-prone areas and provide insurance. The act requires purchase of insurance for buildings in special flood-hazard areas (SFHA). The act is applicable to any federally assisted acquisition or construction projects in an area identified as having special flood hazards. Projects should avoid construction in, or develop a design to be consistent with, Federal Emergency Management Agency (FEMA) identified SFHAs.

To be eligible for federally backed flood insurance, a community must participate in the National Flood Insurance Program. Participating communities must adopt and enforce floodplain management ordinances meeting or exceeding FEMA requirements for reducing the risks of future flood damage. According to 44 Code of Federal Regulations, Emergency Management and Assistance, FEMA has set a minimum national standard, allowing no more than a 1-foot increase in base flood elevations (BFE) (whether mapped or not mapped) from the cumulative impact of local development and no increases in the BFE of regulatory floodways.

If a project would substantially alter the extent or depth of the base flood, the Authority must submit supporting documentation and modeling. If the development proposal is approved by FEMA, FEMA issues a Conditional Letter of Map Revision. After construction is complete, as-built

construction plans and modeling are submitted to FEMA, and FEMA issues a Letter of Map Revision, which officially updates the Flood Insurance Rate Map (FIRM).

Safe Drinking Water Act of 1974 (42 U.S.C. Section 300 et seq.)

The Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The act authorizes the U.S. Environmental Protection Agency to set national health-based standards for drinking water to protect against both naturally occurring and human-produced contaminants that may be found in drinking water. The act applies to every public water system in the U.S.

The Sole Source Aquifer Protection Program is authorized by Section 1424(e) of the act. The Sole Source Aquifer designation is a tool to protect drinking water supplies in areas where there are few or no alternative sources to the groundwater resource and where, if contamination occurred, using an alternative source would be extremely expensive. All proposed projects that receive federal funds are subject to U.S. Environmental Protection Agency review to ensure that they do not endanger a water source.

3.8.2.2 State

Porter-Cologne Water Quality Control Act (California Water Code, Section 13000 et seq.)

The Porter-Cologne Water Quality Control Act requires the regulation of all pollutant discharges, including wastes in project runoff that could affect the quality of the state's water. Any entity proposing to discharge a waste must file a Report of Waste Discharge or request for CWA Section 401 Certification with the appropriate Regional Water Quality Control Board (RWQCB) or SWRCB unless the CWA Section 401 water quality certification application covers all waters subject to regulation under the Porter-Cologne Water Quality Control Act. The RWQCBs are responsible for implementing CWA Sections 401, 402, and 303(d). Because the HSR project is a project of statewide importance, CWA Section 401 water quality certification applications and any Reports of Waste Discharge would be filed with the SWRCB. The act also provides for the development and periodic review of basin plans that designate beneficial uses for California's major rivers and groundwater basins and establish water quality objectives for those waters.

Construction Activities, National Pollutant Discharge Elimination System General Construction Permit

Under the federal CWA, discharges of stormwater from construction sites must comply with the conditions of an NPDES permit. The SWRCB is the permitting authority in California and has adopted the Construction General Permit (CGP) that applies to projects resulting in 1 or more acres of soil disturbance. For projects disturbing more than 1 acre of soil, the SWRCB requires permittees to prepare a stormwater pollution prevention plan (SWPPP). The SWPPP specifies site management activities that permittees or their construction contractors must implement during site development. These management activities include construction stormwater BMPs, erosion and sedimentation controls, dewatering (nuisance-water removal), runoff controls, and construction equipment maintenance.

National Pollutant Discharge Elimination System Industrial General Permit

Another required permit is the statewide General Permit for Discharges of Stormwater Associated with Industrial Activities (SWRCB Water Quality Order No. 2014-0057-DWQ, NPDES No. CAS000001, as amended by Order WQ 2015-0122-DWQ and Order WQ 2018-0028-DWQ). Qualifying industrial sites are required to prepare SWPPPs describing BMPs that will be employed to protect water quality. Industrial facilities are required to use best conventional pollutant control technology for control of conventional pollutants and best available technology economically achievable for toxic and nonconventional pollutants. Monitoring runoff leaving the site is also required. For transportation facilities, this permit applies only to vehicle maintenance shops and equipment-cleaning operations. The Industrial General Permit Order 2014-0057-DWQ was adopted April 1, 2014, and became effective on July 1, 2015. The Industrial General Permit replaces the previous 1997 statewide permit for industrial stormwater. The Industrial General Permit requires electronic applications and reporting and includes the establishment of numeric

action levels that reflect California Environmental Protection Agency benchmark values for selected parameters, minimum BMP requirements, a revised monitoring protocol, and exceedance response actions if a numeric action level is exceeded.

California Department of Transportation National Pollutant Discharge Elimination System Statewide Stormwater Permit

The California Department of Transportation (Caltrans) operates under a permit (Order No. 2022-0033-DWQ, NPDES No. CAS000003) that regulates stormwater discharge from Caltrans properties, facilities, and activities and requires the Caltrans construction program to comply with the adopted statewide CGP (discussed above). The permit requires Caltrans to implement a year-round program in all parts of the state to control stormwater and nonstormwater discharges effectively (SWRCB 2022a). The Caltrans permit is applicable to portions of the project that involve modifications to state highways.

California High-Speed Rail Authority National Pollutant Discharge Elimination System Permit

On August 24, 2014, the SWRCB designated the California High-Speed Rail Authority (Authority) as a nontraditional permittee under the Phase II Municipal Separate Storm Sewer System (MS4) permit (Order No. 2013-0001-DWQ, as amended by Order WQ 2015-0133-EXEC, Order WQ 2016-0069-EXEC, WQ ORDER 2017-XXXX-DWQ, Order WQ 2018-0001-EXEC, and Order WQ 2018-0007-EXEC). The combined (amended) permit is marked “unofficial” until an order number is assigned; however, the permit, as amended, is fully in effect and enforceable. This order is the only MS4 permit for which the Authority has obtained coverage as a nontraditional permittee. The Authority must follow the discharge, program, and monitoring requirements described in Section F of the Phase II MS4 permit within its right-of-way in Los Angeles County (Los Angeles RWQCB jurisdiction) and Orange County (Santa Ana RWQCB jurisdiction). The Authority’s MS4 permit replaces county-/city-specific MS4 permits that would otherwise be applicable to the project. If runoff enters another agency’s MS4 (i.e., Caltrans) or if the project extends into local rights-of-way (i.e., county or city), the jurisdictional agency’s MS4 permit applies. Low-impact development (LID) design standards and a post-construction stormwater management program are required under the MS4 permit.

General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality

Low-threat discharges, which include small/temporary dewatering projects such as excavations during construction, are regulated under the Low-Threat Discharge General Permit regional general permit (Order No. 2003-0003-DWQ). Low-threat construction discharges shall not contain concentrations of pollutants in excess of the basin plan ground or surface water quality objectives.

Cobey-Alquist Floodplain Management Act (California Water Code Section 8400 et seq.)

The Cobey-Alquist Floodplain Management Act encourages local governments to adopt and enforce land use regulations to accomplish floodplain management. It also provides state assistance and guidance for flood control.

Streambed Alteration Agreement (California Fish and Game Code Sections 1601 to 1603)

The California Fish and Game Code requires the Authority to notify the California Department of Fish and Wildlife prior to implementing any project that would substantially divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream (including intermittent streams), or lake.

Sustainable Groundwater Management Act

On September 16, 2014, Governor Edmund G. Brown, Jr. signed historic legislation to strengthen local management and monitoring of groundwater basins most critical to the state’s water needs. The three bills, Senate Bill 1168 (Pavley), Assembly Bill 1739 (Dickinson), and Senate Bill 1319 (Pavley), together make up the Sustainable Groundwater Management Act. The act establishes

phased requirements for high- and medium-priority basins to adopt groundwater sustainability plans (GSP), depending on whether a basin is in critical overdraft. The act requires locally controlled groundwater sustainability agencies to adopt GSPs by January 31, 2020, for all high- or medium-priority basins in overdraft condition and by January 31, 2022, for all other high- and medium-priority basins unless the basin is legally adjudicated or otherwise managed sustainably.

The Sustainable Groundwater Management Act requires the formation of local groundwater sustainability agencies, which are required to adopt GSPs to manage the sustainability of groundwater basins. The adoption of a GSP is required for high- and medium-priority basins as identified by the California Department of Water Resources (DWR). Groundwater sustainability agencies that are responsible for high- and medium-priority basins must adopt GSPs within 5 to 7 years of implementation of the Sustainable Groundwater Management Act, depending on whether the basin is in critical overdraft. Agencies may adopt a single plan covering an entire basin or combine a number of plans created by multiple agencies. Plans must include a physical description of the basin, including groundwater levels, groundwater quality, subsidence, information on groundwater/surface water interaction, data on historical and projected water demands and supplies, monitoring and management provisions, and a description of how the plan would affect other plans, including city and county general plans.

The Central Basin was adjudicated in 1965 and has been managed by the Central Basin Watermaster since June 30, 2014, when DWR retired as the Watermaster. The act requires that groundwater sustainability agencies implement plans and achieve long-term groundwater sustainability within 20 years of implementation of the Sustainable Groundwater Management Act.

California General Plan Law (California Government Code 65302)

California Government Code 65302 requires cities and counties to include in their general plan a statement of development policies setting forth objectives, principles, standards, and plan proposals for seven policy areas, including safety. The safety element is to provide for the protection of the community from any unreasonable risks associated with seismic hazards and flooding.

3.8.2.3 Regional and Local

This section discusses regional and local programs, policies, regulations, and permitting requirements. The project section would be within Los Angeles and Orange Counties and the cities of Los Angeles, Vernon, Commerce, Bell, Montebello, Pico Rivera, Santa Fe Springs, Norwalk, La Mirada, Buena Park, Fullerton, and Anaheim. Cities and counties in the project section, as well as regional agencies, have developed ordinances, policies, and other regulatory mechanisms to minimize adverse effects during a project's construction and operation. Table 3.8-1 lists regional and local plans, policies, and stormwater permits that were identified and considered for analysis.

Table 3.8-1 Regional and Local Plans and Policies

Policy Title	Summary
Southern California	
SCAG Regional Comprehensive Plan (2008)	SCAG adopted the *2008 Regional Comprehensive Plan* in October 2008. The plan includes water goals and constrained policies for implementation of those water goals. ▪ Constrained Policy WA-23: Local governments should encourage Low Impact Development and natural spaces that reduce, treat, infiltrate and manage runoff flows caused by storms and impervious surfaces. ▪ Constrained Policy WA-24: Local governments should prevent development in flood hazard areas lacking appropriate protections, especially in alluvial fan areas. ▪ Constrained Policy WA-27: Developers and local governments should maximize pervious surface area in existing urbanized areas to protect water quality, reduce flooding, allow for groundwater recharge, and preserve wildlife habitat. New impervious surfaces should be minimized to the greatest extent possible, including the use of in-lieu fees and off-site mitigation. ▪ Constrained Policy WA-34: State and regional agencies should design and operate regional transportation facilities so that stormwater runoff does not contaminate surrounding watershed ecosystems.
SCAG 2024–2050 Connect SoCal Regional Transportation Plan/Sustainable Communities Strategy (2024)	SCAG adopted the Connect SoCal RTP/SCS in 2024, including the following policies related to water: ▪ Policy 48. Promote sustainable development and best practices that enhance resource conservation, reduce resource consumption and promote resilience ▪ Policy 56. Consider the full environmental life cycle of clean transportation technologies, including upstream production and end of life as an important part of meeting SCAG's objectives in economic development and recovery, resilience planning and achievement of equity
Los Angeles Regional Water Quality Control Board	
Water Quality Control Plan for the Los Angeles Region (Basin Plan) (2024)	The *Water Quality Control Plan for the Los Angeles Region* designates beneficial uses for specific surface water and groundwater resources, establishes water quality objectives to protect those uses, and sets forth policies to guide the implementation of programs to attain the objectives. Details for the water quality objectives are provided in Appendix 3.1-A.
Santa Ana Regional Water Quality Control Board	
Water Quality Control Plan for the Santa Ana River Basin (2019)	The *Water Quality Control Plan for the Santa Ana River Basin* designates beneficial uses for specific surface water and groundwater resources, establishes water quality objectives to protect those uses, and sets forth policies to guide the implementation of programs to attain the objectives.
General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (*de minimis*) Threat to Water Quality (2020)	The *General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (de minimis) Threat to Water Quality* (Order No. R8-2020-0006) includes requirements for construction dewatering activities.

Policy Title	Summary
Los Angeles County	
Los Angeles County 2035 General Plan (2025)	The Conservation and Natural Resources Element of the general plan includes goals and policies to protecting and using local surface water resources, groundwater resources, and protecting healthy watersheds. ▪ Goal C/NR 5: Protected and useable local surface water resources. – Policy C/NR 5.1: Support the LID philosophy, which seeks to plan and design public and private development with hydrologic sensitivity, including limits to straightening and channelizing natural flow paths, removal of vegetative cover, compaction of soils, and distribution of naturalistic BMPs at regional, neighborhood, and parcel-level scales. – Policy C/NR 5.2: Require compliance by all County departments with adopted Municipal Separate Storm Sewer System (MS4), General Construction, and point source NPDES permits. – Policy C/NR 5.6: Minimize point and non-point source water pollution. – Policy C/NR 5.7: Actively support the design of new and retrofit of existing infrastructure to accommodate watershed protection goals, such as roadway, railway, bridge, and other— particularly—tributary street and greenway interface points with channelized waterways. ▪ Goal C/NR 6: Protected and usable local groundwater resources. – Policy C/NR 6.1: Support the LID philosophy, which incorporates distributed, post-construction parcel-level stormwater infiltration as part of new development. – Policy C/NR 6.2: Protect natural groundwater recharge areas and regional spreading grounds. – Policy C/NR 6.3: Actively engage in stakeholder efforts to disperse rainwater and stormwater infiltration BMPs at regional, neighborhood, infrastructure, and parcel-level scales. – Policy C/NR 6.5: Prevent stormwater infiltration where inappropriate and unsafe, such as in areas with high seasonal groundwater, on hazardous slopes, within 100 feet of drinking water wells, and in contaminated soils. ▪ Goal C/NR 7: Protected and healthy watersheds. – Policy C/NR 7.1: Support the LID philosophy, which mimics the natural hydrologic cycle using undeveloped conditions as a base, in public and private land use planning and development design. The Safety Element contains goals and policies related to minimizing injury, loss of life, and property damage due to flood and inundation hazards. ▪ Goal S 3: An effective regulatory system that prevents or minimizes personal injury, loss of life, and property damage due to flood and inundation hazards. – Policy S 3.1: Strongly discourage development in the County's Flood Hazard Zones, unless it solely provides a public benefit. – Policy S 3.2: Strongly discourage development from locating downslope from aqueducts, unless it solely provides a public benefit.

Policy Title	Summary
	– Policy S 3.3: Promote the use of natural, or nature-based flood protection measures to prevent or minimize flood hazards, where feasible. – Policy S 3.4: Ensure that developments located within the County's Flood Hazard Zones are sited and designed to avoid isolation from essential services and facilities in the event of flooding. – Policy S 3.5: Ensure that biological and natural resources are protected during rebuilding after a flood event. – Policy S 3.6: Infiltrate development runoff on-site, where feasible, to preserve or restore the natural hydrologic cycle and minimize increases in stormwater or dry weather flows.
Los Angeles County Code of Ordinances (2025)	▪ Chapter 12.80, Stormwater and Runoff Pollution Control: This chapter protects the beneficial uses, marine habitats, and ecosystems of receiving waters within the county from pollutants carried by stormwater and non-stormwater discharges. ▪ Chapter 12.84, Low-Impact Development (LID) Standards: This chapter minimizes pollutant loadings from impervious surfaces by requiring development projects to incorporate properly designed, technically appropriate BMPs and other LID strategies. ▪ Chapter 21, Stormwater and Runoff Pollution Control: This chapter regulates the stormwater and non-stormwater discharges to the facilities of the Los Angeles County Flood Control District for the protection of those facilities, the water quality of the waters in and downstream of those facilities, and the quality of the water that is being stored in water-bearing zones underground.
Los Angeles County Grading Code (2022)	Chapter 26: Building Code, Appendix J, Grading, includes provisions applicable to grading, excavation, and earthwork construction, including fills and embankments and the control of runoff from graded sites, including erosion sediments and construction-related pollutants.
Los Angeles County Low-Impact Development Ordinance (2019)	The LID Ordinance ensures that development and redevelopment projects mitigate runoff in a manner that captures rainwater at its source, while using natural resources.
Los Angeles County Green Street Policy (2011)	The Green Street Policy for Los Angeles County states that street improvements within transportation corridors should provide source control for stormwater, limit the transport of pollutant loads, restore predevelopment hydrology if possible, and incorporate LID strategies, including permanent BMPs. This Green Street Policy references the Green Infrastructure Guidelines as a source of information for projects that are developing or redeveloping streets and transportation corridors. Green street projects are required to develop a LID Plan, similar to that specified in the LID ordinance.
LA River Master Plan (2022)	The *LA River Master Plan* seeks to build on prior and current planning efforts to reimagine the Los Angeles River from a single-use corridor to a tangible, multibenefit resource that connects people, culture, water, open space, and wildlife. Research and analysis for the plan is based on a data-driven watershed and community approach. Relevant goals are: ▪ Reduce flood risk and improve resiliency. ▪ Promote healthy, safe, clean water.

Policy Title	Summary
City of Los Angeles	
City of Los Angeles General Plan (2024)	Safety Element: Objective 1.1: Implement comprehensive hazard mitigation plans and programs that are integrated with each other and with the City's comprehensive emergency response and recovery plans and programs. Infrastructure Element: Water System Plan, Objective 2 – To introduce and utilize new technologies for the improvement of the water system in order to meet the ever increasing demand for water at the most economical rates possible. Conservation Element: Section 8 Erosion Objective – protect the coastline and watershed from erosion and inappropriate sedimentation that may or has resulted from human actions. Open Space Element: Areas which should be maintained for open space includes lands needed for water supply, water recharge, water quality protection, as well as natural drainage channels, and floodplains.
Los Angeles Municipal Code (2025)	Los Angeles Ordinance No. 181899 (updated in 2024 as Ordinance #188125) amended Sections 64.70.01 and 64.70.01 of Article 4.4 of Chapter VI of the Los Angeles Municipal Code.
City of Los Angeles Grading Code (2020)	Chapter 70 provides provisions for grading, excavation, and fills.
City of Los Angeles Low-Impact Development Ordinance (2015)	The LID Ordinance No. 181899 requires LID measures to be incorporated into the design plans of new development and redevelopment projects in order to mitigate stormwater quality impacts and is implemented through the city's plan review and approval process.
City of Los Angeles Green Streets Policy (2009)	Street improvements within transportation corridors should provide source control for stormwater, limit the transport of pollutant loads, restore predevelopment hydrology if possible, and incorporate LID strategies, including permanent BMPs.
Cornfield/Arroyo Seco Specific Plan (2024)	The *Cornfield/Arroyo Seco Specific Plan* improves the ecology surrounding the Los Angeles River Watershed and Arroyo Seco and supports the goals of the *Los Angeles River Revitalization Master Plan.* Chapter 2.4 focuses on Open Space and Chapter 3.1 on Streets including stormwater BMPs.
Los Angeles River Revitalization Master Plan (2007)	The *Los Angeles River Revitalization Master Plan* aims to enhance existing communities by creating a safe environment with more open space, parks, trails, recreation, environmental restoration, riverfront living and commerce, neighborhood identity, and economic development. Relevant goals are: ▪ Enhance flood storage ▪ Enhance water quality
U.S. Army Corps of Engineers and City of Los Angeles	
Los Angeles River Ecosystem Restoration Project (2015)	The *Los Angeles River Ecosystem Restoration Project* would restore approximately 11 miles of the Los Angeles River from Griffith Park to downtown Los Angeles. The project would reestablish riparian strand, freshwater marsh, and aquatic habitat communities, and reconnect the river to major tributaries, its historical floodplain, and the regional habitat zones of the Santa Monica, San Gabriel, and Verdugo Mountains. The Los Angeles River Watershed's former and existing ecosystems would maintain existing levels of flood risk management. The goals of the project are to restore valley foothill riparian strand and freshwater marsh habitat, increase habitat connectivity, and increase passive recreation.

Policy Title	Summary
City of Vernon	
City of Vernon General Plan (2023)	*Circulation and Infrastructure Element* ▪ Goal CI-5: Maintain the storm drainage system to assure the protection of lives and property of in Vernon *Resources Element* ▪ Goal R-1: Conserve and protect the region's water and energy resources – Policy R-1.3: Seek and pursue the most practicable and cost-effective means of implementing National Pollutant Discharge Elimination Systems requirements.
The Code of the City of Vernon (2024)	Chapter 13.24: Storm Sewer System Ordinance: ▪ Section 13.24.200 Control of pollutants from other construction activities ▪ Section 13.24.210 Control of pollutants from new developments/ redevelopment projects
City of Vernon Grading Code (2024)	Chapter 15: Building and Construction Prior to any soil disturbance or construction, a City of Vernon building, grading, or encroachment permit would be obtained.
City of Bell	
City of Bell 2030 General Plan, Resource Management Element (2022)	Resource Management Element Policy 25: The City of Bell shall review its zoning ordinance and make appropriate changes that support drought tolerant planting over traditional landscape planted areas. The new regulations shall provide guidance with hardscape landscaping that has less impact to the environment.
City of Bell Municipal Code (2024)	Chapter 13.08: Stormwater and Urban Runoff Control ▪ Section 13.08.070 Stormwater pollution control measures ▪ Section 13.08.080 Urban runoff mitigation requirements for construction ▪ Section 13.08.085 Low impact development plan (LID)—Development projects
City of Bell Grading Code (2023)	Chapter 15.04: Building Laws. Prior to any soil disturbance or construction, a City of Bell grading permit would be obtained.
City of Commerce	
City of Commerce 2020 General Plan (2008)[1]	The *Resource Management Plan* promotes the protection of the environment in the city. The plan provides a citywide approach to the utilization, conservation, and management of the city's resources ▪ Safety Policy 4.1: The city of Commerce will ensure that appropriate mitigation measures relative to soil contamination and soils characteristics (subsidence, erosion, etc.) are required for development and redevelopment in order to reduce hazards. ▪ Safety Policy 4.2: The city of Commerce will work with other agencies to reduce the potential flood hazard in the city.
Commerce Municipal Code (2024)	Chapter 6.17: Stormwater and Runoff Pollution Control provides standards, guidelines, and criteria to comply with the Federal Clean Water Act, the California Porter-Cologne Water Quality Control Act, and the Municipal NPDES Permit. Chapter 19.24.070: Soil and Grading Requirements provides general provisions handling of soil including testing and grading requirements.

Policy Title	Summary
City of Montebello	
City of Montebello General Plan (2024)	Our Natural Community ▪ P1.1: Enhance air and water quality, increase public green space through the integration of green infrastructure. ▪ P3.7: Maintain high-quality reliable potable water and non-potable water services, diversify supply and maintain and create facilities that meet existing and future water demands including drought conditions. ▪ P3.9: Ensure that wastewater in the City of Montebello is safely and efficiently conveyed and treated under all demand scenarios, including existing and future average and peak flow sewer flow scenarios. ▪ P3.10: Utilize and maintain a robust stormwater conveyance system that protects the City from flooding impacts while seeking multi-benefit solutions including water quality. ▪ P7.3: Promote, expand, and protect a green infrastructure that links the natural habitat.
Montebello Municipal Code (2024)	The intent of Chapter 8.36: Stormwater and Urban Runoff Pollution Prevention is to enhance and protect the water quality of the receiving waters consistent with the Clean Water Act and the municipal NPDES permit. Chapter 15.48: Grading, includes provisions to safeguard health, safety, and public welfare by regulating and controlling the design, construction, quality of materials, and the location of work related to the grading and filling of land within the city.
City of Pico Rivera	
City of Pico Rivera General Plan, Environmental Resources Element (2014)	Environmental Resources Element: Goal 8.4 Policy 8.4-1 Surface Water, 8.4-2 Groundwater, 8.4-3 Recharge Policy, 8.4-4 Regional Coordination, 8.4-5 National Pollutant Discharge Elimination System.
Pico Rivera Municipal Code (2025)	Chapter 16.04: Stormwater and Urban Runoff Pollution Prevention ▪ Section 16.04.110: Control of pollutants from new developments/redevelopment projects Title 15 Building and Construction, Chapter 38: Grading and Excavation.

Policy Title	Summary
City of Santa Fe Springs	
Re-Imagine Santa Fe Springs 2040 General Plan, Conservation and Open Space Element (2022)	▪ Goal COS-4: Clean Surface Water, Drainages, and Groundwater: – Policy COS-4.1: Groundwater Supply Remediation. Work with appropriate agencies and seek funding as appropriate to clean local groundwater to safe conditions. – Policy COS-4.2: Contaminated Soils. Coordinate with responsible agencies to avoid threats that contaminated soils pose to groundwater quality. – Policy COS-4.3: Groundwater Contamination. Evaluate all proposed nonresidential development plans, activities, and uses for their potential to create groundwater contamination hazards from point and nonpoint sources and confer with other appropriate agencies to assure adequate review. – Policy COS-4.4: Runoff Pollution Prevention. Require that new developments incorporate features into site drainage plans that reduce impermeable surface area, increase surface water infiltration, and minimize surface water runoff during storm events. Such features may include additional landscape areas, parking lots with bio-infiltration systems, permeable paving designs, and stormwater detention basins.
Code of Santa Fe Springs (2025)	Chapter 52: Stormwater Management and Discharge Control Section 52.11: Standard Urban Stormwater Mitigation Plan and Low-Impact Development Requirements for New Development and Redevelopment Projects.
City of Santa Fe Springs Grading Code (2023)	Title XV: Land Usage, Chapter 150, Building Laws provides general provisions for the construction and operation of buildings and structures.
City of Norwalk	
Vision Norwalk: The City of Norwalk General Plan, Conservation Element (2023)[1]	The objectives of the *City of Norwalk General Plan* Conservation Element are to encourage efforts to reduce pollution and encourage efforts to clean up contaminated earth, air, and water resources. The plan includes: ▪ Policy 9: Minimize the amount of paved surfaces in new development to reduce the "urban heat island" effect, where temperatures in urban areas are increased due to reflection of heat.
Norwalk Municipal Code (2024)	Chapter 15.04: Building Code provides general provisions for the construction and operation of buildings and structures. Chapter 18.04: Stormwater Management and Discharge Control provides standards for reducing pollutants in stormwater discharges.
City of La Mirada	
City of La Mirada General Plan (2003)	The *City of La Mirada General Plan* Land Use Element includes stormwater requirements for development planning and construction.
La Mirada Code of Ordinances (2024)	Chapter 13.12: Urban Runoff, Section 13.12.110, SUSMP and LID requirements for new development and redevelopment projects.
City of La Mirada Grading Code (2021)	Chapter 17.04, Building Code provides general provisions for the construction and operation of buildings and structures.

Policy Title	Summary
Orange County	
County of Orange General Plan, Resources Element (2025)	The *County of Orange General Plan* Resources Element contains policies on the conservation and management of water resources within the county: ▪ To support groundwater management efforts that are conducted by county water agencies. ▪ Protect and improve water quality through continued management, enforcement, and reporting requirements. ▪ Promote coordination between the county, cities, and other stakeholders in the identification and implementation of watershed protection and Low-Impact Development (LID) principles. ▪ Consider implementation of LID principles to conserve natural features (trees, wetlands, streams, etc.), hydrology, drainage patterns, topography, and soils. ▪ Encourage the creation, restoration, and preservation of riparian corridors, wetlands, and buffer zones. ▪ Intergovernmental coordination to encourage and support a cooperative effort among all agencies toward the resolution of problems and the utilization of opportunities in the planning, management, and protection of water resources, including water quality.
Codified Ordinances of the County of Orange (2024)	Resources Element: Title 9, Water Quality, Division 1, Stormwater Management and Urban Runoff Title 7: Land Use and Building Design, Grading and Excavation
Orange County Grading and Excavation Code (2017)	Subarticle 5 Grading Permit Requirements Subarticle 11 Draining and Terracing Subarticle 13 Erosion and Sediment Control
County of Orange and Orange County Flood Control District - Stormwater Program Local Implementation Plan (2019)	The *Stormwater Program Local Implementation Plan* provides the description and detail of how to implement model programs designed to prevent pollutants from entering receiving waters is accomplished on a local level.

Policy Title	Summary
City of Buena Park	
Buena Park 2035 General Plan Conservation and Sustainability Element (2022)	Conservation and Sustainability Element: ▪ Goal CS-4: Natural resources and features within the City are enhanced and preserved. – Policy CS-4.6: Incorporate natural drainage systems into developments, where appropriate and feasible. – Policy CS-4.7: Substantial alterations or channelization of floodways should be limited. – Policy CS-4.8: Design new development and redevelopment projects in a manner that avoids adverse environmental effects to the maximum extent feasible, considering the following environmental factors: Natural topography; Wildlife habitat and linkages; Erosion protection and sedimentation; Drainage patterns; and Groundwater recharge capability. – Policy CS-4.12: The City will participate in the Coyote Creek Watershed Management Plan including restoration of the existing softbottom sections of the creeks, stepped gabion walls for erosion control, creation of walking trails and pocket parks adjacent to the creeks, and other restoration components.
Buena Park Municipal Code (2025)	Chapter 13.32.030 provides standards to control urban runoff.
City of Buena Park Grading Code (2010)	Chapter 15.86.010 provides grading and excavation requirements.
City of Fullerton	
The Fullerton Plan (2025)	Chapter 16 Water: The purpose of the Water Element of *The Fullerton Plan* is to ensure that the city has adequate water resource capacities and water quality to meet future growth needs. Overarching Policy OAP1: Comply with State and Federal laws and regulations while maintaining local control in decision-making. ▪ Goal 19: An adequate, safe, and reliable water supply – P19.5 Water Quality – P19.7 Sustainable Water Practices in New Development ▪ Goal 20: A healthy watershed and clean urban runoff – P20.4 Local Watersheds – P20.6 Construction Impacts – P20.7 Development Impacts
City of Fullerton Municipal Code (2025)	Chapter 12.18 Water Quality Ordinance provides criteria and requirements related to water quality.
City of Fullerton Grading Code (2019)	Chapter 14.03 Building Code provides general provisions for the construction and operation of buildings and structures.

Policy Title	Summary
City of Anaheim	
City of Anaheim General Plan (2025)	Public Services and Facilities Element (2010): ▪ Goal 6.1 Maintain a storm drain system that will adequately protect and enhance the health, safety and general welfare of residents, visitors, employees, and their property. – Policy 1: Improve the City's storm drain system to address current deficiencies as well as long-term needs associated with future development to minimize flood damage and adequately convey rainfall and subsequent runoff from a 25-year frequency storm. – Policy 2: Develop Anaheim's flood control system for multi-purpose uses whenever practical and financially feasible (i.e., recreational, water quality/treatment, infiltration, etc.). – Policy 3: Minimize the amount of impervious surfaces in conjunction with new development. – Policy 4: Minimize the disturbance of natural water bodies and natural drainage systems, where feasible, resulting from development including roads, highways, and bridges.
Anaheim Municipal Code (2025)	Chapter 10.09: National Pollutant Discharge Elimination System contains guidance related to discharges and urban runoff.
City of Anaheim Grading Code (2005)	Chapter 17.04: Grading, Excavation, Fills, provides standards and requirements related to ground-disturbing activities, grading, and fill.

Sources: City of Anaheim 2005, 2025a, 2025b; City of Bell 2022, 2023, 2024; City of Buena Park 2010, 2022, 2025; City of Commerce 2008, 2024; City of Fullerton 2019, 2025a, 2025b; City of La Mirada 2003, 2021, 2024; City of Los Angeles 2007, 2009, 2015, 2020, 2024a, 2024b, 2025; City of Montebello 2024a, 2024b; City of Norwalk 2023, 2024; City of Pico Rivera 2014, 2025; City of Santa Fe Springs 2022, 2023, 2025; City of Vernon 2023, 2024a, 2024b; County of Los Angeles 2011, 2019, 2022, 2025a, 2025b; County of Los Angeles and Los Angeles County Public Works 2022; County of Orange 2017, 2019, 2024, 2025; Los Angeles RWQCB 2024; SCAG 2008, 2024; Santa Ana RWQCB 2019, 2020; USACE and City of Los Angeles 2015

[1] This plan is currently undergoing an update as of January 2025.

BMP = best management practice; LID = Low-Impact Development; MS4 = Municipal Separate Storm Sewer System; NPDES = National Pollutant Discharge Elimination System; RTP/SCS = Regional Transportation Plan/Sustainable Communities Strategy; SCAG = Southern California Association of Governments; SUSMP = Standard Urban Stormwater Mitigation Plan

3.8.3 Consistency with Plans and Laws

As indicated in Section 3.1.5.3, Consistency with Plans and Laws, CEQA and NEPA require a discussion of inconsistencies or conflicts between a proposed undertaking and federal, state, regional, or local plans and laws. CEQA and FRA NEPA implementing procedures require the discussion of any inconsistency or conflict between a proposed action and federal, state, regional, or local plans and laws. Where inconsistencies or conflicts exist, the Authority must provide a description of the extent of reconciliation and the reason for proceeding if full reconciliation is not feasible under NEPA (64 *Federal Register* 28545, 14(n)(15)) and must discuss the inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans under CEQA (State CEQA Guidelines Section 15125(d)).

Several federal and state laws and implementing regulations listed in Section 3.8.2.1, Federal, and Section 3.8.2.2 govern compliance with hydrology and water resources. The Authority, as the lead agency proposing to build and operate the HSR system, is required to comply with federal and state laws and regulations and to secure applicable federal and state permits prior to initiating construction of the project. Pursuant to U.S.C. Title 23 Section 327, under the NEPA Memorandum of Understanding between the FRA and the State of California, effective July 22, 2024, the Authority is the federal lead agency for environmental reviews and approvals for all Authority Phase 1 and Phase 2 California HSR System projects.

The Authority is a state agency and is therefore not required to comply with local land use and zoning regulations; however, it has endeavored to design and build the project so that it is compatible with land use and zoning regulations. The Shared Passenger Track Alternatives would be consistent with all regional and local plans, policies, and ordinances related to hydrology and water resources.

The Shared Passenger Track Alternatives would include construction, hydromodification, and post-construction BMPs to reduce pollutants of concern in stormwater runoff discharged to waterbodies including the Los Angeles River and the Santa Ana River. The Shared Passenger Track Alternatives would not adversely degrade water quality and would therefore be consistent with the goals of the *Los Angeles River Revitalization Master Plan* (City of Los Angeles 2007) and Los Angeles River Ecosystem Project to improve water quality in the Los Angeles River. The Shared Passenger Track Alternatives would neither preclude nor conflict with the restoration activities proposed under the *Los Angeles River Revitalization Master Plan* (City of Los Angeles 2007) or the *Los Angeles River Ecosystem Restoration, Final Feasibility Report* (USACE and City of Los Angeles 2015).

Refer to Appendix 3.1-A, Regional and Local Policy Inventory and Consistency Analysis, for a complete consistency analysis of local plans and policies.

3.8.4 Methods for Evaluating Impacts

The evaluation of impacts on hydrology and water quality is a requirement of NEPA and CEQA. The following sections define the RSAs and summarize the methods used to analyze impacts on hydrology and water resources. As summarized in Section 3.8.1, Introduction, several other sections of this Draft EIR/EIS also provide additional information related to hydrology and water resources.

3.8.4.1 Definition of Resource Study Areas

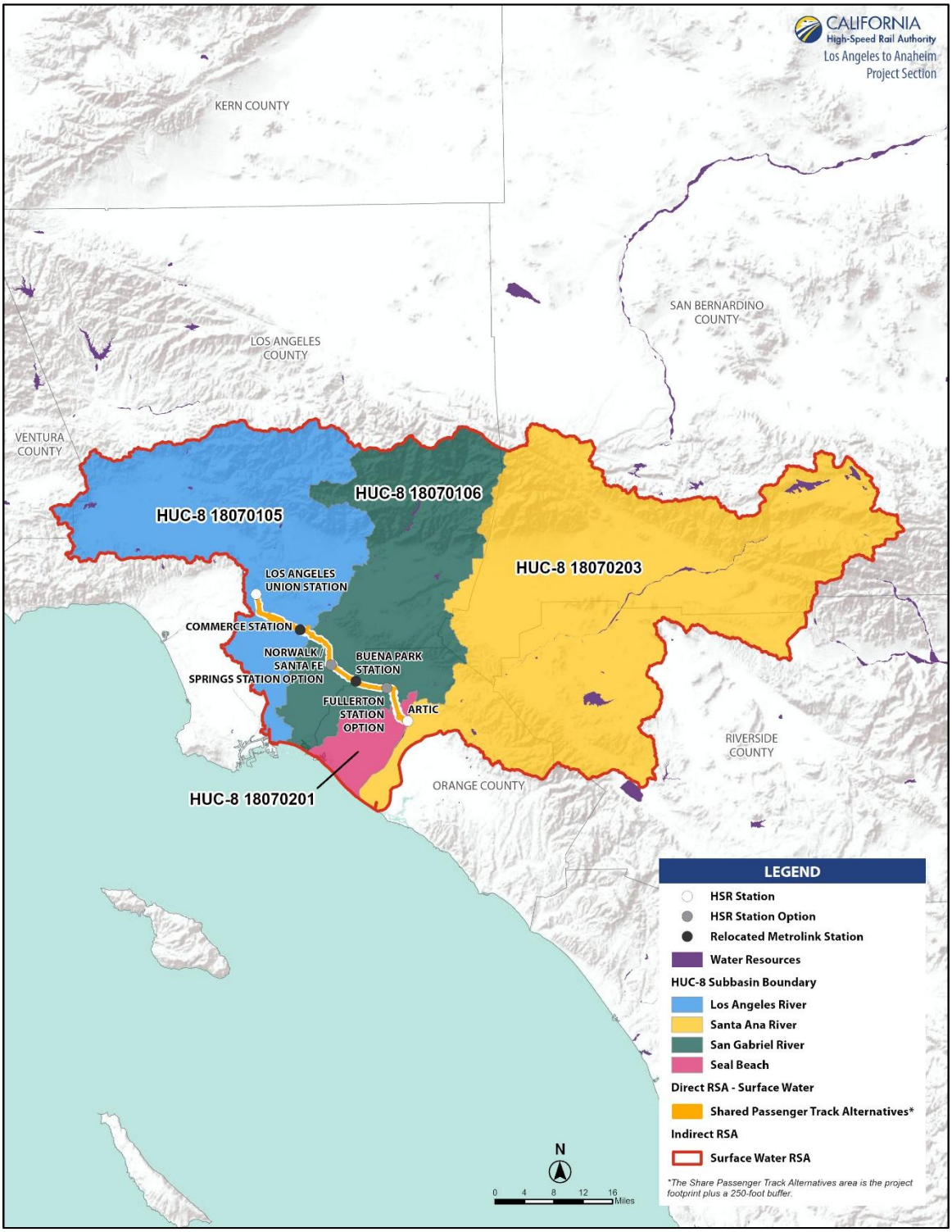
As defined in Section 3.1, Introduction, RSAs are the geographic boundaries in which the Authority conducted environmental investigations specific to each resource topic.

The RSA consists of a direct RSA and indirect RSA. The direct RSA for hydrology and water resources includes the project footprint of the Shared Passenger Track Alternatives (e.g., stations, HSR station options, track, light maintenance facility [LMF]) plus a 250-foot buffer (e.g., the project footprint plus the 250-foot buffer includes the temporary construction areas). The indirect RSA is the area beyond the direct RSA's 250-foot buffer and includes water resources downstream that could receive runoff and sediment from the potential area of disturbance. The RSAs include surface water resources adjoining, adjacent, or downstream that could receive runoff and sediment from the potential area of disturbance. Indirect RSA boundaries vary for surface water, groundwater, and floodplains. Table 3.8-2 provides a general definition and boundary description for the RSAs as depicted on Figure 3.8-1 through Figure 3.8-3.

Table 3.8-2 Definition of Hydrology and Water Resources Resource Study Areas

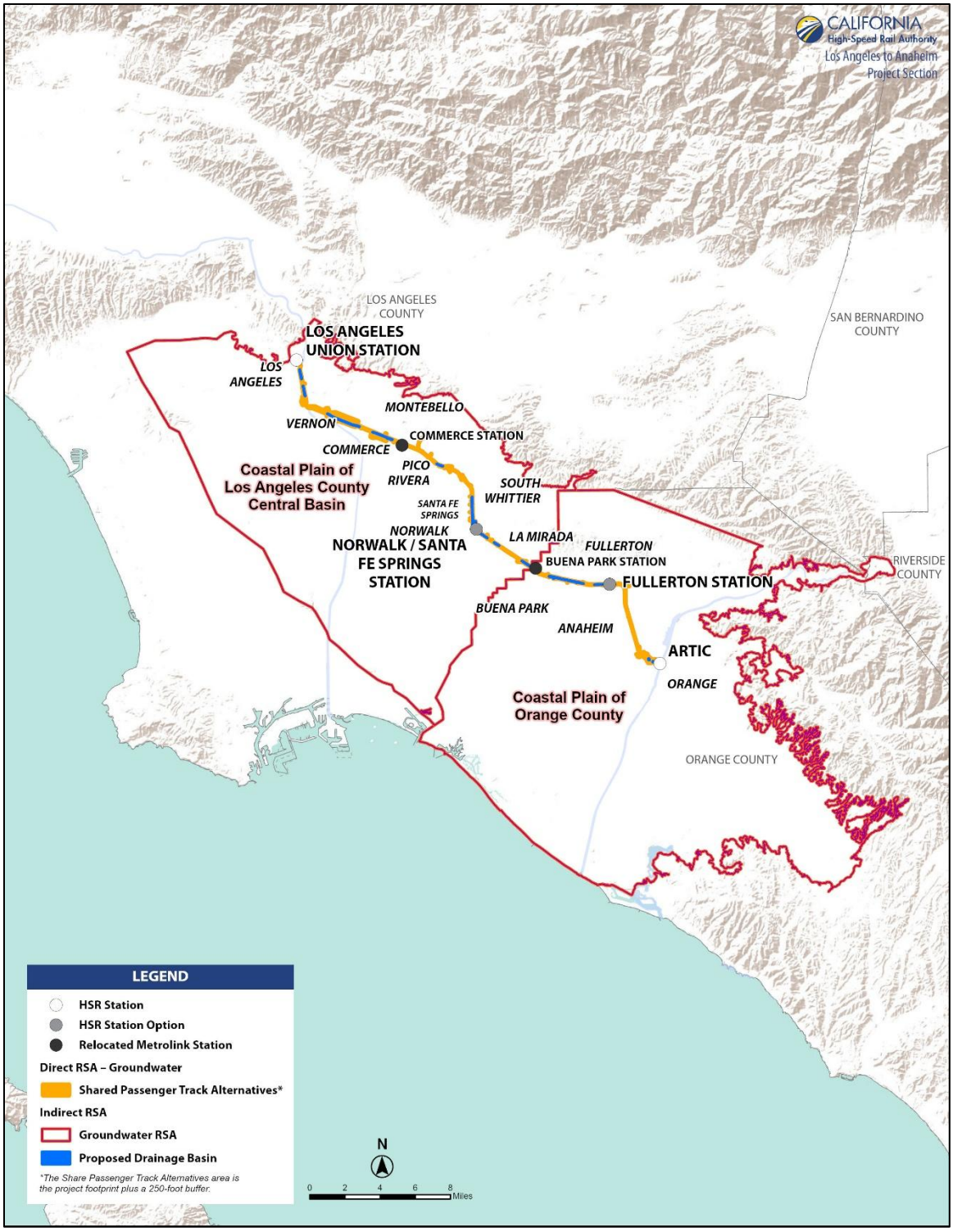
General Definition	Resource Study Area Boundary and Definition
Direct RSA	Project footprint (e.g., stations, HSR station options, track, light maintenance facility, temporary construction areas)[1] plus a 250-foot buffer
Indirect RSA	Area beyond the direct RSA's 250-foot buffer, to include water resources downstream, depending on the topography, soil conditions, and runoff rates and volumes, that could receive runoff and sediment from the potential area of disturbance. The limits of the indirect RSA include the direct RSA and the following additional elements: ▪ **Surface Water:** Watersheds and receiving waters of project runoff ▪ **Groundwater:** Aquifer(s) underlying the project footprint ▪ **Floodplain:** FEMA-designated flood-hazard areas in receiving waters of the disturbance area, as well as areas that could affect flood frequency, extent, and duration

[1] The project footprint includes all areas required to build, operate, and maintain all permanent HSR facilities, including permanent right-of-way, permanent utility and access easements, and temporary construction easements.
FEMA = Federal Emergency Management Agency; HSR = high-speed rail; RSA = resource study area



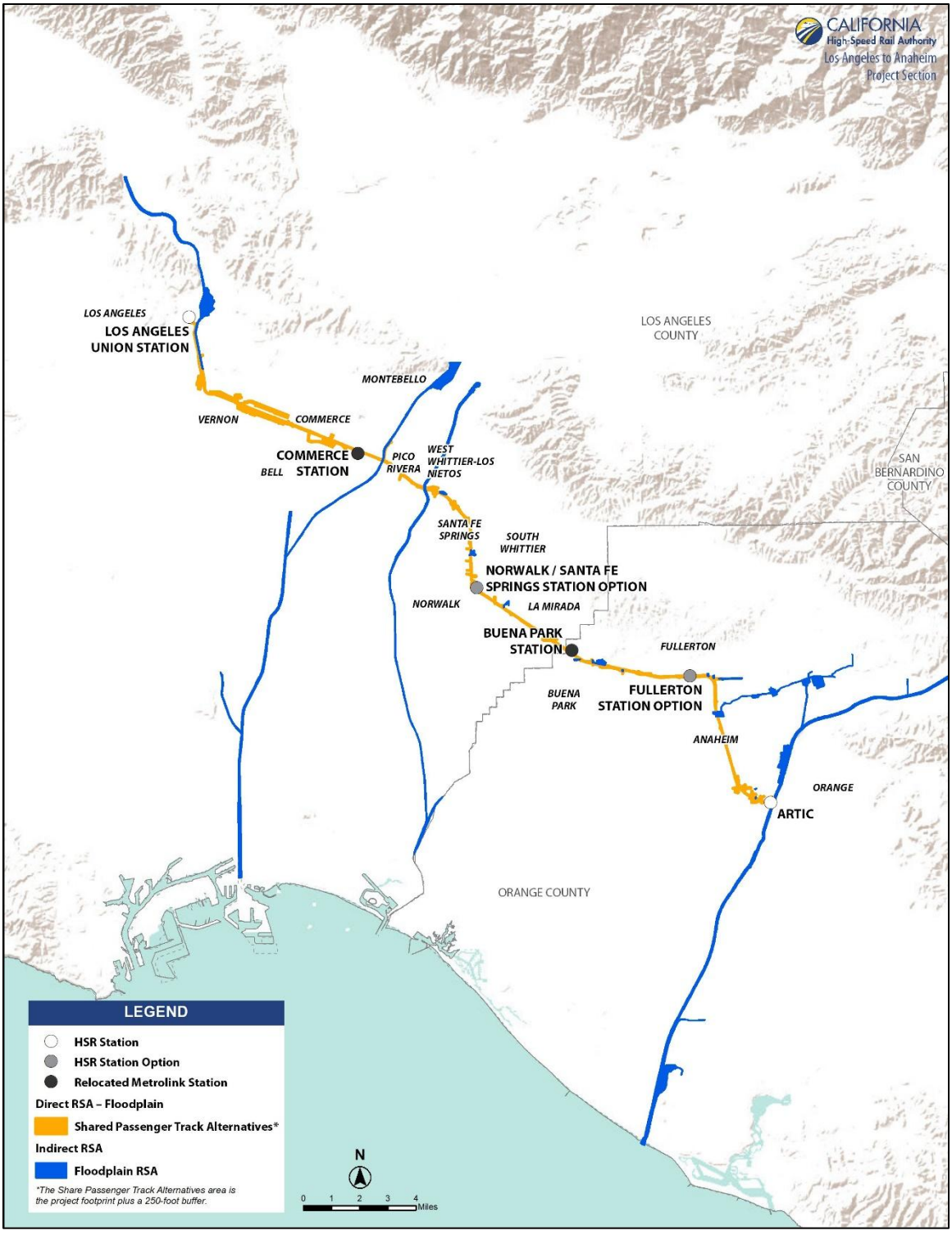
Sources: USGS 2018; STV 2009; DWR 2016; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-1 Surface Water Direct and Indirect Resource Study Areas



Sources: DWR 2016; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-2 Groundwater Direct and Indirect Resource Study Areas



Sources: FEMA 2023; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-3 Floodplain Direct and Indirect Resource Study Areas

3.8.4.2 Impact Avoidance and Minimization Features

The Shared Passenger Track Alternatives incorporate standardized HSR features to avoid and minimize impacts. These features are referred to as IAMFs and are considered to be part of the project. The Authority will incorporate IAMFs during project design and construction, and therefore the analysis of impacts of the Shared Passenger Track Alternatives in this section factors in applicable IAMFs. Appendix 2-A provides a detailed description of IAMFs that are included as part of the project design. The IAMFs differ from mitigation measures in that they are part of the project regardless of whether an impact is identified in this document. In contrast, mitigation measures may be available to further reduce, compensate for, or offset project impacts that the analysis identifies under NEPA or concludes are significant under CEQA. IAMFs applicable to hydrology and water resources include:

- **HYD-IAMF#1, Stormwater Management**, incorporates preparation of a stormwater management and treatment plan (SWMTP) in compliance with MS4s and construction general permits, issued by the SWRCB for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff will be evaluated. On-site stormwater management facilities will be designed and built to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways. LID techniques will be used to detain runoff on site and to reduce off-site runoff. The SWMTP will also address hydromodification such that preproject hydrology is maintained.
- **HYD-IAMF#2, Flood Protection**, incorporates preparation of a flood protection plan. The flood protection plan will be prepared to ensure that the project is designed both to remain operational during flood events and to minimize increases in 100-year flood elevations. The Authority-designated contractor will be responsible for implementation of the design standards as presented in the flood protection plan.
- **HYD-IAMF#3, Prepare and Implement a Construction Stormwater Pollution Prevention Plan**, requires compliance with the SWRCB CGP requiring preparation and implementation of a SWPPP and erosion and sediment control BMPs to minimize short-term increases in sediment transport. Other BMPs will include strategies to manage the amount and quality of overall stormwater runoff and construction materials and wastes.
- **HYD-IAMF#4, Prepare and Implement an Industrial Stormwater Pollution Prevention Plan,** ensures that industrial facilities (e.g., vehicle maintenance facilities) comply with existing industrial stormwater regulation. The Industrial General Permit for stormwater discharges associated with industrial activities requires preparation of an industrial SWPPP and a monitoring plan and includes performance standards for pollution control.

Other resource IAMFs applicable to impacts on hydrology and water resources include:

- **BIO-IAMF#9, Dispose of Construction Spoils and Waste**
- **BIO-IAMF#11, Maintain Construction Sites and BMP Training**
- **GEO-IAMF#1, Geologic Hazards**
- **GEO-IAMF#1A, Groundwater Withdrawal**
- **GEO-IAMF#1B, Unstable Soils**
- **GEO-IAMF#1D, Water and Wind Erosion**
- **HMW-IAMF#3, Work and Vapor Barriers**
- **HMW-IAMF#4, Known, Suspected, and Unanticipated Environmental Contamination**
- **HMW-IAMF#6, Spill Prevention**
- **HMW-IAMF#7, Storage and Transport of Materials**
- **HMW-IAMF#8, Permit Conditions**
- **HMW-IAMF#9, Environmental Management System**
- **HMW-IAMF#10, Hazardous Materials Plans**
- **SS-IAMF#3, Hazard Analyses**

In Section 3.8.6, Environmental Consequences, each impact narrative describes how these project features are applicable and, where appropriate, effective at avoiding or minimizing potential impacts to less-than-significant levels under CEQA.

3.8.4.3 Methods for Impact Analysis

This section describes the sources and methods the Authority used to analyze impacts from implementing the Shared Passenger Track Alternatives and the HSR station options on hydrology and water resources. These methods apply to both NEPA and CEQA analyses unless otherwise indicated. Refer to Section 3.1.5.4, Methods for Evaluating Impacts, for a description of the general framework for evaluating impacts under NEPA and CEQA. Refer to the respective technical reports (Authority 2025a, 2025b, 2025c) for information regarding the methods and data sources used in this analysis. Laws, regulations, and local planning documents (refer to Section 3.8.2) that regulate hydrology and water resources were also considered in the evaluation of direct and indirect impacts on surface water hydrology, surface water quality, groundwater, and floodplains. For project construction and operational actions that would result in impacts, feasible mitigation measures are identified to avoid or minimize impacts or to compensate for impacts.

The Authority used the following methods to evaluate direct and indirect impacts from construction and operation on surface water hydrology, surface water quality, groundwater, and floodplains.

Surface Water Hydrology

Project construction and operation could affect surface water hydrology. Conditions that could potentially lead to an impact include increases in impervious surface area resulting in increases in the runoff volumes and rates. Project construction and operation could also result in temporary or permanent alterations in drainage patterns, changes in local drainage infrastructure, or localized or regional drainage impacts.

The following methods were used to evaluate the impacts the Shared Passenger Track Alternatives and the HSR station options could have on surface water hydrology:

- Overlaid geographic information system (GIS) layers for the Shared Passenger Track Alternatives and HSR station options on the GIS layers for surface waters and flood-prone areas, U.S. Geological Survey topographic maps, and aerial photography from web mapping services to identify the impacts on surface waters.
- Used GIS to estimate the length of surface waters crossed by the Shared Passenger Track Alternatives.
- Used GIS to estimate the amount of surface area that would be disturbed by the Shared Passenger Track Alternatives and HSR station options. The amount of disturbed area includes permanent features and areas requiring temporary access.
- Estimated the amount of impervious surface area that would be created by the Shared Passenger Track Alternatives and HSR station options using GIS. The amount of proposed impervious area includes permanent features such as access roads, bridge access, graded areas, roadways, stations, tracks, radio sites, and permanent access areas.
- Evaluated the changes to drainage patterns in the direct RSA during construction and operation based on the hydraulic model results included in the following technical reports:
  - *Los Angeles to Anaheim Project Section Floodplain, Hydrology, and Hydraulics Technical Report* (Authority 2024a)
  - *Los Angeles to Anaheim Project Section Aquatic Resources Impacts Memorandum* (Authority 2025b)
  - *Los Angeles to Anaheim Project Section Draft Aquatic Resources Delineation Report* (Authority 2025c)

  - *Los Angeles to Anaheim Project Section Water Crossings Technical Report* (Authority 2024c)

- Evaluated aquatic resources delineation data for locations of surface waters. Delineation methodology is more fully described in the *Los Angeles to Anaheim Project Section Draft Aquatic Resources Delineation Report* (Authority 2025c). Refer to Section 3.7 for more information on these water features.

Surface Water Quality

Project construction and operation could affect surface water quality. During construction, sediment or ground disturbance could affect surface water quality through increased erosion or accidental spill of hazard materials used during construction activities. New and replaced impervious surfaces could collect and mobilize pollutants by runoff during storm events, and potentially discharge pollutants into surface waters.

The following methods were used to evaluate the impacts the Shared Passenger Track Alternatives and HSR station options could have on surface water quality:

- Used online GIS mapping and CWA Section 303(d) list of water quality-impaired reaches (SWRCB 2022b) to identify locations of stream segments with impaired water quality in relation to the proposed Shared Passenger Track Alternatives and their project footprints.
- Evaluated construction activities for the potential to affect surface water quality through uncontrolled runoff and discharges. These activities include accidental releases of construction-related hazardous materials, ground-disturbing activities and associated erosion and sedimentation, and stormwater discharges, particularly in locations within or close to a surface waterbody.
- Considered the potential for in-water construction work to directly contaminate surface water quality and redirect flows.
- Reviewed operation and maintenance activities with the potential to introduce pollutants into the environment, with a particular focus on stormwater runoff from Shared Passenger Track Alternatives facilities.
- Evaluated the potential of the Shared Passenger Track Alternatives to create significant new sources of pollutants (e.g., construction equipment and parking lots), leading to new sources of contaminated runoff in the direct RSA.
- Evaluated the use of treatment control BMPs in the direct RSA based on the information included in the *Los Angeles to Anaheim Project Section Stormwater Management Technical Report* (Authority 2024b).

Groundwater

Potential impacts on groundwater resources were evaluated using documents available from DWR, Los Angeles and Santa Ana RWQCBs, the Counties of Los Angeles and Orange, and other agencies. During construction, excavation in areas of high groundwater could affect groundwater quality or quantity from dewatering activities.

To evaluate the impacts the Shared Passenger Track Alternatives and HSR station options could have on groundwater, GIS database layers for groundwater basins were used to estimate the length and acreage of groundwater basins beneath the project footprint. Additionally, the available documentation from the DWR (e.g., Department of Water Resources Bulletin 118) was reviewed to obtain estimates of the depth to groundwater within the groundwater RSA. The Authority evaluated the following potential construction and operational impacts:

- Excavation activities that could result in intrusions below the groundwater table could be a direct mechanism for contaminants to enter groundwater
- Dewatering activities that could potentially deplete localized groundwater supplies

- Contaminated site runoff that potentially could percolate to the groundwater aquifer
- Increases in impervious surfaces as a result of the Shared Passenger Track Alternatives that could reduce groundwater recharge
- Creation of substantial new sources of pollutants, such as parking lots and maintenance facilities, leading to new sources of contaminated runoff, that could percolate to the aquifer

Floodplains

Project construction and operation could affect floodplains. Construction and operation of the Shared Passenger Track Alternatives could result in changes to the hydraulics and connectivity of the waterbodies and associated floodplains. Redirected or impeded flood flows have the potential to redefine flood-hazard areas and cause flooding in areas previously not at risk to the 100-year flood.

To evaluate the potential effects project construction or operations could have on floodplains, conceptual-level plans (15 percent design) for the Shared Passenger Track Alternatives were reviewed and compared with information on existing floodplains. The Shared Passenger Track Alternatives would cross designated floodplains on bridges and elevated structures. The evaluation of impacts of the Shared Passenger Track Alternatives on floodplains included the following analyses:

- Estimation of the length of the floodplains (defined as 100-year floodplains or SFHAs) crossed by the station options by overlaying GIS layers for the Shared Passenger Track Alternatives onto the GIS layers for floodplains
- Evaluation of changes to floodplains, based on hydraulic model results included in the *Los Angeles to Anaheim Project Section Floodplain, Hydrology, and Hydraulics Technical Report* (Authority 2024a) and the *Los Angeles to Anaheim Project Section Aquatic Resources Impacts Memorandum* (Authority 2025b)
- Review of Shared Passenger Track Alternatives facilities within a mapped floodplain that could expose the Shared Passenger Track Alternatives to risks related to flooding and subject other areas to impacts resulting from changes in the location and or direction of floodflows
- Evaluation of the potential for the Shared Passenger Track Alternatives to increase flood height or divert floodflows
- Evaluation of the potential for the Shared Passenger Track Alternatives to result in incompatible floodplain development and affect floodplain values
- Consideration of construction activities within a floodplain that could redirect flows and pose a risk to construction workers and equipment

3.8.4.4 Method for Evaluating Impacts Under NEPA

NEPA implementing procedures, regulations, and guidance provide the basis for evaluating project effects (as described in Section 3.1.1, Federal and State Regulatory Context). The criteria of context and intensity are considered together when determining the severity of changes introduced by the project:

- **Context:** For this analysis, the *context* for hydrology and water resources includes the volume and timing of existing surface water flows; extent of impervious surface and density of drainage systems in affected watersheds; existing levels of biological, chemical, and physical contaminants in surface water and groundwater; beneficial uses and water quality standards of surface water and groundwater; depth to the groundwater table; the footprint, water surface elevation (WSE), and peak flow of existing floodplains; and the regulatory setting pertaining to hydrology and water resources.

- **Intensity:** For this analysis, *intensity* is determined by the severity of the impact for hydrology and water resources, such as changes in local and regional drainage patterns, stormwater runoff rates and volumes, capacities of existing or planned drainage systems, concentrations of pollutants in surface waterbodies and groundwater aquifers, elevation of the groundwater table, and 100-year floodplain and floodway WSEs, footprints, and peak flows.

3.8.4.5 Method for Determining Significance Under CEQA

CEQA requires that an EIR identify the significant environmental impacts of a project (State CEQA Guidelines Section 15126). By contrast, under NEPA, significance is used to determine whether an EIS will be required; NEPA requires that an EIS is prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." Significant impacts are determined by evaluating whether project impacts would exceed the significance threshold established for the resource (as presented in Section 3.1.5.4). For this analysis, the project would result in a significant impact on hydrology and water resources if it would:

- 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 that would:
  - Result in substantial erosion or siltation on or off site
  - Substantially increase the rate or amount of surface runoff in a manner that would result in flooding 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
  - Impede or redirect floodflows
- Risk release of pollutants because of project inundation in flood hazard, tsunami, or seiche zones
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

As discussed above, state and federal agencies, including USEPA, SWRCB, and the RWQCBs, have established Basin Plans, water quality objectives or standards, and waste discharge requirements that are relevant to the project. These standards and requirements have been developed to prevent the degradation of water quality pursuant to the CWA and the Porter-Cologne Water Quality Control Act, including changes in hydrology associated with additions of impervious surfaces (hydromodification) as well as erosion and sedimentation that may result from hydromodification, and thus serve as appropriate thresholds for determining the effects (NEPA) or significance (CEQA) of water quality impacts as well as hydrology impacts related to hydromodification. The analysis of risk associated with release of pollutants from project inundation was focused on materials storage areas rather than nonpoint sources.

In 2014, California adopted the Sustainable Groundwater Management Act, which provides a regulatory framework for the management and use of groundwater in a manner that can be maintained through the planning horizon without causing undesirable results. Under this act, *undesirable results* are defined as the chronic lowering of the groundwater table, reduction of storage capacity, intrusion of seawater, degradation of groundwater quality, subsidence of land, and depletions of interconnected surface water; these conditions must be both significant and unreasonable to be considered an undesirable result. Therefore, compliance with the Sustainable

Groundwater Management Act and avoidance of undesirable results are appropriate thresholds for determining the significance of groundwater impacts under CEQA.

For impacts related to flood hazards, the analysis relies on standards established by FEMA and local agencies. FEMA oversees federal floodplain management policies and runs the National Flood Insurance Program adopted under the National Flood Insurance Act of 1968. FEMA prepares FIRMs that delineate the regulatory floodplain to assist local governments with land use and floodplain management decisions to avoid flood-related hazards. To avoid impacts related to flooding, FEMA and the local agencies require that an encroachment into a floodplain not increase the WSE of the 100-year flood by more than 1 foot in floodplains and 0.1 foot in floodways.

3.8.5 Affected Environment

This section describes the affected environment for hydrology and water resources in the RSA, including surface water hydrology and quality, groundwater hydrology and quality, and floodplains. This information provides the context for the environmental analysis and evaluation of impacts.

Issues and concerns from interested parties relevant to hydrology and water resources include impacts on major water crossings including structures and associated impacts such as dredge or fill material in aquatic environments. A summary of issues and concerns from public outreach efforts can be found in Chapter 9, Public and Agency Involvement.

3.8.5.1 Climate, Precipitation, and Topography

The climate within the RSA is arid to semi-arid. Summer and fall seasons (dry season) are generally hot and dry, with the majority of rain falling during the mid-winter months (wet season). Rainfall stations within the RSA indicate that approximately 80 percent of annual precipitation occurs between November and April. Accordingly, the condition of water resources (e.g., presence of surface water) is seasonally variable between the wet and dry seasons. Rainwater often inundates the watercourses and waterbodies within the RSA during winter storms, common from November through March, but many are completely dry or contain only nuisance or wastewater low flows during other seasons (NOAA 2024a, 2024b).

Adiabatic cooling (i.e., cooling caused by change in air pressure) causes warm, moisture-laden air masses to be generated over the Pacific Ocean, which condense and cool as they are pushed upward and over the San Gabriel and San Fernando Mountains, resulting in moderate to heavy precipitation on the southwestern slopes. The resulting snowpack is highly variable but averages from 5 to 70 inches as elevation increases from the lower foothills to the mountain peaks. Similar to snowpack, mean annual precipitation for the downtown Los Angeles (University of Southern California Campus) meteorological station is highly variable, ranging from 3.85 inches in 1953 to 34.04 inches in 1983, and averaging 14.77 inches per year (WRCC 2016a). Mean annual temperature records for the same station site indicate an average high temperature of 74 degrees Fahrenheit and an annual average low temperature of 56 degrees Fahrenheit (WRCC 2016a). Key climatic factors influencing this high variability in intra-seasonal and inter-annual precipitation include the Madden-Julian Oscillation (NOAA 2024a) and the El Niño Southern Oscillation (NOAA 2024b), respectively.

Table 3.8-3 presents annual precipitation data for four stations in the surface waters indirect RSA. Average annual precipitation ranges from 12.01 inches at Brea Dam to 20.24 inches in Pasadena (WRCC 2016b, 2016c).

Table 3.8-3 Historical Annual Precipitation

Station	Location Relative to RSA	Elevation (msl)	Data Range	Mean Annual Rainfall (inches)
Pasadena (046719)	North	820 feet	1893–2015	20.24

Station	Location Relative to RSA	Elevation (msl)	Data Range	Mean Annual Rainfall (inches)
Brea Dam (041057)	East	300 feet	1948–2013	12.01
Los Angeles Downtown USC Campus (045115)	West	175 feet	1877–2016	14.77
Santa Ana Fire Station (047888)	South	110 feet	1906–2016	13.69

Source: WRCC 2016a, 2016b, 2016c, 2016d
msl = mean sea level; RSA = resource study area; USC = University of Southern California

3.8.5.2 Watershed

The direct RSA encompasses the Los Angeles River subwatershed[1] (531,790 acres), San Gabriel River subwatershed (579,977 acres), Seal Beach subwatershed (81,533 acres), and Santa Ana River subwatershed (1,084,238 acres). Watersheds crossed by the Shared Passenger Track Alternatives are depicted on Figure 3.8-1. The U.S. Geological Survey classifies these subwatersheds as Hydrologic Unit Code 8 (HUC-8) watersheds: Los Angeles River (HUC-8 18070105), San Gabriel River (HUC-8 18070106), Seal Beach (HUC-8 18070201), and Santa Ana River (HUC-8 18070203) (USGS 2018). More details on the watersheds within the direct RSA can be found in the *Los Angeles to Anaheim Project Section Hydrology and Water Resources Technical Report,* Section 5.1 (Authority 2025a).

The Los Angeles River subwatershed encompasses and is shaped by the path of the Los Angeles River, which flows 51 miles from its headwaters in the Santa Monica Mountains and into San Pedro Bay near Long Beach. Major tributaries to the Los Angeles River include Pacoima Wash, Tujunga Wash, Burbank Western Channel, Verdugo Wash, Arroyo Seco, the Rio Hondo, and Compton Creek. The Los Angeles River subwatershed is heavily urbanized in the lower reaches but retains largely undeveloped open space areas in the upper reaches of the subwatershed.

The San Gabriel River subwatershed drains into the San Gabriel River from the San Gabriel Mountains, flowing 58 miles south until its confluence with the Pacific Ocean. The upper portion of the watershed consists of undisturbed riparian and woodland habitats, while the lower portion of the watershed is heavily urbanized. Major tributaries to the San Gabriel River include Walnut Creek, San Jose Creek, Coyote Creek, and numerous storm drains from the 19 cities that the San Gabriel River passes through. The San Gabriel River crosses the project area in Santa Fe Springs.

The Seal Beach subwatershed is composed of a number of channels, none of which is a dominant river for the watershed. However, each drains a substantial portion of the watershed. These channels are not included in the Basin Plan for the Santa Ana River Basin. Ultimately, the channels converge along the coast where they empty into Huntington Harbour and Anaheim Bay. The headwaters for these channels begin in the northern and eastern reaches of the watershed, which are almost completely urbanized. These areas have very low slopes, having once been primarily swamplands or low coastal floodplains for the San Gabriel and Santa Ana Rivers. The typical flow in the Seal Beach subwatershed is almost completely dry-weather runoff.

The Santa Ana River subwatershed covers a land area of 1,084,238 acres. Banks of the Santa Ana River are stabilized. Only 20 percent of the Santa Ana River is a concrete channel, the majority of which is near the mouth of the river. Discharges from publicly owned wastewater treatment facilities have changed natural surface flows and provided the base flow in many parts

[1] The U.S. Geological Survey hydrologic unit code 8 (HUC-8) refers to subbasins. HUC-6 is the unit used to refer to basins and HUC-10 is the watershed unit.

of the Santa Ana River's drainage network. This treated wastewater has altered the natural system by providing year-round river flow.

3.8.5.3 Surface Water Hydrology

The Shared Passenger Track Alternatives would cross 11 water features, as depicted on Figure 3.8-4 through Figure 3.8-14. Table 3.8-4 summarizes the characteristics of each water feature crossing within the direct RSA. More details on the watercourses within the direct RSA can be found in the *Los Angeles to Anaheim Project Section Hydrology and Water Resources Technical Report,* Section 5.3.1 (Authority 2025a).

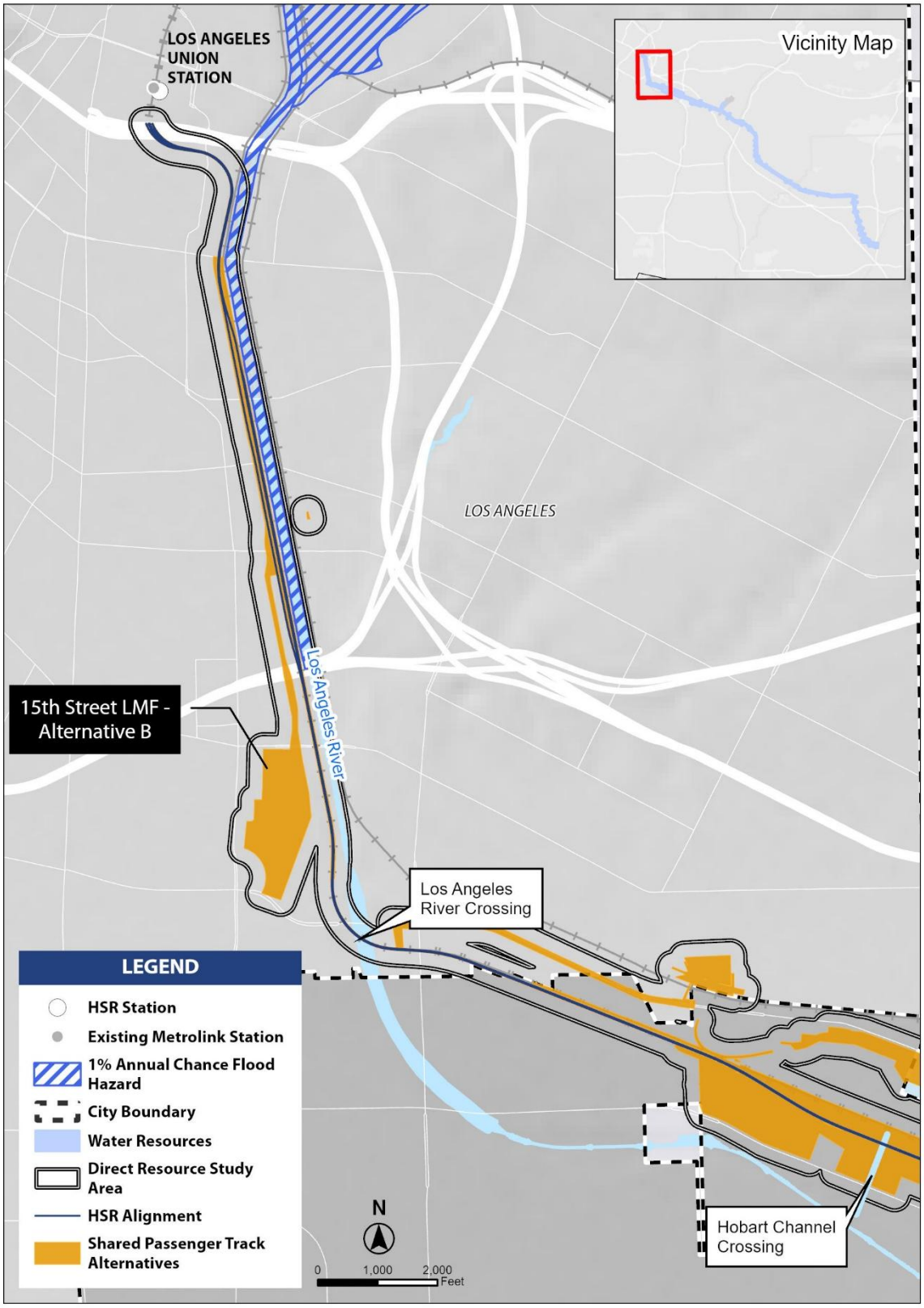
Table 3.8-4 Water Crossings: Drainage Features Information

Waterbody	Length of Crossing (feet)	Structure Type	Bottom Material	Design Flow Rate (cfs)
Los Angeles River (south of Washington Blvd and north of 26th St)	372	Bridge	Concrete	104,000
Hobart Channel	55	Reinforced concrete box	Concrete	321
Rio Hondo	120	Modify existing bridge	Concrete	51,650
San Gabriel River	240	New bridge	Earthen	14,700
North Fork Coyote Creek	85	New bridge	Concrete	21,000
La Mirada Creek	80	Modify existing bridge	Concrete/earthen	3,600
Coyote Creek	45	Box culvert extension	Concrete	15,000
Brea Creek	50	New bridge/extension	Concrete	7,390
Balcom Avenue Storm Drain	12	Reinforced concrete box	Concrete	NA[1]
Fullerton Creek	24	Existing box culvert	Concrete	3,550
Carbon Creek	9	Box culvert extension	Concrete	1,000

Source: Authority 2025b, 2025c, 2024c

[1] The design flow rate of Balcom Avenue Storm Drain is unknown. According to the current Federal Emergency Management Agency flood insurance rate maps and the flood insurance study for Orange County, a floodplain has not been delineated along the Balcom Avenue Storm Drain at the location of the crossing

cfs = cubic feet per second, N/A = not available

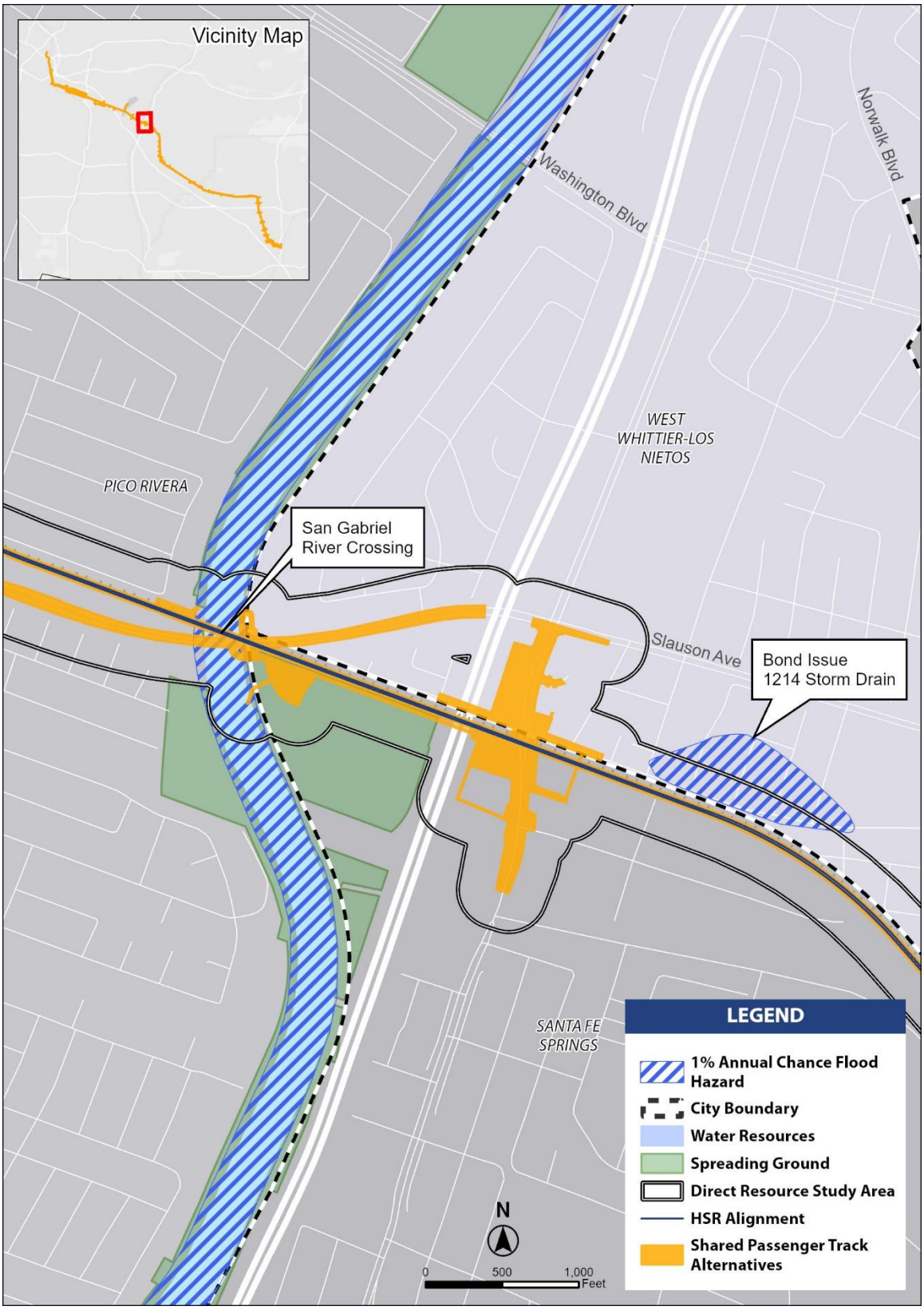


Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2025d; ESRI/National Geographic 2024

Figure 3.8-4 Los Angeles River Floodplain

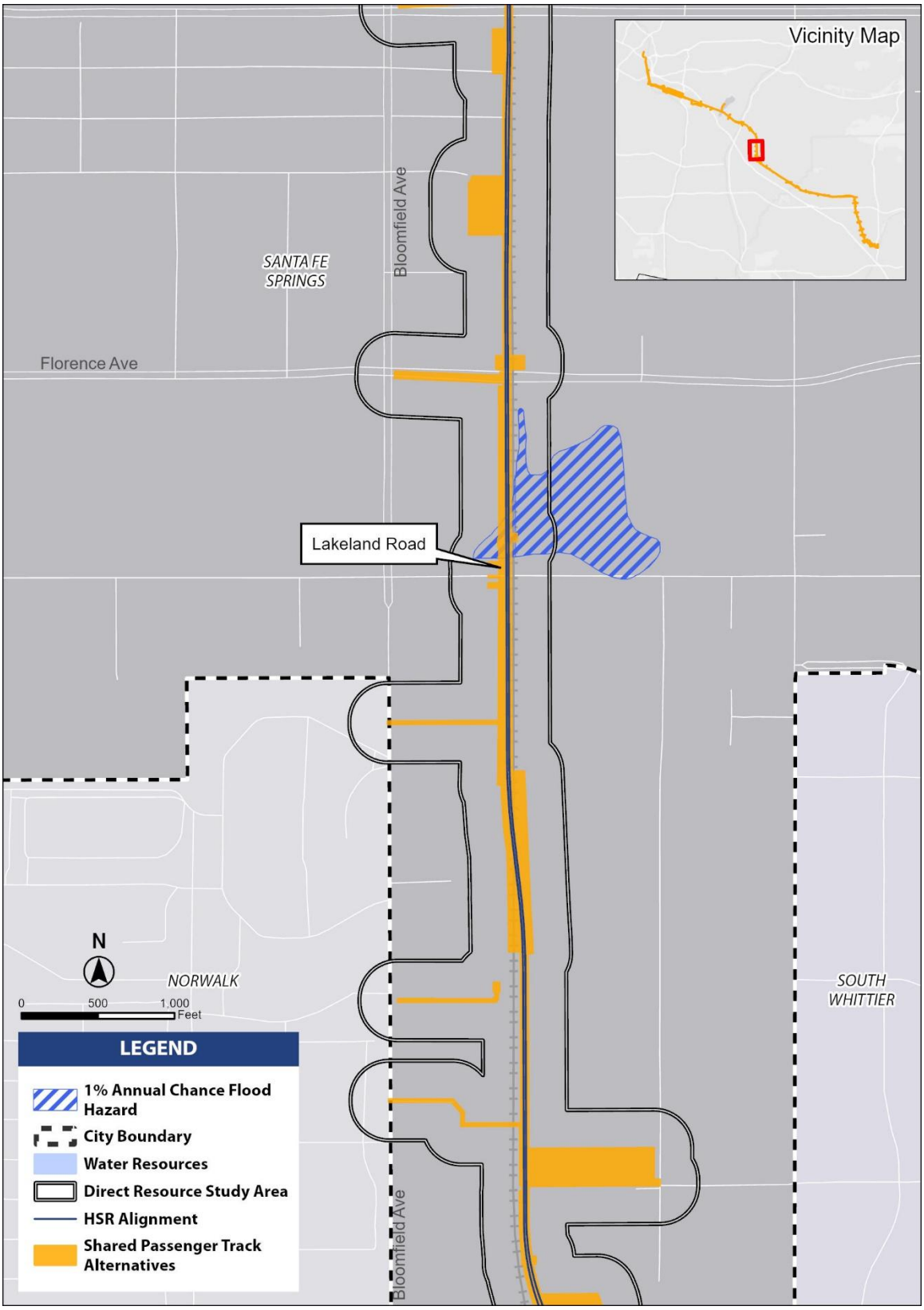
Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-5 Rio Hondo Floodplain



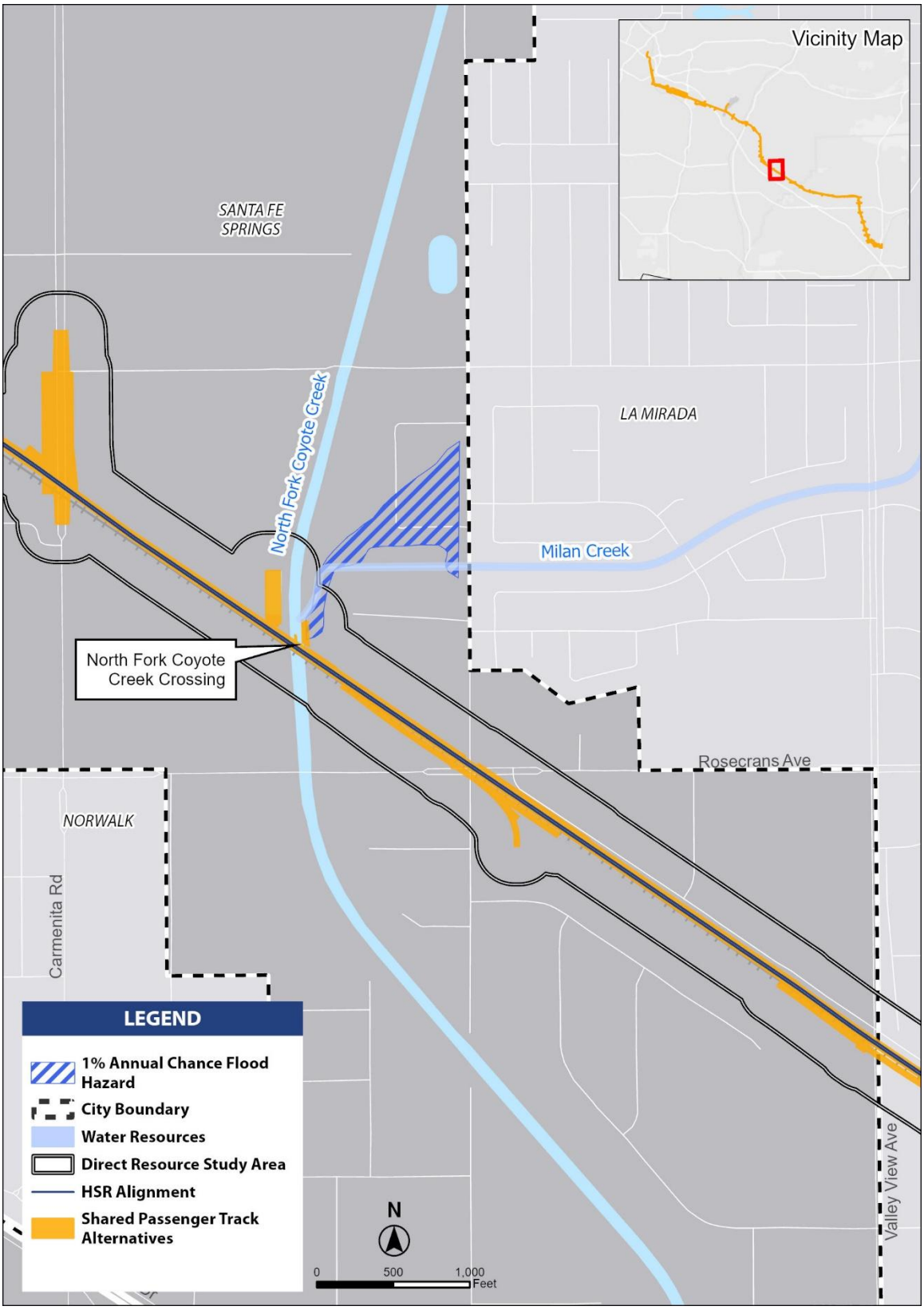
Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-6 San Gabriel River and Bond Issue 1214 Storm Drain Floodplain



Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-7 Lakeland Road Floodplain

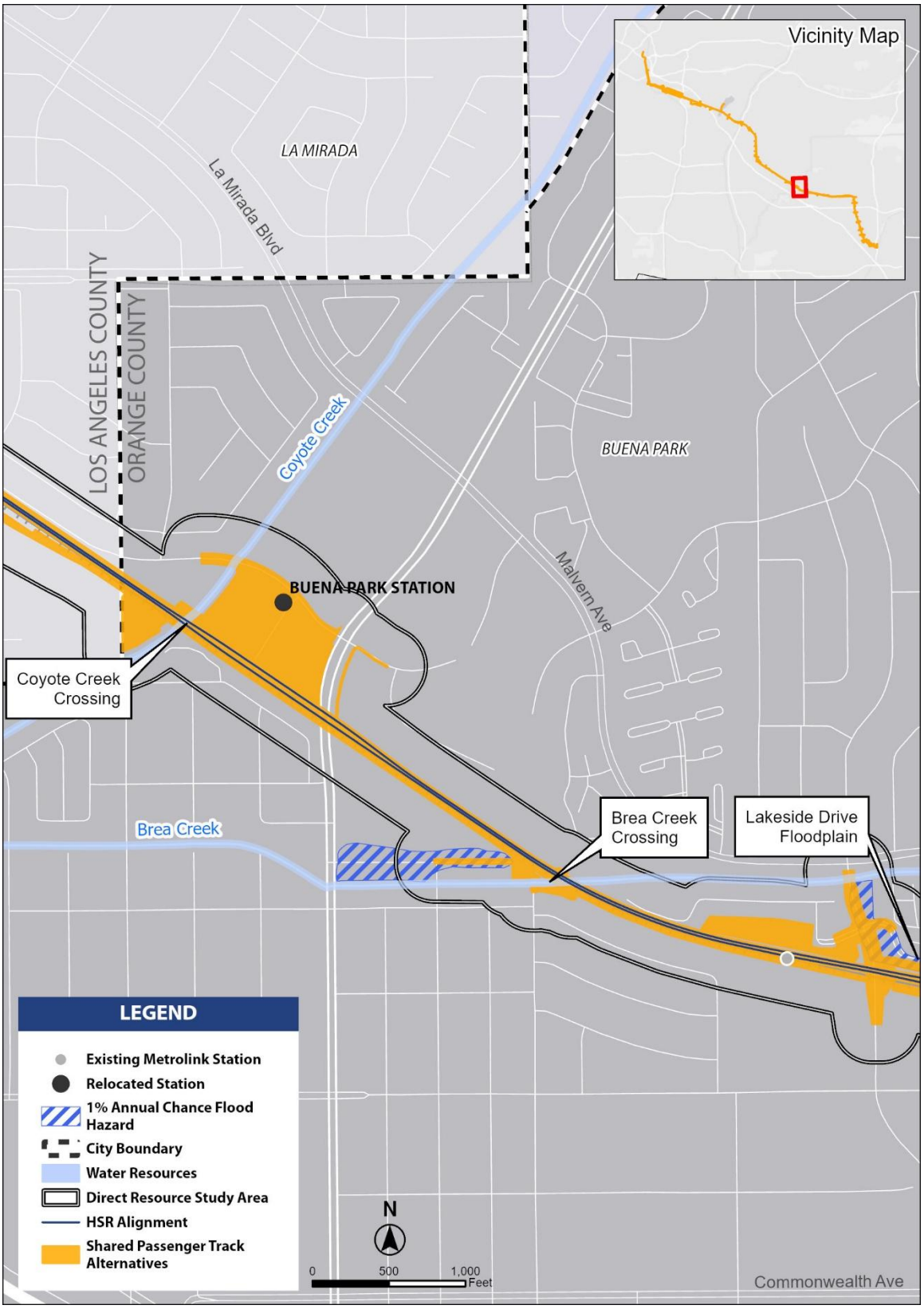


Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-8 North Fork Coyote Creek Floodplain

Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-9 La Mirada Creek Floodplain



Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-10 Brea and Lakeside Drive Floodplain

Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

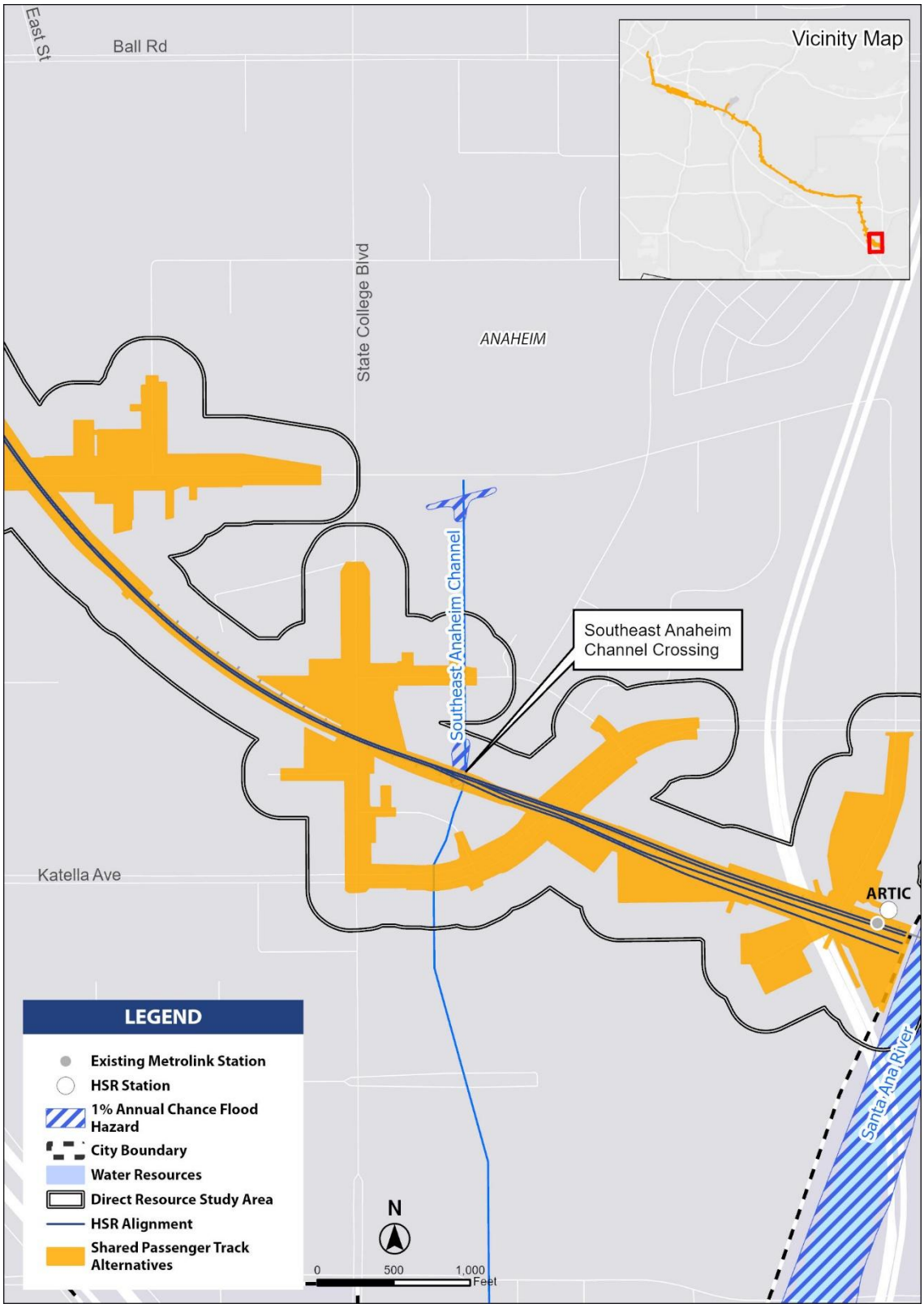
Figure 3.8-11 Gilbert Street and Artesia Street Floodplain

Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-12 Balcom Avenue Storm Drain Floodplain

Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024

Figure 3.8-13 Carbon Creek Floodplain



Sources: FEMA 2023; USGS 2018; STV 2009; Authority 2024d; ESRI/National Geographic 2024
The Southeast Anaheim Channel is enclosed and buried within the right-of-way, and not considered a surface water feature.

Figure 3.8-14 Southeast Anaheim Channel Floodplain

3.8.5.4 Surface Water Quality

Existing water quality conditions in the RSA are influenced by the urban setting. Pollutant sources in urban areas include parking lots and streets; residential, commercial, and industrial development; rooftops; exposed earth at construction sites; bare undeveloped areas; and petroleum-fueled railroads. Water quality is also affected by existing rail operations. Brake dust from existing trains consists primarily of particulate metals. Once dissolved in rainwater, some metals can be mobilized to storm drains or waterbodies, or infiltrate into the ground. Braking that occurs where the existing rail crosses a waterbody can lead to brake dust being directly discharged into the waterbody. More details on surface water quality within the direct RSA can be found in the *Los Angeles to Anaheim Project Section Hydrology and Water Resources Technical Report,* Section 5.4.1 (Authority 2025a). Table 3.8-5 summarizes beneficial uses of affected waterbodies in the project section. Table 3.8-6 summarizes Section 303(d) list impaired waters and applicable TMDLs in the project section.

Headwaters of the Los Angeles River Basin are relatively free of pollutants. As water flows from the headwaters, through mountain streams, and into the valley or basin, streams and rivers tend to accumulate both natural and anthropogenic pollutants. Within the RSA, the Los Angeles River and selected tributaries are impaired by pollutants, mainly because of the watershed's large, dense population and the amount of impervious ground surface, which prevents large quantities of runoff from infiltrating into the soils (Los Angeles RWQCB n.d.).

The RSA is also in the middle and lower portions of the San Gabriel River Watershed, where pollutants from dense clusters of residential and commercial activities have impaired water quality. Segments of the San Gabriel River and its tributaries are listed as exceeding water quality objectives for copper, lead, selenium, and zinc (Hunter and Associates 2015). Metal loading to the San Gabriel River has the potential to cause impairments of the designated beneficial uses.

Within the Santa Ana River Watershed, water quality has improved in recent years because of technological developments (e.g., advanced wastewater control infrastructure) and water quality planning (Santa Ana Watershed Project Authority 2018). Impacts on aquatic resources include nonlethal forms of pollution such as elevated water temperatures or high sediment loads, elevated but nontoxic levels of ammonia, increases in salinity, and low levels of dissolved oxygen (Santa Ana Watershed Project Authority 2018).

Channel reaches within the RSA ultimately flow to the Seal Beach Watershed. The 303(d) list specifies Anaheim Bay as an impaired water quality segment for dieldrin, nickel, polychlorinated biphenyls, and sediment toxicity. The 303(d) list specifies Huntington Harbour as an impaired water quality segment for chlordane, copper, lead, nickel, polychlorinated biphenyls, pathogens, and sediment toxicity. Additional pollutants are emitted from brake dust from the ongoing operation of petroleum-fueled rail service in the project area.

Surface Water Beneficial Uses

The water quality of surface water features in the project section is regulated under the Los Angeles and Santa Ana Basin Plans (Los Angeles RWQCB 2024; Santa Ana RWQCB 2019). In order to protect these features, the Los Angeles and Santa Ana RWQCBs have established the beneficial uses supported for specific surface water and groundwater resources. The RWQCBs have also established water quality objectives in the Basin Plans to protect those uses and sets forth policies to guide the implementation of programs to attain the objectives. Water quality objectives are levels of pollutants above or below which that pollutant would reasonably expect to impair a beneficial use. The water quality objectives for surface waters in the project section are detailed in Table 5-6 and Table 5-7 of the *Los Angeles to Anaheim Project Section Hydrology and Water Resources Technical Report* (Authority 2025a). When beneficial uses are impaired by a pollutant that chronically exceeds its water quality objective, the RWQCB places the waterbody and pollutant on the CWA Section 303(d) list of water quality impairments. Once a waterbody is placed on the 303(d) list, the RWQCB must begin developing a TMDL program that provides a programmatic response to the impairment in order for the waterbody to meet the water quality

objective and continue to support its beneficial uses. Table 3.8-5 summarizes the beneficial uses of waterbodies in the project section surface water RSA.

Table 3.8-5 Beneficial Uses of Potentially Affected Waterbodies in the Project Section

Beneficial Use	MUN[1]	IND	PROC	GWR	WARM	WILD	RARE	WET[2]	REC-1	REC-2
Los Angeles River (Reach 3)[3]	P*	P	-	E	E	E	-	E	E	E[4]
Los Angeles River (Reach 2)[5]	P*	P	-	E	E	P	-	-	E[4]	E
Rio Hondo (Reach 2)[6]	P*	-	-	I	P	I	-	-	I[4]	E
Rio Hondo (Reach 1)[7]	P*	-	-	I	P	I	-	-	P[4]	E
San Gabriel River (Reach 2)[8]	P*	P	P	I	I	E	E	-	E[4]	E
North Fork Coyote Creek[9]	P*	P	P	-	P	P	E	-	P[4]	I
La Mirada Creek[9]	P*	P	P	-	P	P	E	-	P[4]	I
Coyote Creek	P*	P	P	-	P	P	E	-	P[4]	I
Brea Creek[9]	P*	P	P	-	P	P	E	-	P[4]	I
Fullerton Creek[9]	P*	P	P	-	P	P	E	-	P[4]	I
Carbon Creek	E/P	E/P	-	-	E/P	E/P	E/P	-	E/P	E/P

Source: Los Angeles RWQCB 2024

[1] The MUN designations are designated under State Water Resources Control Board Resolution No. 88-63 and Los Angeles Regional Water Quality Control Board Resolution No. 89-03, some of which may be considered for exemption at a later date.

[2] May have wetlands habitat associated with only a portion of the waterbody.

[3] Los Angeles River (reach 3) extends from riverside drive (upstream) to Figueroa Street (downstream).

[4] Access prohibited by Los Angeles County Flood Control District in the concrete channelized areas.

[5] Los Angeles River (Reach 2) extends from Figueroa Street (upstream) to Carson Street (downstream).

[6] Rio Hondo (Reach 2) extends from the Whittier Narrows Dam (upstream) to the Santa Ana Freeway (downstream).

[7] Rio Hondo (Reach 1) extends from the Santa Ana Freeway (upstream) to the Los Angeles River (downstream).

[8] San Gabriel River (Reach 2) extends from Whittier Narrows Dam (upstream) to Firestone Boulevard (downstream).

[9] Beneficial uses not identified in the Basin Plan; therefore, downstream beneficial uses are identified.

* Asterisked MUN designations are designated under Senate Bill 88-63 and Resolution Number 89-03, some of which may be considered for exemption at a later date.

E = Existing beneficial use; GWR = Groundwater recharge; I = Intermittent beneficial use; IND = Industrial Service Supply; MUN = Municipal and Domestic Supply; P = Potential beneficial use; PROC = Industrial Process Supply; RARE = Rare, threatened, or endangered species; REC-1 = Water contact recreation; REC-2 = Noncontact water recreation; WARM = Warm freshwater habitat; WET = Wetland habitat; WILD = Wildlife habitat

Water Quality Impairments

The SWRCB developed a list of waterbodies (known as 303(d) water-quality-limited waterbodies) that are impaired and do not meet water quality objectives (CWA Section 303(d) specifies the requirements for listing impaired waterbodies). A TMDL is developed for constituents on the CWA Section 303(d) List to restore the quality of the waterbody. The SWRCB develops TMDLs for constituents on the list over several years to restore the quality of the waterbody. As indicated in

the 2022 Integrated Report, five of the waterbodies in the project section are on the Section 303(d) list and require TMDL limits, as summarized in Table 3.8-6.

TMDLs identified for the Los Angeles River also apply to its tributaries, including Rio Hondo, because the tributary is named in the TMDLs. TMDLs identified for the San Gabriel River apply to Coyote Creek and may also apply to its tributaries (and their tributaries) if they cause or contribute to the impairment, including North Fork Coyote Creek, La Mirada Creek, and Brea Creek.

Table 3.8-6 Section 303(d) List of Impaired Waters and Applicable Total Maximum Daily Loads Directly in the Project Section

Waterbody	Impairment	Sources of Impairment	TMDL Date[1] (Expected or Actual)	Applicable TMDL
Los Angeles River (Reaches 2 and 3)	Ammonia	Nonpoint/point source	2004	Los Angeles River Nitrogen TMDL
	Nutrients (algae)	Nonpoint/point source	2004	Los Angeles River Nitrogen TMDL
	Indicator bacteria	Source unknown	2012	Los Angeles River Pathogens TMDL
	Copper	Source unknown	2005	Los Angeles River Metals TMDL
	Lead	Nonpoint/point source	2005	Los Angeles River Metals TMDL
	Oil	Natural Sources	2019	-
	Trash	Nonpoint source/ surface runoff/urban runoff/storm sewers	2008	Los Angeles River Trash TMDL
		Natural sources		
Rio Hondo (Reach 2)	Coliform bacteria	Source unknown	2012	Los Angeles River Pathogens TMDL
	Cyanide	Source unknown	2021	
Rio Hondo (Reach 1)	Indicator bacteria	Source unknown	2012	Los Angeles River Pathogens TMDL
	Copper	Nonpoint/point source	2005	Los Angeles River Metals TMDL
	Lead	Nonpoint/point source	2005	Los Angeles River Metals TMDL
	Toxicity	Source unknown	2021	-
	Zinc	Nonpoint/point sources	2005	Los Angeles River Metals TMDL
	pH	Nonpoint/point sources	2004	Los Angeles River nitrogen TMDL
	Trash	Nonpoint/urban runoff/storm sewers	2008	Los Angeles River Trash TMDL
San Gabriel River (Reach 2)	Temperature	Source unknown	2027	
	Cyanide	Source unknown	2021	San Gabriel River Metals TMDL
	Lead	Nonpoint/point source	2007	
North Fork Coyote Creek	Indicator bacteria	Source unknown	2016	San Gabriel River Coliform TMDL
	Selenium	Source unknown	2021	

Waterbody	Impairment	Sources of Impairment	TMDL Date[1] (Expected or Actual)	Applicable TMDL
Coyote Creek	Dissolved copper	Source unknown	2007	San Gabriel River Metals TMDL
	Indicator bacteria	Source unknown	2016	San Gabriel River Coliform TMDL
	Iron	Source unknown	2027	-
	Malathion	Source Unknown	2027	-
	pH	Source unknown	2019	-
	Toxicity	Source unknown	2008	-

Source: SWRCB 2022b
[1] Date listed in the State Water Resources Control Board 303(d) list. Dates relate to the TMDL requirement status. For additional details, refer to the 303(d) list: www.waterboards.ca.gov/water_issues/programs/tmdl/2014_16state_ir_reports/category5_report.shtml.
TMDL = total maximum daily load

3.8.5.5 Soils and Erosion

Soils along the project section in Los Angeles County have formed on Pleistocene to Holocene sedimentary deposits, including alluvial fans, fan remnants, alluvial plains, floodplains, and coastal plains. Soil textures along the project section include fine sand, fine sandy loam, loamy sand, loam, silt loam, and clay loam. The soils along the project section in Orange County have formed on Pleistocene to Holocene sedimentary deposits associated with alluvial processes. The typical soil associations include fine sandy loam, loamy sand, silt loam, sandy clay loam, and silty, clay loam. In addition, stratified coarse sand to sandy loam has been identified in river channel areas (Authority 2025c).

Erosion and sediment are major contributing factors to water quality degradation associated with construction activities that result in soil disturbance. Generally, sediment is transported by water, with finer particles such as silt more easily suspended by water while larger erodible particles such as sand are often transported as a bedload and the substrate moves slowly downslope. A combination of erosive soil types and steep slopes influence susceptibility to erosion. Certain soil types demonstrate a higher potential for erosion by rainfall and runoff, expressed as “K,” the soil erodibility factor. K is defined as a function of texture, organic matter content and cover, structure size class, and subsoil-saturated hydraulic conductivity. Soils with low erodibility (low K values) include fine-textured soils high in clay, which have a strong adherence between individual particles, as well as coarse-textured soils, which rapidly allow water to infiltrate and reduce surface runoff rates. Medium-textured soils such as silt loams have a moderate potential for erosion because they are susceptible to detachment and produce moderate runoff. Most of the direct RSA in both Los Angeles and Orange Counties is in areas with moderate susceptibility to erosion, with a few areas of low susceptibility. Additional information regarding geology, soil type, and erosion can be found in the *Los Angeles to Anaheim Project Section Geology, Soils, and Seismicity Technical Report* (Authority 2025c).

3.8.5.6 Groundwater

The project section is in two groundwater basins: the Coastal Plain of Los Angeles – Central Subbasin (commonly referred to as the Central Subbasin) and the Coastal Plain of Orange County, as depicted on Figure 3.8-2. The RSAs do not overlay a sole-source aquifer. A summary of existing groundwater quality and groundwater levels is provided below (under the Existing Groundwater Quality and Existing Groundwater Levels discussions), and details on beneficial uses and groundwater quality objectives for groundwater basins in the project section can be found in the *Los Angeles to Anaheim Project Section Hydrology and Water Resources Technical Report* (Authority 2025a).

The Central Subbasin occupies a large portion of the southeastern part of the Coastal Plain of the Los Angeles Groundwater Basin (DWR 2004a). The Central Subbasin is divided into forebay and pressure areas. The Los Angeles forebay and the Montebello forebay have unconfined groundwater conditions and relatively interconnected aquifers to provide recharge to the aquifer system of this subbasin. The Whittier area contains freshwater-bearing sediments. The Central Subbasin pressure area is the largest of the four divisions and contains many aquifers of permeable sands and gravels separated by semipermeable to impermeable sandy clay to clay. Groundwater enters the Central Subbasin through surface and subsurface flow and by direct percolation of precipitation, streamflow, and applied water and replenishes the aquifers in the forebay areas where permeable sediments are exposed at ground surface. Natural replenishment of the subbasin's groundwater supply is largely from surface inflow through Whittier Narrows and some underflow from the San Gabriel Valley. The Coastal Plain of Los Angeles Central Basin is identified by DWR as a very low-priority basin (DWR 2020); therefore, development of a GSP is not required.

The Main Subbasin is the largest subbasin of the Coastal Plain of the Orange County Groundwater Basin. It is within this subbasin that most groundwater production occurs (OCWD 2015). The Main Subbasin, which is divided into upper, middle, and lower aquifer systems, is managed by the Orange County Water District (OCWD 2015). The Orange County Water District subdivided the groundwater basin into three major aquifer systems, known as Shallow, Principal, and Deep, which are hydraulically connected because groundwater flows between them (OCWD 2015). Recharge to the basin is through percolation of Santa Ana River flow, infiltration of precipitation, and injection into groundwater wells. Santa Ana River flow contains natural flow, reclaimed water, and imported water that is spread in the basin forebay. The Coastal Plain of Orange County Basin is designated as a medium-priority basin (DWR 2020). Therefore, the basin must be managed to comply with the Sustainable Groundwater Management Act. In 2017, the Orange County Water District, City of La Habra, and Irvine Ranch Water District submitted the basin into the Sustainable Groundwater Management Act Alternative Plan, with elements included in GSPs incorporated into the Alternative Plan. Table 3.8-7 summarizes the groundwater basin area and area crossed by the project section.

Table 3.8-7 Groundwater Basins in the Project Section

Groundwater Basin	Total Groundwater Basin Area	Groundwater Storage (acre-feet)	Length of Groundwater Basin Crossed (miles)	Area of Groundwater Basin Crossed (acres)
Coastal Plain of Los Angeles, Central Subbasin	177,000	13,800,000	19.99	666.9
Coastal Plain of Orange County, Main Subbasin	224,000	66,000,000	10.67	278.6

Sources: Calculated using ESRI ArcGIS; DWR 2004a, 2004b, 2022; USGS 2012

Existing Groundwater Quality

Groundwater in the Central Basin is degraded by both organic and inorganic pollutants from a variety of sources, such as leaking tanks, leaking sewer lines, and illegal discharges. Migration of pollutants from the upper aquifers threatens the quality of the deeper groundwater (Los Angeles RWQCB 2024). Total dissolved solids content (or all dissolved inorganic and organic substances) in Coastal Plain of Los Angeles Central Basin groundwater ranges from 200 to 2,500 milligrams per liter (mg/L), according to data from 293 public supply wells (DWR 2004a). The average for these 293 wells is 453 mg/L (DWR 2004a).

Dissolved constituents within the Coastal Plain of Orange County, Main Subbasin's groundwaters are primarily sodium-calcium bicarbonate (DWR 2004a) and average 475 mg/L. The average total dissolved solids content of 240 public supply wells is 507 mg/L, with a range of 196 to 1,470 mg/L (DWR 2004a). Groundwater impairments include seawater intrusion near the coast,

colored water from natural organic materials in the lower aquifer system, increasing salinity, high nitrates, and Methyl tert-butyl ether (MTBE) (DWR 2004a). Additional groundwater pollutants are emitted from brake dust from the ongoing operation of petroleum-fueled rail service in the project area.

As discussed in Section 3.8.5.4, Surface Water Quality, brake dust from the ongoing existing operation of petroleum-fueled rail service in the project section is an additional source of groundwater pollution. Once released by a train, the pathway that brake dust follows in the environment and the resulting impacts on groundwater quality can be determined, in part, by the rail profile. Brake dust emitted from trains traveling on an at-grade or embankment profile can be deposited in the ballast material that supports the tracks. In general, the track ballast retains this brake dust; however, runoff can mobilize brake dust in track ballast into earthen drainage ditches that parallel the track alignment and then into a waterbody. This runoff can infiltrate into the ground in the earthen drainage ditches or through the substrate of a waterbody. When the track is on a viaduct, brake dust can be deposited onto the impervious viaduct structure. During a storm event, a storm drainage system can carry the deposited brake dust into a waterbody, where it infiltrates into the ground.

Existing Groundwater Levels

Water levels in the Central Basin vary but were approximately 25 feet below ground surface between 1961 and 1977. Levels have fluctuated by 5 to 10 feet since 1996 (DWR 2004a). Groundwater depths along the alignment could range from the ground surface adjacent to rivers, percolation basins, and drainages to depths of more than 100 feet below ground surface. The depth to groundwater can vary seasonally, based on precipitation, pumping practices, recharge, and irrigation. Groundwater plots from this region indicate that water levels can vary seasonally by as much as 35 feet (CDMG 1997a–c, 1998a–f).

Groundwater depths along the project alignment within the Coastal Plain of Orange County, Main Subbasin could range from the ground surface adjacent to rivers, percolation basins, and drainages to depths of greater than 100 feet below ground surface. The depth to groundwater can vary seasonally, based on precipitation, pumping practices, recharge, and irrigation. Historically, groundwater depths have been as shallow as 10 feet below ground surface along portions of the project footprint, including in the Buena Park to east Fullerton area (CDMG 1997a–c, 1998a–f).

3.8.5.7 Floodplains

FEMA identified SFHAs on FIRMs for all communities that participate in the National Flood Insurance Program, including Los Angeles and Orange Counties and cities in the counties. State and local governments use these FIRMs for administering floodplain management programs, enforcing building codes, and mitigating flooding losses. The 100-year floodplain corresponds to FEMA's SFHAs. The SFHAs consist of the land areas covered by the base flood to which the FEMA floodplain management regulations apply. SFHAs in the direct RSA include Flood Zone A, AE, AH, and AO from the floodplain crossings. There is no FEMA Regulatory Floodway mapped at the crossings. Zone A areas have a 1 percent annual chance of flooding (100-year flood) with no BFE determined. Zone AE areas have a 1 percent annual chance of flooding (100-year flood) with BFE determined. Zone AH areas have a 1 percent annual chance of shallow flooding with BFE determined. Zone AO areas are river or stream flood-hazard areas with a 1 percent annual chance of shallow flooding (100-year flood) with BFE determined. A regulated floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the WSE more than a designated height. More details on floodplains within the direct RSA can be found in the *Los Angeles to Anaheim Project Section Hydrology and Water Resources Technical Report,* Section 5.6 (Authority 2025a).

Table 3.8-8 lists and summarizes the floodplains in the RSA crossed by the project section. Figure 3.8-4 through Figure 3.8-14 depict the SFHA where the direct RSA crosses a floodplain.

Table 3.8-8 Federal Emergency Management Agency Floodplains within the Resource Study Area

Floodplain Name or Floodplain Source	City	FEMA Flood Zone	FIRM	Existing Water Surface Elevation Range (feet)	Existing Bank Elevation Range (feet)	Approximate Length of Floodplain Crossing (feet)[1]	Approximate Area of Floodplain Crossed (acres)[2]
Los Angeles River	Los Angeles	AE	06037C1636F and 06037C1638F	190–210	209–221	0	0
Rio Hondo	Pico Rivera	A	06037C1830F	157–163	161–169	192	0.02
San Gabriel River	Pico Rivera	AE	06037C1829F	136–137	145–147	334	0.58
Lakeland Rd Storm Drain	Santa Fe Springs	AE/AH	06037C1841F	N/A	N/A	264	0
North Fork Coyote Creek	Santa Fe Springs	AE	06037C1841F and 06037C1843F	78–89	82–93	116	0.02
Brea Creek	Buena Park	AO	06059C0038J	72–77	77–80	515	0
Lakeside Dr Storm Drain	Buena Park	AE	06059C0038J and 06059C126J	N/A	N/A	2,323	2.12
Fullerton Creek	Fullerton	AO	06059C0131J	N/A	N/A	307	0
Gilbert St and Artesia Ave Storm Drain	Fullerton	AO	06059C0127J	N/A	N/A	209	1.06
Lawrence Ave	Fullerton	AO	06059C0131J	N/A	N/A	268	0
Yale Ave	Fullerton	AO	06059C0131J	N/A	N/A	252	0
Balcom Ave Storm Drain	Fullerton	AO	06059C0131J	N/A	N/A	365	0
Carbon Creek	Anaheim	A/AO	06059C0131J	155–167	147–160	729	0
Southeast Anaheim Channel	Anaheim	AH	06059C0142J	N/A	N/A	96	0

Sources: FEMA 2023; Authority 2024a

[1] Crossing lengths estimated using GIS, based on FEMA FIRMs and the alignment centerline, which may be elevated and outside the floodplain. Shared Passenger Track Alternative A and Shared Passenger Track Alternative B have the same length of floodplain crossed.

[2] Area of floodplain crossed estimated using GIS, based on FEMA FIRMs and the temporary level of disturbance, resulting in temporary impacts. Shared Passenger Track Alternative A and Shared Passenger Track Alternative B have the same area of temporary floodplain impacts.

FEMA = Federal Emergency Management Agency; FIRM = Flood Insurance Rate Map; GIS = geographic information system; N/A = not applicable; RSA = resource study area

Seismically Induced Flooding

The primary risk of dam failure is related to seismic hazards. Two types of primary seismic hazards are present in the RSA: surface fault ruptures and ground shaking. If strong ground shaking occurred—from either nearby or distant earthquakes, depending on the combination of earthquake magnitude and distance from the project footprint—a number of secondary seismic hazards may result, including flooding from induced dam failure. Seismically induced flood hazards include the potential for inundation or erosion from flood waters associated with the breach of a dam. Dam inundation maps represent a theoretical failure of the entire dam and represent a worse-case inundation area. A review of dam inundation maps and risk assessments in Los Angeles and Orange Counties indicates that the project section would cross the inundation area of seven dams: Hansen Dam, Garvey Reservoir, Whittier Narrows Dam, Brea Dam, Fullerton Dam, Carbon Canyon Dam, and Prado Dam. Dams in the RSA are depicted on Figure 3.9-5 in Section 3.9.

Tsunami and Seiche Hazards

Tsunamis are a series of large wavelength waves in a waterbody caused by a sudden large displacement of water. They are commonly generated by large-magnitude, offshore earthquakes or submarine landslides. The waves are of a very long period, such that there is a retreat of water away from the coastline followed by a subsequent surge of water along low-lying coastal areas. Tsunami inundation maps for California cover most areas along the state's coastline. The inundation areas depicted on the maps represent the maximum inland extent of an extreme, yet realistic, tsunami. The nearest portion of the RSA to the coast is the southern portion of the project section, which is approximately 10 miles from the coast. As such, the Shared Passenger Track Alternatives would not occur within or near the mapped tsunami inundation areas of Southern California. Seiche occurs in an enclosed or partially enclosed body of water, such as a lake or reservoir. Although large flood control reservoirs are upgradient of the project footprint, the risk of inundation from seiches is low because of the distance of the closest reservoirs to the project alignment (16 miles) and typical low water levels in the reservoirs.

3.8.6 Environmental Consequences

3.8.6.1 Overview

This section discusses the potential impacts on hydrology and water quality from construction and operation of the project alternatives and station options. For this resource topic, any differences in the impacts for the HSR station options are described in the analysis.

The project design includes several features (IAMFs) to allow continued use of the facilities with minimal disruption from HSR construction and operation. Refer to Section 3.8.4.2, Impact Avoidance and Minimization Features, for a summary of the IAMFs relevant to hydrology and water resources, and Volume 2, Appendix 2-A, for detailed description of all IAMFs. For instance, the Shared Passenger Track Alternatives incorporate preparation of a stormwater management and treatment plan to manage on-site and off-site runoff (**HYD-IAMF#1**), preparation of a flood protection plan to minimize development in floodplains and impacts in the 100-year floodplain (**HYD-IAMF#2**), and preparation and implementation of a SWPPP to minimize short-term increases in sediment transport and runoff (**HYD-IAMF#3**). The project will also appropriately dispose of construction spoils and waste (**BIO-IAMF#9**), implement standard construction site housekeeping practices (**BIO-IAMF#11**), and incorporate a spill prevention, control, and countermeasure plan (**HMW-IAMF#6**) to prevent hazardous material releases.

The IAMFs differ from mitigation measures in that they are part of the project design. In contrast, proscribed mitigation measures are implemented to further reduce, compensate for, or offset project impacts that the analysis identifies under NEPA or concludes are significant under CEQA.

The impacts of the Shared Passenger Track Alternatives are described and organized as follows.

Construction Impacts

- Impact HWR-1: Temporary Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Construction
- Impact HWR-2: Permanent Construction Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology)
- Impact HWR-3: Temporary Impacts on Surface Water Quality During Construction
- Impact HWR-4: Permanent Impacts on Surface Water Quality During Construction
- Impact HWR-5: Temporary Impacts on Groundwater Volume, Quality, and Recharge During Construction
- Impact HWR-6: Permanent Impacts on Groundwater Volume, Quality, and Recharge During Construction
- Impact HWR-7: Temporary Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction
- Impact HWR-8: Permanent Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction

Operational Impacts

- Impact HWR-9: Permanent Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Operations
- Impact HWR-10: Permanent Impacts on Surface Water Quality During Operations
- Impact HWR-11: Permanent Impacts on Groundwater Volume, Quality, and Recharge During Operations
- Impact HWR-12: Permanent Impacts on Floodplains During Operations
- Impact HWR-13: Temporary Impacts from Risk of Release of Pollutants from Inundation During Operations

3.8.6.2 No Project Alternative

Under the No Project Alternative, recent development trends in the project section and associated increased traffic and vehicle use are anticipated to continue. Planned residential, industrial, commercial, and transportation projects could result in new impervious surfaces in the direct RSA and would result in associated direct and indirect impacts on hydrology and water resources. These impervious surfaces could increase the total volume of runoff generated during storm events, increase the risk of release of pollutants caused by flooding in receiving waterbodies, and potentially result in erosion or sedimentation in receiving waterbodies. The impervious surfaces associated with these developments could accumulate contaminants during the summer (low-precipitation periods). In the winter, these contaminants could be discharged to a waterbody as runoff during storms, contributing to increased pollutant loads in the surface water RSA. Traffic congestion is likely to worsen, which could result in associated hydrology and water quality impacts. Planned developments, included in Section 3.19, would be required to comply with existing laws and regulations that protect surface water hydrology, which would include, but not be limited to, various state and federal permits. Projects would comply with the appropriate water quality objectives for the region and would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Development trends are likely to continue and could affect groundwater quantity as well, because the demand for drinking water would increase as the population grows. Drinking water in the RSA is partly supplied by aquifers within the RSA. Therefore, as the population increases groundwater pumping in the RSA could increase to supply local demand. Land use change under the No Project Alternative could result in indirect impacts on groundwater quality. Planned residential and

highway development could result in the expansion of impervious surfaces, including residential roads, roofs on structures, widened roads, and extended roads, which could reduce groundwater recharge area and capacity. These trends of increased population growth and land use change, as well as additional impervious surface areas from planned development, under the No Project Alternative could affect groundwater in the RSA. Planned development would be required to comply with existing laws and regulations, and coordinate or consult with agencies that protect groundwater resources.

Impacts including temporary changes to drainage patterns, stormwater runoff volumes, runoff quality, and hydraulic capacity caused by ground-disturbing activities, could persist from other current and planned development. These trends are likely to continue and could affect hydrology and water resource in the RSA.

Planned development and transportation projects that would occur under the No Project Alternative would likely include mitigation to address impacts on surface water hydrology, water quality, floodplains, and groundwater resources. It is assumed that the development under the No Project Alternative would be evaluated to determine the significance of impacts and mitigation measures would be developed, as needed, to avoid or reduce significant impacts. It would be the affected jurisdictions' responsibility to ensure compliance with established regulations. As such, the other transportation, development, and planned projects under the No Project Alternative would undergo environmental review, and effects on hydrology and water resources would be analyzed and mitigated.

3.8.6.3 Project Impacts

Construction and operations of the Shared Passenger Track Alternatives could result in temporary and permanent impacts on hydrology and water resources. There could be impacts on surface water hydrology, water quality, groundwater, and floodplains.

Construction of the Shared Passenger Track Alternatives would involve demolition of existing structures; clearing and grubbing; reduction of permeable surface area; handling, storing, hauling, excavating, and placing fill; possible pile driving; and construction of aerial structures, bridges, road modifications, utility upgrades and relocations, power pole installation, HSR electrical systems, and railbeds and rail yards. Operation of the Shared Passenger Track Alternatives would include operation of trains; LMF activities including operation, storage, daily inspections, and predeparture cleaning and testing; and inspection and maintenance along the track and railroad right-of-way, as well as on the structures, fencing, power system, train control, electric interconnection facilities, and communications. Construction and operations and maintenance are described in Chapter 2, Alternatives.

The Shared Passenger Track Alternatives could affect hydrology and water resources. The Authority has incorporated IAMFs into the project design that would reduce effects on these resources (refer to Appendix 2-A). IAMFs relevant to hydrology and water resources are described in Section 3.8.4.2.

The following sections describe each construction and operational impact for the Shared Passenger Track Alternatives and the HSR station options.

Construction Impacts

Impact HWR-1: Temporary Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Construction

Shared Passenger Track Alternative A

Construction of the Shared Passenger Track Alternatives would create temporary impacts from demolition, grading, temporary stream diversions, and construction staging areas, and require the use of temporary drainage systems during construction, which could temporarily alter existing drainage patterns and stormwater runoff on and off site. Such ground disturbance during construction could alter drainage patterns, resulting in redirection of stormwater runoff, changes in runoff volumes and rates, and diversion of stream flow. These effects would be prominent in the winter during heavy, lengthy, or repeated rain events when the ground becomes saturated

and excess rainfall becomes runoff. These changes in stormwater runoff during construction could also result in increased pollutant loads in stormwater runoff and on- or off-site flooding. Although grading, staging areas, and temporary drainage systems could alter existing drainage patterns and stormwater runoff dynamics, temporary drainage systems would be used to convey potentially erosive run-on away from disturbed soil and work areas and prevent discharging sediment-laden runoff to receiving waters during construction.

Shared Passenger Track Alternative A would cross 11 water features: Los Angeles River, Hobart Channel, Rio Hondo, San Gabriel River, North Fork Coyote Creek, La Mirada Creek, Coyote Creek, Brea Creek, Balcom Avenue Storm Drain, Fullerton Creek, and Carbon Creek. Shared Passenger Track Alternative A would temporarily disturb up to approximately 891 acres of land. Disturbed soil areas and construction activities would be associated with the proposed track improvements, Commerce and Buena Park Metrolink Station relocations, modifications at the Norwalk/Santa Fe Springs Metrolink Station and Fullerton Metrolink/Amtrak Station, and Anaheim Regional Transportation Intermodal Center (ARTIC) station improvements; 14 floodplain crossings; five grade separations at Pioneer Boulevard, Norwalk Boulevard, Los Nietos Road, Cerritos Avenue, and State College Boulevard; and the 26th Street LMF. The 26th Street LMF would be built on a developed, industrial site. These improvements could result in increased polluted stormwater runoff from the demolition and excavation activities, staging areas, and the use of temporary drainage systems during construction, which could alter existing drainage patterns and stormwater runoff.

Shared Passenger Track Alternative A improvements could redirect and increase the volume and rate of shallow overland flows, increasing the potential for erosion and siltation in areas of exposed soils. Soil's potential to erode is dependent on a number of factors, including the type of soil, the topography, and the amount and type of precipitation. Because the project area lacks soils that are highly erodible and the topography is generally flat, minimal effects on erosion are anticipated.

Because some of the water crossings are intermittent streams, and not continuously flowing, construction would be scheduled in the dry season such that changes in drainage patterns from construction may not affect all waterbodies. For water crossings with flowing water during construction, construction could alter existing drainage patterns and stormwater runoff. Construction activities could redirect and increase the volume and rate of shallow overland flows, increasing the potential for erosion and siltation in areas of exposed soils and along channel banks. It may be necessary in some instances to temporarily divert low-flow surface water into a storm drain or around the work area for work within drainage channels. For example, it may be necessary to divert surface water into a storm drain for work within the Los Angeles River. Temporary drainage systems used for construction of Shared Passenger Track Alternative A could result in temporary effects on the rate of flow of receiving waters. This potential effect would be a result of increasing the connectivity of a watershed with pipes and conduits. These effects would be temporary and limited to the construction phase.

The Authority will prepare a SWPPP (as detailed in **HYD-IAMF#3**) and construction BMPs (as detailed in **BIO-IAMF#11**) to avoid or minimize increased rates and volumes of flows. Temporary BMPs, such as velocity-dissipation devices like check dams and outfall protection and detention, retention, or infiltration facilities, would be incorporated into the temporary drainage design plans as necessary to minimize temporary hydromodification effects during construction. A Qualified SWPPP Developer will prepare the SWPPP, which would include temporary drainage design plans and would identify stormwater BMPs to minimize effects on hydrology. Implementation of the SWPPP and stormwater BMPs would ensure that construction activities would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. Furthermore, the effectiveness of construction BMPs would be monitored before, during, and after storm events. Prior to construction, the Authority would notify the California Department of Fish and Wildlife and other relevant agencies of planned alterations of channels, if any, pursuant to Sections 1601 through 1603 of the California Fish and Game Code (California Department of Fish and Game 2009). Per CWA and Section 1600 requirements, in-stream

construction activities during flows would require dewatering in the areas of construction to avoid and minimize potential impacts on on- and off-site flows.

Shared Passenger Track Alternative B

Temporary impacts on drainage patterns, stormwater runoff, and hydraulic capacity would be similar to those of Shared Passenger Track Alternative A, with the exception of the area of temporary disturbance. Up to approximately 939 acres of land would be disturbed, representing a larger footprint of similar types of impacts compared to Shared Passenger Track Alternative A. The increase in disturbed area is associated with the proposed 15th Street LMF, which would be on a larger area (63.1 acres) than the 26th Street LMF (54 acres) proposed for Shared Passenger Track Alternative A. In addition, construction of the 15th Street LMF would require deeper excavation depths than construction of the 26th Street LMF. Greater excavation depths would result in increased soil disturbance. The Authority will comply with the CGP and prepare a SWPPP for construction activities (as required by **HYD-IAMF#3**), which will include construction BMPs to manage the overall amount of stormwater runoff generated from the construction soil disturbance areas. The Authority will also apply construction BMPs (as detailed in **BIO-IAMF#11**), which require implementation of standard construction sites housekeeping practices. Incorporation of **HYD-IAMF#3** and **BIO-IAMF#11** will avoid or minimize the potential for on- and off-site temporary surface water hydrology impacts, as stated above.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, and there would be no difference in the area of temporary disturbance. The Authority will apply a SWPPP (**HYD-IAMF#3**) and construction BMPs (**BIO-IAMF#11**) to avoid or minimize erosion and sedimentation from increased rates and volumes of flows. The project incorporates **HYD-IAMF#3** and **BIO-IAMF#11** to avoid or minimize the potential for temporary surface water hydrology impacts, as stated above.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than the area that would be disturbed under the Shared Passenger Track Alternatives. The additional area of temporary disturbance for construction of the HSR station elements would be up to 10 more acres. The project incorporates **HYD-IAMF#3** and **BIO-IAMF#11** to avoid or minimize the potential for temporary surface water hydrology impacts, as stated above.

CEQA Conclusion

The temporary impacts on drainage patterns, stormwater runoff, and hydraulic capacity would redirect stormwater runoff, alter runoff volumes and rates, and divert stream flow. With incorporation of **HYD-IAMF#3** and **BIO-IAMF#11**, temporary impacts on drainage patterns, stormwater runoff, and hydraulic capacity associated with construction of the Shared Passenger Track Alternatives will be less than significant under CEQA because temporary drainage features and stormwater management BMPs will be applied during construction. These IAMFs will minimize the impacts of changes to existing drainage patterns in a manner that could result in substantial erosion or siltation, substantially increase the rate or amount of surface runoff in a manner that will result in flooding on or off site, create or contribute runoff water that will exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or impede or redirect floodflows. Therefore, CEQA does not require mitigation.

Impact HWR-2: Permanent Construction Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology)

Shared Passenger Track Alternative A

Construction of Shared Passenger Track Alternative A would result in alteration of the existing localized drainage patterns from development of the project elements, including the proposed track improvements, a new crossing of the Los Angeles River floodplain, the proposed LMF, roads, and communication and electrical infrastructure. However, overall on- and off-site drainage patterns including stormwater infrastructure would remain similar to existing conditions. The project would require 11 water feature crossings, including the alteration of engineered channels, rivers, and culverts. Crossings and the structure type are summarized in Table 3.8-4. Modifications include modifying existing bridges and building new bridges and box culvert extensions. The modifications could result in permanent effects on drainage patterns, hydraulic capacity, and stormwater runoff during construction. Because no modifications are anticipated at Fullerton Creek and Southeast Anaheim Channel is enclosed and buried within the right-of-way, no permanent effects on drainage patterns, hydraulic capacity, and stormwater runoff during construction are expected.

The project would replace or create new impervious surfaces that would require new or modified drainage systems to prevent flooding and standing water during and after storm events. Impervious surfaces would be associated with the proposed track improvements, new track, Metrolink station relocations, modifications at the Norwalk/Santa Fe Springs Metrolink Station and Fullerton Metrolink/Amtrak Station, proposed HSR station platform and facilities at ARTIC, the LMF, 14 floodplain crossings, and five grade separations. Existing impervious surfaces within the project footprint cover approximately 76 percent. Impervious surfaces resulting from construction of Shared Passenger Track Alternative A would cover 83 percent of the area within the project footprint. There would be an increase of approximately 7 percent in impervious surface area, or 53 acres (refer to Table 3.8-9) (Authority 2024b). Introducing new impervious surfaces where they currently do not exist would increase the rate and amount of stormwater runoff and could cause erosion in areas adjacent to the new impervious surfaces and in new or existing drainage channels.

Table 3.8-9 Proposed Impervious Surface Area Changes within the Shared Passenger Track Alternative A Footprint

Surface Area Type	Existing Acres (%)	Proposed Acres (%)	Change Acres (%)
Impervious surface area	552.3 (76%)	605.4 (83%)	53.1 (7%)
Pervious surface area	178.7 (24%)	125.6 (17%)	53.1 (-7%)
Total	**731.0 (100%)**	**731.0 (100%)**	**0**

Source: Authority 2024b

Shared Passenger Track Alternative A would be built within an existing railroad corridor and existing tracks would be shifted to accommodate the new tracks.

Certain infrastructure may require modifying topography in specific areas for the track and roadway crossings, including roadway embankments for overcrossings, roadway underpasses, at-grade tracks, and bridge and viaduct approaches. Introducing new topographical features (i.e., new drainage systems) to a landscape could result in new topographical depressions or elevations that result in permanent, localized effects on existing drainage patterns. The Authority will comply with the CGP and apply a SWPPP for construction activities (as required by **HYD-IAMF#3**), which will include construction BMPs to manage the overall amount of stormwater runoff generated from the construction soil disturbance areas.

Shared Passenger Track Alternative A would include development of the 26th Street LMF in an existing developed location. The majority of the proposed improvements to the LMF would occur in areas that already include impervious surfaces. However, the LMF would result in permanent

changes in drainage patterns compared to existing conditions. Improvements at the LMF would trigger MS4 permit drainage requirements because the LMF site would involve at least 5,000 square feet of new and redeveloped (existing) impervious areas.

Stormwater management and treatment measures are required for the net impervious area, which includes both new and replaced (or reworked) impervious surface areas. Replaced impervious surfaces would be associated with the Commerce and Buena Park Metrolink Station relocations, and ARTIC improvements. Construction of new impervious surfaces would capture additional runoff volumes and associated pollutants. As a result, runoff volumes and rates conveyed to storm drains would increase or provide additional sources of polluted runoff, unless stormwater management and treatment measures are implemented in compliance with the applicable MS4 permit. For project improvements within Caltrans rights-of-way, the Authority would comply with the Caltrans MS4 stormwater permit requirements. To offset on- and off-site hydrology effects associated with new impervious surfaces, the project design will include permanent BMPs required by the applicable CWA Section 402 NPDES MS4 permits, in order to avoid permanent hydromodification effects consistent with **HYD-IAMF#1**.

HYD-IAMF#1 will reduce effects on hydrology and water resources by requiring the preparation of an SWMTP for areas of newly acquired right-of-way. This IAMF is applicable to portions of the newly acquired and existing right-of-way that do not currently have stormwater treatment. Application of the SWMTP will reduce stormwater management effects by evaluating each receiving stormwater system's capacity to accommodate project runoff and identifying stormwater management BMPs designed to capture runoff and provide treatment prior to discharge from pollutant-generating surfaces. Such surfaces include access roads, new road over- and underpasses, reconstructed interchanges, and modified roads and highways. Biofiltration and bioretention systems, organic mulch layers, planted soil beds, vegetated systems (biofilters), vegetated swales, and grass filter strips will be used where appropriate to increase/improve infiltration and provide treatment of stormwater. Stormwater infiltration or detention facilities for areas of newly acquired right-of-way will be built in compliance with the Authority's or local agency's MS4 permit design standard. Existing drainage patterns during large storm events would be evaluated to identify configurations that would mimic existing drainage patterns. Temporary drainage systems would also be used to convey potentially erosive run-on away from disturbed soil and work areas and to prevent discharging sediment-laden runoff to receiving waters during construction. As a result, stormwater runoff would be managed and permanent impacts on drainage patterns and hydraulic capacity would be minimized or avoided.
Table 3.8-10 presents the size of proposed drainage basins, such as detention or infiltration basins (treatment BMPs), in the direct RSA. The combined basin sizes would be 57.18 acres in the project section; this area would support permanent BMPs identified by **HYD-IAMF#1** to reduce effects from stormwater runoff from new impervious surfaces. The proposed basin design has the capacity to accommodate a 50-year flood event. Proposed drainage basins are depicted on Figure 3.8-2.

Table 3.8-10 Proposed Drainage Basins/Facilities in the Project Section

City Where Basin Occurs	Basin Size (acres)
Los Angeles	3.16
Vernon	14.43
Commerce	6.48
Pico Rivera	1.01
Santa Fe Springs	14.36
Norwalk	0.001
La Miranda	1.62

City Where Basin Occurs	Basin Size (acres)
Buena Park	1.43
Fullerton	11.53
Anaheim	3.16
Total	**57.18**

Source: Authority 2025d

Shared Passenger Track Alternative A would include one section between Dale Street and Gilbert Street in Fullerton adjacent to the Fullerton Municipal Airport that includes a short below-grade section (approximately 0.9 mile long). Soils would be excavated and hauled off site. Drainage within this area along the tracks would be pumped out of the below-grade section and discharged to a proposed detention basin before flows are conveyed to a local existing storm drain.

Shared Passenger Track Alternative A would also affect Hobart Channel, La Mirada Creek, and Coyote Creek. The maximum change in WSE at Hobart Creek would be 0.03 foot, which would not exceed the channel walls and is below federal and state action levels related to changes in water surface elevation. The existing bank elevation is 176.97 feet, and the proposed WSE is 173.21 feet; therefore, there is sufficient freeboard to meet both Authority and local freeboard requirements at Hobart Creek to accommodate this rise in WSE. Proposed improvements include modifying the existing open channel upstream and downstream of the existing culvert. A double 10-foot-wide by 4-foot-high reinforced concrete box is proposed 170 feet upstream and 70 feet downstream of the existing culvert on the Hobart Channel. Proposed improvements would match the existing level of protection and would not cause conditions in the area to be worse than existing conditions. The maximum increase in WSE from construction of the bridge modification over La Mirada Creek would be 0.01 foot. The existing bank elevation is 91.96 feet, and the existing WSE is 93.72 feet.[2] The proposed WSE would be 93.73 feet, which is only slightly (0.01 foot) higher than existing conditions. The existing WSE within La Mirada Creek would be maintained following implementation of infrastructure improvements and IAMFs (**HYD-IAMF#2**) proposed to support the project. The WSE near the bridge hydraulically jumps (approximately 4 feet) because of a surface transition from concrete to natural bottom (Authority 2024c). An existing conditions model developed for La Mirada Creek based on available topographic and hydrologic/hydraulic data and the data presented in the as-builts assessed changes to the channel hydraulics rather than the potential for flooding to occur (Authority 2024c). If flows exceed the channel banks and result in localized flooding, the impact of a 0.01-foot rise from project construction would result in a negligible increase in the volume of water and would not result in substantial flooding or provide substantial additional sources of polluted runoff.

The maximum increase in WSE from construction of the proposed box culvert extension over Coyote Creek would be 0.14 foot. The existing bank elevation is 81.37 feet, and the proposed WSE would be 78.23 feet; therefore, there is sufficient freeboard at Coyote Creek to accommodate this rise in WSE.

Shared Passenger Track Alternative A would also result in no permanent impacts on drainage patterns and hydraulic capacity for Fullerton Creek because the existing box culvert at the Fullerton Creek crossing would remain as is without structural modifications (Authority 2024c). The railroad tracks would be reconfigured, while the structure would remain the same (Authority

[2] Although it appears as if the water surface elevation is exceeding the channel banks, this may not be the case. The elevations along the banks and at the crossings have changed since the original as-builts were prepared in 1958. The model uses the data presented in the as-builts for the purpose of assessing changes to the channel hydraulics rather than the potential for flooding to occur.

2024a). The water crossings associated with floodplain impacts are described in more detail under Impact HWR-8.

HYD-IAMF#2 establishes design standards that minimize the effects of waterbody crossing structures on surface water hydrology. A Flood Protection Plan as noted in **HYD-IAMF#2** will include measures that minimize development in floodplains and prevent 100-year WSEs from increasing by more than 1 foot, such as optimizing bridge designs, installing equalizer pipes in embankment sections, and balancing cut and fill in floodplains. These design standards include provisions to design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length; orient piers to be parallel to the flow direction to minimize flow disturbance; provide adequate clearance for floating debris; analyze potential scour depths to evaluate the depth for burying the bridge piers and abutments; apply scour-control measures to reduce erosion potential; use natural materials like rock stabilized with riparian plantings for erosion control along rivers and streams; and place bedding materials under the riprap erosion protection at locations where the underlying soils require stabilization as a result of streamflow velocity. The design standards required by **HYD-IAMF#2** will minimize effects on hydraulic capacity and surface water connectivity at each waterbody crossing through design optimization.

Shared Passenger Track Alternative B

Permanent impacts on drainage patterns, stormwater runoff, and hydraulic capacity for Shared Passenger Track Alternative B would be similar to those of Shared Passenger Track Alternative A. Existing impervious surfaces within the project footprint cover approximately 75 percent, and the impervious surfaces resulting from construction of Shared Passenger Track Alternative B would cover 83 percent (649.5 acres) of the area within the project footprint. There would be an increase of approximately 8 percent in impervious surface area, or 61.5 acres (refer to Table 3.8-11). However, the proposed impervious surface area would represent a greater area of impervious cover and extent of impacts than Shared Passenger Track Alternative A (605.4 acres), although the types of impacts would be similar. Shared Passenger Track Alternative B would include development of the 15th Street LMF in an existing developed location, in areas that already include predominantly impervious surfaces. The LMF would result in permanent changes in drainage patterns compared to existing conditions. However, improvements at the LMF would trigger MS4 permit drainage requirements because the LMF site would involve at least 5,000 square feet of new and redeveloped (existing) impervious areas. The project includes design measures to not impede floodflows (as detailed in **HYD-IAMF#2**) and to accommodate project runoff (as detailed in **HYD-IAMF#1** and **HYD-IAMF#3**), which will avoid or minimize the potential for permanent on- or off-site surface water hydrology impacts, as stated above.

Table 3.8-11 Proposed Impervious Surface Area Changes within the Shared Passenger Track Alternative B Footprint

Surface Area Type	Existing Acres (%)	Proposed Acres (%)	Change Acres (%)
Impervious surface area	588.0 (75%)	649.5 (83%)	61.5 (8%)
Pervious surface area	191.4 (25%)	129.9 (17%)	-61.5 (-8%)
Total	**779.4 (100%)**	**779.4 (100%)**	**0**

Source: Authority 2024d

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, and would have the same change of impervious areas. Application of a SWPPP (**HYD-IAMF#3**) will reduce effects from construction site stormwater runoff. Application of an SWMTP (**HYD-IAMF#1**) will reduce effects from stormwater runoff from new

impervious surfaces. **HYD-IAMF#1** will avoid or minimize the potential for permanent surface water hydrology impacts, as stated above.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than what would be modified under Shared Passenger Track Alternative A, with up to 10 more acres of disturbance and 8.9 acres of additional impervious surface cover. Application of a SWPPP (**HYD-IAMF#3**) will reduce effects from construction site stormwater runoff. Application of an SWMTP (**HYD-IAMF#1**) will reduce stormwater management effects, identify stormwater management BMPs designed to capture runoff, and provide treatment prior to discharge from pollutant-generating surfaces. **HYD-IAMF#1** will avoid or minimize the potential for permanent surface water hydrology impacts, as stated above.

CEQA Conclusion

Permanent impacts on surface water hydrology during construction would be less than significant under CEQA through application of an SWMTP (**HYD-IAMF#1**), SWPPP (**HYD-IAMF#3**), and a flood protection plan (**HYD-IAMF#2**) included as part of project design measures. The SWMTP will evaluate the capacity of receiving stormwater drainage systems to determine the improvements required to maintain existing drainage capacity. The plan will specify BMPs, including retention or detention, or upgrades to the receiving drainage system, to manage potentially increased flow volumes and velocities resulting from new and reconstructed impervious surfaces and avoid erosion and sedimentation in receiving waterbodies. Furthermore, a Flood Protection Plan will include measures that minimize development in floodplains, prevent impedance or redirection of floodflows, and prevent 100-year WSEs from increasing by more than 1 foot, such as optimizing bridge designs, installing equalizer pipes in embankment sections, and balancing cut and fill in floodplains (**HYD-IAMF#2**). Minimizing increases in 100-year flood elevations would reduce the potential for pollutant release. The project would not substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion or siltation, surface runoff that would result in flooding or exceed the capacity of stormwater drainage systems, provide substantial additional sources of polluted runoff, or impede or redirect floodflows. Therefore, CEQA does not require mitigation.

Impact HWR-3: Temporary Impacts on Surface Water Quality During Construction

Shared Passenger Track Alternative A

The Authority uses two different measurements to identify the potential of a project to degrade surface water quality: the total area of disturbance caused by construction activities and the number of waterway crossings (i.e., channel crossings) that may require construction within the water channel itself. The waterbodies potentially affected by the project are subject to degradation from stormwater runoff and pollutants that are discharged from various land use activities, including transportation sources, such as railroads, streets, and highways.

Shared Passenger Track Alternative A would temporarily disturb up to approximately 891 acres of land. The project would result in 14 floodplain crossings and 11 surface water crossings. Soil-disturbing activity during construction (i.e., excavation and grading) can lead to erosion and sedimentation resulting from the exposure of bare soils to stormwater. Bare soils are more likely to erode than vegetated areas that can provide infiltration and retention. Surface water quality could be affected by water contaminants generated or inadvertently released during construction (e.g., bacteria from portable toilets and trash; metals from construction equipment; nutrients from vegetation; sediments, fuel, and oil from construction equipment and storage; concrete wastes, which may impair pH levels). In addition to potential pollutant contributions from disturbed areas, the delivery, handling, and storage of construction materials and wastes, as well as the use of construction equipment, could introduce a risk for stormwater contamination that could affect water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination. Some hydrocarbon compound pollution associated with oil and grease can be toxic to aquatic organisms at low concentrations. Staging areas or building sites can also be the

source of pollution because of the use and temporary storage of paints, solvents, cleaning agents, and metals during construction. Materials from the demolition of existing structures and soil excavation could contain hazardous materials that could be exposed to stormwater. Larger pollutants, such as trash, debris, and organic matter, are also associated with construction activities. Furthermore, concrete, for structures and footings, and other paving materials would be used. These materials could be sources of water quality pollution if they were spilled or deposited on unprotected surfaces. Other potential effects include health hazards and aquatic ecosystem damage associated with the introduction of bacteria, viruses, and vectors if waste management and good housekeeping strategies such as sanitary/septic waste and liquid waste management including appropriate installation, maintenance, and disposal are not adequately carried out.

To avoid or minimize the potential for these impacts, Shared Passenger Track Alternative A would comply with the CGP and incorporate erosion and sedimentation controls to stabilize disturbed soils and prevent sediments from entering nearby storm drains and waterbodies as detailed in **HYD-IAMF#3**. Additional good housekeeping BMPs (which include proper handling and managing of construction materials) will also be incorporated, along with plans regarding spill prevention and response, to prevent discharge of trash, hazardous materials, general construction site cleanliness measures, or discharge of other materials to waters (as detailed in **BIO-IAMF#11**). The Authority or its designated contractor entity will also apply Environmental Management System and hazardous materials monitoring plans to limit the potential for spills and establish cleanup protocols and trained personnel to prevent accidental spills of hazardous materials (as specified in **HMW-IAMF#9** and **HMW-IAMF#10**) during construction. Waste management and materials pollution controls (as detailed in **BIO-IAMF#9** and **HMW-IAMF#7**) will also be included to ensure construction debris, spoils, and hazardous waste are properly disposed of on a daily basis and proper transport of materials to minimize effects on water quality. A SWPPP would be prepared and would include BMPs, such as coffer dams to temporarily divert flows during in-channel work. To minimize or avoid erosion and sedimentation, methods will be applied for controlling water and wind erosion of soils per **HYD-IAMF#3** and **GEO-IAMF#1D**, to prevent sediments from entering nearby storm drains and waterbodies**.** In addition, **HYD-IAMF#3** requires construction activities that involve in-water work to be limited, where feasible, to dry periods when flows in waterbodies are low or absent. BMPs to prevent hazardous material releases and ensure cleanup of hazardous material releases will be required (**HMW-IAMF#6**). Furthermore, compliance with permit conditions (as required by **HMW-IAMF#8**) requires appropriate transport and storage of hazardous materials during construction. Construction will also include measures to minimize impacts on surface water resources and address necessary cleanup or disposal of contaminants (e.g., previously contaminated soil or other materials), pursuant to **HMW-IAMF#3** and **HMW-IAMF#4**.

Shared Passenger Track Alternative A would require work in the Hobart Channel, Rio Hondo, San Gabriel River, North Fork Coyote Creek, La Mirada Creek, Coyote Creek, and Brea Creek, which may require in-water work for the construction of supporting piers or culvert modifications. Section 303(d) listed waterbodies in the project section are summarized in Table 3.8-6. Construction activities including operation of equipment and use of common construction materials have the potential to contribute pollutants that may exacerbate Section 303(d) impairments in listed waterbodies. Water crossings are particularly vulnerable to degraded water quality because construction would occur in the stream channel, and contaminants would have a direct path to surface water. Potential temporary water quality impacts may result during construction activities such as soil disturbance, use of heavy equipment resulting in the discharge of pollutants, or sediment-laden runoff to receiving waters. Although not quantifiable, potential water quality impacts include increased pollutants such as metals (i.e., copper, lead, and zinc), oils, siltation, turbidity, or alterations in pH. Bridge supports in areas of high groundwater or in surface water would require excavation in the stream channel and may require dewatering of the project area directly in the channel and from shallow groundwaters. To the extent that construction occurs in a stream channel with flowing water, there could be an increase in silt or sediment along with other construction-related contaminants in the creeks during construction.

Because construction associated with Shared Passenger Track Alternative A includes **HYD-IAMF#3**, the introduction of substantial quantities of pollutants, including pollutants that will increase existing CWA 303(d)-listed impairments, degrade beneficial uses, or exceed water quality criteria, is not anticipated. To avoid or minimize the potential for water quality impacts, the Authority will prepare and implement a SWPPP (**HYD-IAMF#3**). Implementation of the SWPPP and stormwater BMPs would ensure short-term increases in polluted runoff are minimized during construction activities. Shared Passenger Track Alternative A would comply with the CGP and incorporate stormwater and erosion controls to stabilize disturbed soils and prevent pollutants, including Section 303(d) impairments, from entering nearby storm drains and waterbodies.

Construction of Shared Passenger Track Alternative A would occur near 305 potential environmental concern sites. The presence of potential environmental concern sites, including Superfund sites at the former Exide Technologies Facility and the Orange County North Basin, is associated with contamination including groundwater contamination. Risks associated with construction in or near sites with contamination include direct and indirect exposure of surface water to contaminants, the potential to exacerbate or spread existing environmental contamination, and the creation of environmental contamination via incidental mobilization of unknown or contained environmental contamination (e.g., nonleaking underground storage tanks). It may be feasible to avoid disturbing contaminants during construction on most off-site potential environmental concern sites by following the stipulations in the Construction Management Plan prepared as part of **HMW-IAMF#4**. The Authority may also use barriers that are included in the project design, in conjunction with site investigation and remediation, to limit the potential exposure to subsurface contaminants (**HMW-IAMF#3**). Refer to Section 3.10 for detailed information regarding potential environmental concern sites in the RSA.

The IAMFs listed above will not entirely avoid temporary impacts on surface water quality during construction. Mitigation measures, as described in Section 3.8.7, would be implemented to minimize turbidity and siltation during construction (**BIO-MM#62, Prepare Plan for Dewatering and Water Diversions**). To avoid or minimize the potential water quality impacts from dewatering activities, **BIO-MM#62** requires the Authority to prepare a dewatering plan for construction dewatering or work requiring a water diversion where open or flowing water is present. The dewatering plan will identify how to divert water from the work area in a manner that avoids or minimizes effects on resources to the maximum extent possible. The Authority would obtain review and approval from the applicable regulatory agency (e.g., RWQCB, USACE). The Authority would apply BMPs and comply with Los Angeles Dewatering Permit requirements to minimize the effects on water quality during dewatering activities. These efforts would minimize changes on overall water quality so that project construction would neither contribute to a violation of regulatory standards or waste discharge requirements nor conflict with or obstruct implementation of a water quality control plan.

Shared Passenger Track Alternative B

Temporary impacts on water quality for Shared Passenger Track Alternative B would be similar to those of Shared Passenger Track Alternative A because both would be built in the same manner with similar types of potential impacts. The project includes design measures to avoid or minimize the potential for temporary water quality impacts, as stated above for Shared Passenger Track Alternative A. Shared Passenger Track Alternative B would disturb up to approximately 939 acres of land and would result in the same number of floodplain crossings and water crossings (Authority 2025a). Because there would be slightly more acres of disturbance, 38 acres, there would be the potential for increased impacts from soil and wind erosion in those additional 38 acres. However, because of the variability of wind speed and direction, this increase is not possible to quantify. The Authority will implement good housekeeping BMPs and plans regarding spill prevention and response to prevent discharge of trash, hazardous materials, or other materials to waters (as detailed in **BIO-IAMF#11**). Waste management and materials pollution controls (as detailed in **BIO-IAMF#9**, **HMW-IAMF#7**, and **HMW-IAMF#8**) are also included to ensure trash is properly disposed of daily and materials are transported properly to minimize effects on water quality. Methods will be applied for controlling water and wind erosion of soils per **HYD-IAMF#3** and **GEO-IAMF#1D** to prevent sediments from entering nearby storm drains and

waterbodies. BMPs to prevent hazardous material releases and ensure cleanup of hazardous material releases will be required (**HMW-IAMF#6**, **HMW-IAMF#9**, and **HMW-IAMF#10**). Construction will also include measures to minimize impacts on surface water resources and address necessary cleanup or disposal of undocumented contaminates (e.g., previously contaminated soil or other materials), pursuant to **HMW-IAMF#3** and **HMW-IAMF#4**. To minimize the potential turbidity and siltation impacts from dewatering activities, a dewatering plan will be prepared (**BIO-MM#62**). Furthermore, preparation of a construction management plan will control groundwater withdrawals (as required by **GEO-IAMF#1**).

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, and there would be no difference in the area of disturbance or affected waterbodies. The project includes design measures to minimize effects on water quality, provide erosion control, and prevent hazardous materials release as stated above for Shared Passenger Track Alternative A. The project will incorporate **BIO-IAMF#11**, **BIO-IAMF#9**, **HMW-IAMF#7**, **HMW-IAMF#8**, **HYD-IAMF#3**, **GEO-IAMF#1D**, **HMW-IAMF#6**, **HMW-IAMF#3**, **HMW-IAMF#4**, **HMW-IAMF#9**, **HMW-IAMF#10**, and **GEO-IAMF#1** and would implement **BIO-MM#62** to avoid or minimize the potential for temporary water quality impacts, as stated above.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than what would be modified under the Shared Passenger Track Alternatives. The area of temporary disturbance for construction of the HSR station elements would be up to 10 acres, but the types of temporary impacts would be similar in nature, and no waterbodies would be crossed for construction of the HSR station elements. The project will incorporate **BIO-IAMF#11**, **BIO-IAMF#9**, **HMW-IAMF#7**, **HMW-IAMF#8**, **HYD-IAMF#3**, **GEO-IAMF#1D**, **HMW-IAMF#6**, **HMW-IAMF#3**, **HMW-IAMF#4**, **HMW-IAMF#9**, **HMW-IAMF#10**, and **GEO-IAMF#1** and would implement **BIO-MM#62** to avoid or minimize the potential for temporary water quality impacts, as stated above.

CEQA Conclusion

Temporary impacts on surface water quality could be generated or contaminants inadvertently released during construction activities. With incorporation of **HMW-IAMF#6**, **BIO-IAMF#11**, **HYD-IAMF#3**, **HMW-IAMF#3**, **HMW-IAMF#4**, **HMW-IAMF#6**, **HMW-IAMF#7**, **HMW-IAMF#8**, **HMW-IAMF#9**, **HMW-IAMF#10**, **BIO-IAMF#9**, **GEO-IAMF#1D**, and **GEO-IAMF#1**, temporary impacts on surface water quality will be reduced through measures to manage stormwater and prevent the potential for introduction of pollutants to surfaces during construction activities. Furthermore, with application of these IAMFs, the project will neither provide additional sources of polluted runoff nor conflict with or obstruct implementation of a water quality control plan. However, significant temporary surface water quality impacts during construction related to water crossings (i.e., channel crossings) that require dewatering and potential turbidity and siltation would remain. **BIO-MM#62** requires the Authority to prepare a dewatering plan for review and approval by regulatory agencies for construction dewatering or work requiring a water diversion where open or flowing water is present and to ensure turbidity and siltation is adequately addressed. With implementation of **BIO-MM#62**, impacts would be less than significant under CEQA.

Impact HWR-4: Permanent Impacts on Surface Water Quality During Construction

Shared Passenger Track Alternative A

Construction of Shared Passenger Track Alternative A would result in the addition of impervious surfaces to the landscape. The project would introduce new features into the project RSAs, including HSR tracks, relocated roads or roadway closures, an LMF, communication and

electrical infrastructure, pole installation, relocation of two Metrolink stations, modifications to Norwalk/Santa Fe Springs Metrolink Station and Fullerton Metrolink/Amtrak Station, and the HSR station option at ARTIC. The HSR station would include platforms, station buildings, parking areas, loading areas, and substation areas. Construction of the project would result in an increase of impervious surfaces from approximately 76 percent to 83 percent—an increase of approximately 7 percent, or 53 acres, of impervious surface (refer to Table 3.8-9) (Authority 2024b).

New and replaced impervious surfaces collect pollutants, including sediment, oil and grease, hydrocarbons (e.g., fuels, solvents), heavy metals, organic fertilizers and pesticides, organic compounds, pathogens, nutrients, trash, and debris. These pollutants are mobilized by runoff during storm events and conveyed into surface water either directly or through drainage systems. Within the new project right-of-way, applicable site design, source control, LID design standards, stormwater treatment, and hydromodification management measures would be applied according to Section F of the Authority's Phase II MS4 permit. These measures would reduce runoff volumes, increase stormwater infiltration, and filter pollutants to reduce discharge to surface waters and storm drains. LID measures could include biofiltration and bioretention systems, wet ponds, organic mulch layers, planted soil beds, and vegetated biofilters. The Authority has directed designers to use Caltrans' *Project Planning and Design Guide* (Caltrans 2017) for the selection, evaluation, and design of permanent stormwater BMPs.

Project-specific BMPs, such as bioswales or infiltration basins, would be developed and applied to treat runoff from areas of new or replaced impervious surfaces before entering the stormwater drainage system or recharge basins. The stormwater system design for Shared Passenger Track Alternative A would accommodate runoff and provide stormwater quality treatment for new impervious areas of acquired right-of-way. The project stormwater system would direct runoff from new impervious areas in newly acquired rights-of-way to treatment BMPs. It would not result in water quality changes in local waterbodies. However, because construction associated with the project will conform to **HYD-IAMF#1**, the introduction of substantial quantities of pollutants, including pollutants that will increase existing CWA 303(d)-listed impairments, is not anticipated. **HYD-IAMF#1** requires preparation of an SWMTP. Application of the SWMTP will reduce effects from stormwater runoff by evaluating each receiving stormwater system's capacity to accommodate project runoff and identifying stormwater management designs that capture runoff and provide treatment prior to discharge of pollutant-generating surfaces.

Where fill is planned in or adjacent to streams or rivers, the Authority would comply with CWA Sections 401 and 404, which require permits for fill activities at specific surface water features. Before construction, the Authority would notify the California Department of Fish and Wildlife and other relevant agencies of planned alterations of channels, if any, pursuant to Sections 1601 through 1603 of the California Fish and Game Code (California Department of Fish and Game 2009). Refer to Section 3.7 for detailed information on direct impacts on waters of the U.S.

A LMF is proposed along the south side of the existing BNSF Railway (BNSF) Hobart Yard (26th Street) in Vernon between approximately Downey Road and Interstate 710. Prior to construction, a SWPPP will be prepared for the LMF with Standard Industrial Codes regulated by the Industrial General Permit (as detailed in **HYD-IAMF#4**) to minimize the potential for contaminated surface runoff. The Stormwater General Permit requires dischargers to apply BMPs that comply with Best Available Technology/Best Conventional Pollutant Control Technology requirements to reduce or prevent discharges of pollutants in their stormwater discharge in a manner that reflects best industry practice, considering technological availability and economic practicability and achievability. The Stormwater General Permit SWPPP would document BMPs applied at the facility to manage the quality of stormwater runoff. The design of the LMF will result in minimal net new impervious area, and stormwater management measures will be incorporated into the design to minimize reductions in infiltrative capacity (as detailed in **HYD-IAMF#1** and **HYD-IAMF#4**), which will avoid or minimize effects on surface water quality.

Shared Passenger Track Alternative B

Permanent impacts on water quality for Shared Passenger Track Alternative B would result in similar types of permanent impacts on water quality as Shared Passenger Track Alternative A because both would have similar types of improvements. Shared Passenger Track Alternative B would include the 15th Street LMF and would result in an increase of approximately 8 percent, or 61 acres, of impervious surfaces. However, the proposed impervious surface area would represent a greater area of impervious cover (649.5 acres) than that of Shared Passenger Track Alternative A (605.4 acres). The Authority will prepare and implement an SWMTP to accommodate project runoff and identify stormwater management designs that capture runoff and provide treatment prior to discharge of pollutant-generating surfaces (**HYD-IAMF#1**). An industrial SWPPP will be prepared for the 15th Street LMF to minimize the potential for contaminated surface runoff (as detailed in **HYD-IAMF#4**). The project includes design measures to avoid or minimize the potential for surface water quality impacts, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, and would have the same change of impervious areas. The project includes design measures to capture runoff and provide treatment prior to discharge (**HYD-IAMF#1**) to avoid or minimize the potential for surface water quality impacts, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than what would be modified under the Shared Passenger Track Alternatives, with up to 10 more acres of disturbance and 8.9 acres of additional impervious surface area. No fill would be placed in or adjacent to streams or rivers to build the HSR station elements. The project includes design measures to detain runoff and reduce off-site runoff (**HYD-IAMF#1**) and avoid or minimize the potential for surface water quality impacts, as stated above.

CEQA Conclusion

Application of post-construction BMPs would reduce the potential for pollutants to be discharged to surface waters, and construction activities would not permanently adversely affect beneficial uses of surface waters or attainment of water quality objectives established in the water quality control plans applicable to the RSAs. Therefore, the Shared Passenger Track Alternatives would not conflict with implementation of the Los Angeles Water Quality Control Plan. With incorporation of **HYD-IAMF#1** and **HYD-IAMF#4**, discharges of pollutants to surface waters will be reduced. Permanent impacts on surface water quality would be less than significant under CEQA because the project includes IAMFs that will reduce the discharge of pollutants. The project would not result in the violation of water quality standards, provide additional sources of polluted runoff, or conflict with or obstruct implementation of a water quality control plan. The design of stormwater BMPs in local rights-of-way would be built according to the jurisdictional agency's MS4 permit. Therefore, CEQA does not require mitigation.

Impact HWR-5: Temporary Impacts on Groundwater Volume, Quality, and Recharge During Construction

Shared Passenger Track Alternative A

Along the length of the project section, the majority of track work built at grade would involve excavation with typical construction equipment to a depth of approximately 5 feet below the current grade. However, the maximum depth of excavation including replacement of utilities could be up to 30 feet deep. Construction of Shared Passenger Track Alternative A would require excavations that may encounter groundwater and could result in temporary effects on

groundwater quality and volume. For example, if groundwater is encountered during excavation, the quality of the groundwater may be affected during dewatering activities. Sediment is the most common pollutant associated with dewatering operations on construction sites (Caltrans 2014). Dewatering operations require the water to be treated to remove some level of sediment. Other pollutants affecting groundwater tend to be site-specific and are often associated with current or past use of the site or adjacent land. Common “other pollutants” on construction sites include nitrogen and phosphate from fertilizers; organic materials from plant waste; metals such as arsenic, cadmium, copper, and lead; and constituents that affect pH or hardness. Other pollutants could include oil, grease, pesticides, solvents, fuels, trash, and bacteria from human/animal wastes. Bridge supports in areas of high groundwater or in surface water would also require excavation in the stream channel and may require dewatering of the project area directly in the channel and from shallow groundwaters.

The amount of dewatering is likely to be relatively small and done in widely spaced locations depending on project location. For example, groundwater was detected at approximately 20 feet to 30 feet below ground surface near the Los Angeles River (Authority 2024b). However, based on subsurface data from prior geotechnical investigations and published literature, groundwater depths along the project section could range from the ground surface adjacent to rivers and drainages to depths of greater than 30 feet below ground surface. Shallow groundwater depths are found in Norwalk and Santa Fe Springs, where an elevated structure would be required as part of the modifications to the Norwalk/Santa Fe Springs Metrolink Station and deeper excavation for columns would be needed. Depth to groundwater at the Norwalk/Santa Fe Springs Metrolink Station is unknown, but generally groundwater depths throughout the project area range from 10 to 30 feet (Authority 2024b). The depth to groundwater can vary seasonally, based on precipitation, pumping practices, recharge, and irrigation (Authority 2024b). The effects from groundwater dewatering would be temporary, because dewatering would cease once construction has been completed.

Shared Passenger Track Alternative A could affect the Orange County groundwater basin at floodplain crossings that could result in dewatering effects, depending on the groundwater levels present at the time of construction. A number of the floodplains delineated by FEMA on FIRMs are in the direct RSA, as listed in Table 3.8-8. Construction of Shared Passenger Track Alternative A would require excavations and work in stream channels that may encounter groundwater and could result in temporary effects on groundwater quality and volume. Construction or modification of bridges or culverts (where groundwater levels may be locally higher) could require dewatering, such as at the Hobart Channel, Rio Hondo, San Gabriel River, North Fork Coyote Creek, La Mirada Creek, Coyote Creek, and Brea Creek. The Authority will apply stormwater BMPs consistent with the CGP to minimize the potential for polluted runoff to enter groundwater (**HYD-IAMF#3**). Effects from groundwater dewatering would be temporary, because dewatering would cease once construction has been completed.

If groundwater is encountered during construction, it would be removed and disposed of according to the requirements of the applicable Los Angeles RWQCB Dewatering Permit (Order Number R4-2013-0095) or Santa Ana RWQCB Dewatering Permit (Order No. R8-2020-0006, NPDES No. CAG998001) requirements, both of which would ensure the water discharged to surface water or land would not degrade existing water quality. The Authority would conduct dewatering activities according to Los Angeles RWQCB dewatering requirements by (1) treating the water prior to discharge so that discharges would not contain significant quantities of pollutants, or (2) hauling the water to a treatment facility, in accordance with the Caltrans *Field Guide to Construction Site Dewatering* (Caltrans 2014). To manage groundwater in excavations and temporarily diverted surface waters, the Authority would conduct dewatering activities according to the Los Angeles RWQCB dewatering requirements or Santa Ana RWQCB dewatering requirements, CGP, and the Caltrans *Field Guide to Construction Site Dewatering* (Caltrans 2014) to minimize effects on groundwater quantity and quality. The amount of groundwater withdrawal will be controlled, pursuant to **GEO-IAMF#1A**. In addition, the Authority will control the amount of re-inject groundwater at specific locations if necessary or use alternate foundation designs to offset the potential for groundwater overdraft (as detailed in **GEO-IAMF#1**).

During dewatering activities, groundwater quality monitoring would be required prior to disposal, as well as water quality testing prior to disposal to ensure there are no impacts on surface water quality. For contaminated groundwater encountered, the water may be collected and off-hauled to a local sanitary sewer or an active treatment system that may be required to treat the water prior to discharge.

Methods will be applied to mitigate for the risk of ground failure, such as replacement with competent soils, strengthening with geosynthetics, stone columns and similar approaches, and vertical drains (**GEO-IAMF#1B**). Staging and construction activities could inadvertently disturb sites with previously undocumented contamination or could affect previously identified sites with contaminated soil and groundwater (Authority 2025e). Los Angeles RWQCB and Santa Ana RWQCB dewatering requirements require treating the water prior to discharge so that discharges do not contain significant quantities of pollutants, or hauling the water off site to a treatment facility. Groundwater that meets surface water quality standards may be discharged into a surface waterbody in accordance with applicable dewatering permits. Most dewatering is likely to encounter a minimal amount of groundwater that, if discharged into a surface waterbody, would not cause effects on surface water hydrology and drainage. Refer to Impact HWR-1 for a discussion of temporary drainage impacts.

Effects from groundwater dewatering would be temporary because dewatering would cease once construction is completed. The Authority would control the amount of groundwater withdrawal, re-inject groundwater at specific locations if necessary, or use alternate foundation designs to offset the potential for groundwater overdraft (as detailed in **GEO-IAMF#1**). Because the amount of dewatering is likely to be small in areas within or adjacent to surface waterbodies, impacts on the groundwater basin volumes are likely to be minimal in relation to the amount of water in the groundwater basin.

The Sustainable Groundwater Management Act requires GSPs to be developed in medium- and high-priority basins to manage the sustainability of groundwater basins. The DWR identified the Coastal Plain of Los Angeles Central Basin as a very low-priority basin. Therefore, development of a GSP for the Coastal Plain of Los Angeles Central Basin is not required. However, the Coastal Plain of Orange County Groundwater Basin is designated as a medium-priority basin. The basin must be managed to comply with the Sustainable Groundwater Management Act Alternative Plan. Construction activities would not conflict with or obstruct the implementation of a sustainable groundwater management plan.

The IAMFs listed above would not entirely avoid temporary groundwater impacts during construction. Groundwater would be managed in accordance with the requirements of the Santa Ana RWQCB Dewatering Permit (Order No. R8-2020-0006, NPDES No. CAG998001). The Authority would obtain review and approval from the applicable regulatory agency (e.g., RWQCB, USACE). These efforts would minimize changes to overall water quality so that construction of the project would neither contribute to a violation of regulatory standards or waste discharge requirements nor impede sustainable groundwater management of the basin.

Shared Passenger Track Alternative B

Temporary impacts on groundwater volume, quality, and recharge during construction of Shared Passenger Track Alternative B would result in similar types of temporary impacts on groundwater as Shared Passenger Track Alternative A because both would have similar types of construction activities and improvements. Shared Passenger Track Alternative B would result in an increase of approximately 8 percent, or 61 acres, of impervious surfaces including for the construction of the 15th Street LMF, which would not substantially interfere with groundwater recharge within underlying groundwater basins. However, the proposed impervious surface area would represent a greater area of impervious cover (649.5 acres) than that of Shared Passenger Track Alternative A (605.4 acres), representing a greater extent of similar types of groundwater impacts compared to Shared Passenger Track Alternative A. In addition, construction of the 15th Street LMF would require deeper excavation depths (up to 8 feet) than construction of the 26th Street LMF. Greater excavation depths would result in increased soil disturbance and erosion, although the excavation at the LMF would not be deep enough to result in groundwater dewatering. The Authority will

apply erosion control and stormwater BMPs consistent with the CGP to minimize the potential for sediment-laden runoff to enter surface water features (**HYD-IAMF#3**). The amount of groundwater withdrawal will be controlled (**GEO-IAMF#1** and **GEO-IAMF#1A**) and methods will be applied to mitigate for the risk of ground failure, such as replacement with competent soils, strengthening with geosynthetics, stone columns and similar approaches, and vertical drains (**GEO-IAMF#1B**). The project includes design measures to avoid or minimize the potential for temporary groundwater impacts, as stated above for the Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, and there would be no difference in the area of disturbance or depth of excavation. The station improvements include **HYD-IAMF#3**, **GEO-IAMF#1A**, **GEO-IAMF#1B**, and **GEO-IAMF#1** to minimize impacts on groundwater quality and volume during construction including compliance with dewatering requirements.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than what would be modified under the Shared Passenger Track Alternatives, but the depth of excavation for the HSR station elements would likely not exceed 10 feet in depth for most of the site. Relocation of utilities could be up to 30 feet deep, and would require dewatering during construction. The types of temporary impacts would be similar in nature, as described above. The station improvements include IAMFs and mitigation to reduce groundwater quality impacts including sediment transport through preparation of a SWPPP (**HYD-IAMF#3**) and will manage groundwater withdrawals and resources (**GEO-IAMF#1**, **GEO-IAMF#1A**, and **GEO-IAMF#1B**) to avoid or minimize the potential for temporary groundwater impacts, as stated above for Shared Passenger Track Alternative A.

CEQA Conclusion

Temporary impacts on groundwater volume, quality, and recharge may occur during construction-related dewatering activities. **HYD-IAMF#3**, **GEO-IAMF#1A**, **GEO-IAMF#1B**, and **GEO-IAMF#1** will minimize impacts on groundwater quality and volume during construction. These measures include the requirement to perform dewatering according to the requirements of the applicable RWQCB dewatering permit. Therefore, the Shared Passenger Track Alternatives will not violate groundwater quality standards and will not substantially degrade groundwater quality. In addition, the RWQCB-approved dewatering permit will avoid and minimize temporary impacts related to groundwater recharge and supply. Project-specific BMPs, such as infiltration basins, will be developed and applied to allow infiltration of runoff and groundwater recharge. Therefore, the project would not substantially interfere with groundwater recharge during construction compared to existing conditions. Because there are no applicable groundwater management plans, no impact would occur related to conflict or obstructing implementation of a sustainable groundwater management plan. Temporary impacts on groundwater volume, quality, and recharge during construction would be less than significant under CEQA.

Impact HWR-6: Permanent Impacts on Groundwater Volume, Quality, and Recharge During Construction

Shared Passenger Track Alternative A

The Rio Hondo spreading grounds facility and the Raymond Retarding Basin are adjacent to the project alignment; however, no project facilities are proposed to be located within the spreading grounds or retarding basin. No other portions of the direct groundwater RSA include recharge facilities. Shared Passenger Track Alternative A would have no ongoing need for groundwater supplies or dewatering after construction. A total of 76 percent of the project footprint is currently covered with impervious surfaces and does not allow water recharge through infiltration. Shared Passenger Track Alternative A could affect groundwater recharge through the placement of new

impervious surfaces. An increase in impervious surface area decreases infiltration, which can decrease the amount of water that is able to recharge the aquifer/groundwater basin. Construction of Shared Passenger Track Alternative A would result in an increase of impervious surfaces from approximately 76 percent to 83 percent, an increase of approximately 7 percent of impervious surface, or 53 acres, as presented in Table 3.8-9 (Authority 2024b). The project will not result in a reduction in infiltration because the project will include project-specific stormwater BMPs, such as infiltration basins. Infiltration basins will promote additional surface water infiltration on site (Table 3.8-10), as required by **HYD-IAMF#1**, and will improve runoff quality from new or replaced impervious surfaces. The increase in the total new impervious surfaces would not affect existing groundwater recharge capabilities and would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table with the addition of the proposed infiltration facilities. Because of the addition of infiltration BMPs (Table 3.8-10), Shared Passenger Track Alternative A would not interfere with groundwater recharge, deplete groundwater volume or quality, and recharge conditions would remain similar following construction of the project. Shared Passenger Track Alternative A would not impede sustainable groundwater management of the basin.

Shared Passenger Track Alternative B

Permanent impacts on groundwater volume, quality, and recharge during construction of Shared Passenger Track Alternative B would result in similar types of permanent impacts on groundwater as those of Shared Passenger Track Alternative A because both would have similar types of improvements.

Shared Passenger Track Alternative B would result in an increase of approximately 8 percent, or 61 acres, of impervious surfaces, including construction of the 15th LMF. The proposed impervious surface area would represent a greater area of impervious cover (649.5 acres) than that of Shared Passenger Track Alternative A (605.4 acres), representing a larger extent of similar types of groundwater impacts compared to Shared Passenger Track Alternative A. The project includes design measures, such as project-specific stormwater BMPs including infiltration basins, to allow surface water infiltration on site, as required by **HYD-IAMF#1**. Surface water infiltration on site would improve runoff quality from new or replaced impervious surfaces. As a result, the potential for permanent impacts on groundwater resources during construction would be avoided or minimized, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, and would have the same change of impervious areas. The station improvements include IAMFs such as infiltration basins to promote surface water infiltration on site, as required by **HYD-IAMF#1**. Infiltration basins would also improve runoff quality from new or replaced impervious surfaces and avoid or minimize the potential for permanent impacts on groundwater resources, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than what would be modified under the Shared Passenger Track Alternatives, with up to 10 more acres of disturbance and 8.9 acres of additional impervious surface area. The station improvements include IAMFs such as project-specific stormwater BMPs to improve runoff quality from new or replaced impervious surfaces (**HYD-IAMF#1**) and avoid or minimize the potential for permanent impacts on groundwater resource, as stated above for Shared Passenger Track Alternative A.

CEQA Conclusion

Permanent impacts on groundwater volume, quality, and recharge may occur because of changes in impervious areas. The Shared Passenger Track Alternatives include project design features that minimize permanent impacts on groundwater, such as designing drainage systems and stormwater BMPs to facilitate infiltration of runoff and managing the quality and quantity of runoff (as required by **HYD-IAMF#1**). These features would minimize the exposure of pollutants to runoff and directly improve the quality of runoff that could percolate to groundwater. Therefore, the impact would be less than significant under CEQA because construction of the project would not violate groundwater quality standards or waste discharge requirements, otherwise substantially degrade groundwater quality, substantially deplete groundwater supplies, or interfere with groundwater recharges. Furthermore, project construction would not conflict with or obstruct implementation of a sustainable groundwater management plan. Therefore, CEQA does not require mitigation.

Impact HWR-7: Temporary Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction

Shared Passenger Track Alternative A

The project alignment would cross or encroach on 14 floodplain areas. Construction would temporarily disturb the floodplains summarized in Table 3.8-8.

Construction in a floodplain could temporarily impede or redirect floodflows because of the presence of construction equipment and materials in the floodplain, depending on the activity occurring within a specific area. Redirecting or impeding floodflows has the potential to redefine flood-hazard areas and cause flooding in areas previously not at risk to the 100-year flood, and risk release of pollutants. Construction of Shared Passenger Track Alternative A would require temporary fill inside of 100-year floodplains regulated by FEMA, which could result in temporary flood hazards resulting in the risk of release of pollutants. Construction activity could also result in temporary effects on the existing beneficial floodplain values. Temporary fill within floodplains during construction could include temporary structures such as formworks (temporary molds for new concrete structures), falseworks (temporary supports for new structures), trestles (temporary elevated working surfaces), and cofferdams (temporary structures to isolate work from receiving waters); equipment, including excavators and pumps; and construction materials. Construction personnel also would be in the floodplain area. Temporary fill could reduce the storage capacity of the floodplain, resulting in localized changes in WSE, flow velocity, or extents of the floodplain to areas that may not have previously experienced flooding. The severity of the effect would be directly related to the volume of temporary fill, because the volume of temporary fill would displace an equal volume of flood waters.

To avoid or minimize the potential for the risk of release of pollutants in a flood-hazard zone, the Authority will comply with the CGP and prepare a SWPPP for construction activities (as required by **HYD-IAMF#3**), which will include construction BMPs to manage the overall amount of stormwater runoff and associated release of pollutants generated from the construction soil disturbance areas. Consistent with typical SWPPP requirements, weather conditions would be monitored for heavy storms (and potential floodflows) so that construction workers would be notified to relocate construction equipment and apply temporary BMPs to minimize the flood risk and release of pollutants during a flood hazard. Shared Passenger Track Alternative A would incorporate erosion and sedimentation controls to stabilize disturbed soils and prevent sediments from entering nearby storm drains and waterbodies. Control measures and BMPs can include installing erosion control measures such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, and sandbag dikes to prevent silt runoff to public roadways, storm drains, or waterways and control the release of pollutants. Additional good housekeeping practice BMPs (which include proper handling and managing of construction materials) will also be incorporated, along with plans regarding spill prevention and response, to prevent discharge of trash, hazardous materials, or other materials to waters (as detailed in **BIO-IAMF#11** and **HMW-IAMF#6**).

Environmental Management System and hazardous materials monitoring plans will be implemented to limit the potential for spills and establish cleanup protocols and trained personnel to prevent accidental spills of hazardous materials (as specified in **HMW-IAMF#9** and **HMW-IAMF#10**) during construction. In addition, **HYD-IAMF#3** requires development and application of a spill prevention and emergency response plan to handle potential fuel or hazardous material spills. With proper handling of hazardous materials and proper cleanup of accidental spills, Shared Passenger Track Alternative A would not risk release of pollutants during inundation.

HYD-IAMF#3, **BIO-IAMF#11, HMW-IAMF#9**, and **HMW-IAMF#10** will minimize temporary effects on flood-hazard zones resulting in the risk of release of pollutants associated with construction activities. Project features would avoid construction activities in waterbodies when the risk of flooding is greatest and would require the Authority to monitor weather forecasts and relocate equipment and materials temporarily stored in floodplains to minimize risk of pollutant release. Therefore, IAMFs would minimize temporary effects from risk of pollutants in a flood hazard that could otherwise be substantial. No tsunami or seiche hazards are anticipated because of the location of the project corridor.

Shared Passenger Track Alternative B

Shared Passenger Track Alternative B would cross 14 floodplain areas (Table 3.8-8), the same crossings as Shared Passenger Track Alternative A. Temporary impacts resulting in risk of release of pollutants because of inundation during construction for Shared Passenger Track Alternative B would result in the same type of temporary impacts as Shared Passenger Track Alternative A because it would have the same types of construction activities within floodplains. However, Shared Passenger Track Alternative B would disturb 939 acres, resulting in a greater area of temporary disturbance (48 acres) within the same floodplains as Shared Passenger Track Alternative A (891 acres). The 15th Street LMF is not within a floodplain. To manage the overall amount of stormwater runoff and associated release of pollutants during construction, the Authority will prepare a SWPPP (as required by **HYD-IAMF#3**). Good housekeeping practice BMPs and plans regarding spill prevention and response will also be incorporated to prevent discharge of trash, hazardous materials, or other materials to waters (**BIO-IAMF#11** and **HMW-IAMF#6**). Implementation of an Environmental Management System and hazardous materials monitoring plans would limit the potential for spills and establish cleanup protocols to prevent accidental spills of hazardous materials (**HMW-IAMF#9** and **HMW-IAMF#10**) during construction. The project includes design measures **HYD-IAMF#3, BIO-IAMF#11**, **HMW-IAMF#6, HMW-IAMF#9** and **HMW-IAMF#10** to avoid or minimize the potential for temporary impacts resulting in risk of release of pollutants because of inundation, as stated above for Shared Passenger Track Alternative A. No tsunami or seiche hazards are anticipated because of the location of the project corridor.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, which is not within a floodplain.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than what would be modified under the Shared Passenger Track Alternatives, but the site is not within a floodplain.

CEQA Conclusion

Temporary impacts on flood hazard, tsunami, or seiche zones resulting in risk of release of pollutants because of inundation could result because of construction in the floodplains. Impacts would be less than significant under CEQA because **HYD-IAMF#3**, **BIO-IAMF#11**, **HMW-IAMF#6**, **HMW-IAMF#9**, and **HMW-IAMF#10** will ensure construction of the project will not

substantially increase the risk of pollutants caused by project inundation in flood hazard, tsunami, or seiche zones during construction. Project features include measures to avoid construction activities in waterbodies when the risk of flooding is greatest and control measures to minimize the release of pollutants and prevent polluted runoff from entering into storm drains or waterways. Therefore, CEQA does not require mitigation.

Impact HWR-8: Permanent Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction

Shared Passenger Track Alternative A

The project would cross fourteen 100-year floodplains. Stream crossings would meet the provisions of California Code of Regulations title 23, division 1, which requires that crossings maintain stream channel flow capacity. With application of these design elements, as detailed in **HYD-IAMF#2**, effects on hydraulic capacity at water crossing will be minimized and the associated risk of pollutant release in a flood hazard will also be reduced. No tsunami or seiche hazard is anticipated because of the location of the project.

Construction would disturb the following floodplains: Rio Hondo, San Gabriel River, Lakeland Road Storm Drain, North Fork Coyote Creek, Brea Creek, Lakeside Drive Storm Drain, Fullerton Creek, Gilbert Street and Artesia Avenue, Lawrence Avenue, Yale Avenue, Balcom Avenue Storm Drain, and Carbon Creek and raise the WSE of several floodplains. The maximum change in WSE from construction of the project floodplain crossings would be less than 1 foot and would not affect the other floodplains in the project alignment. The Rio Hondo would result in a WSE rise of 0.48 foot. The existing bank elevation is approximately 164.35 feet and the proposed WSE is approximately 161.48 feet; therefore, there is sufficient freeboard to accommodate this rise in WSE. The San Gabriel River would result in a WSE rise of 0.02 foot. The existing bank elevation is approximately 145.78 feet and the proposed WSE is approximately 136.33 feet; therefore, there is sufficient freeboard to accommodate this rise in WSE. Brea Creek would result in a WSE rise of 0.10 foot. The existing bank elevation is approximately 78.52 feet and the proposed WSE is approximately 76.28 feet; therefore, there is sufficient freeboard to accommodate this rise in WSE. Carbon Creek would result in a WSE decrease of 2.71 feet. The existing bank elevation is approximately 173.33 feet, and the proposed WSE is approximately 161.64 feet. Therefore, there is sufficient freeboard and the proposed decrease in WSE would result in a positive impact on flood protection in this floodplain. Shared Passenger Track Alternative A would also encroach into the existing Southeast Anaheim Channel floodplain as a result of the at-grade crossing. The alignment would cross where the floodplain is a result of flooding experienced in the local storm drain. However, there would be no changes in WSE or changes in the drainage conveyed by these storm drains as a result of project implementation.

Shared Passenger Track Alternative A would include flood protection measures that minimize effects on the vertical profile, horizontal extent, flow patterns, and peak flows of 100-year floodplains and associated risk of pollutant release. Project features include the development and implementation of a Flood Protection Plan that will include specific measures to minimize development within floodplains and prevent increases in 100-year WSEs by more than 1 foot or substantially changing the floodplain limits and optimize bridge designs to minimize backwater (as required by **HYD-IAMF#2**). Additionally, the Authority would design the shape and alignment of the piers to minimize adverse hydraulic effects. Water crossings would meet the provisions of California Code of Regulations title 23, division 1, which requires that crossings maintain channel flow capacity through measures such as perpendicular crossings (where practical), in-line piers, adequate streambank heights (freeboard), and protection against streambank and channel erosion. Design measures, project features, and local regulations would minimize effects, but would not avoid potential permanent effects on floodplains. The Authority would apply measures to avoid hydraulic effects on floodplains, such as raising the WSE and backwater effects. Therefore, through compliance with **HYD-IAMF#2** and the requirements set forth in Executive Order 11988 and FEMA regulations, permanent effects on the floodplains will be minimized. Floodplain effects including increasing the BFE by greater than 1 foot or substantially changing the floodplain limits would be prevented.

Permanent impacts on flood hazards may result in the risk of release of pollutants. Within the project right-of-way, applicable site design, source control, LID design standards, stormwater treatment, and hydromodification management measures would be applied according to Section F of the Authority's Phase II MS4 permit. Project-specific BMPs, such as bioswales or infiltration basins, would be developed and applied to treat runoff and floodflows from areas of new impervious surfaces before entering the stormwater drainage system or recharge basins. The project stormwater system would accommodate runoff and direct runoff from new impervious areas in newly acquired rights-of-way to treatment BMPs to provide stormwater quality treatment. Construction associated with ARTIC will conform to **HYD-IAMF#1**; therefore, the introduction of substantial quantities of pollutants is not anticipated. **HYD-IAMF#1** requires preparation of an SWMTP. Application of the SWMTP would reduce effects from risk of pollutants in a flood hazard by identifying stormwater management designs that capture runoff and provide treatment prior to discharge of pollutant-generating surfaces.

Environmental Management System and hazardous materials monitoring plans would be applied to limit the potential for spills and establish cleanup protocols and trained personnel to prevent accidental spills of hazardous materials (as specified in **HMW-IAMF#9** and **HMW-IAMF#10**) during construction. A spill prevention and emergency response plan (**HYD-IAMF#3**) will be applied to handle potential fuel or hazardous material spills. With proper handling of hazardous materials and proper cleanup of accidental spills, the project would not risk release of pollutants during inundation. Shared Passenger Track Alternative A would include requirements to conduct a preliminary hazards analyses during design and construction. These analyses will determine and address facility hazards and vulnerabilities, thereby preventing impacts, such as risks of flooding, that may occur during operations (**SS-IAMF#3**). With incorporation of these measures into the design of Shared Passenger Track Alternative A, it is not anticipated that there would be a risk of pollutant release from inundation.

Shared Passenger Track Alternative A would require review from USACE under Section 408 where the project would include modifications or alterations of federal flood control facilities built to ensure that its usefulness is not impaired. The Rio Hondo, San Gabriel River, North Fork Coyote Creek, and Coyote Creek crossings are USACE facilities under Section 14 of the Rivers and Harbors Act of 1899, as amended and codified in 33 U.S.C. 408 (Section 408).[3] Therefore, during the design phase, the Authority would be required to coordinate with the Los Angeles County Flood Control District and USACE to obtain Section 408 review for these bridge crossings to ensure its usefulness is not impaired. Ongoing coordination with the Los Angeles County Flood Control District and USACE would occur for other crossings, as needed. Section 408 provides that USACE may grant permission for another party to alter a USACE flood control facility on a determination that the alteration proposed would not be injurious to the public interest and would not impair the usefulness of the facility.

Shared Passenger Track Alternative B

Permanent impacts resulting in risk of release of pollutants because of inundation during construction for Shared Passenger Track Alternative B would result in the same type and magnitude of potential impacts as those of Shared Passenger Track Alternative A, because both would have similar types of construction activities within the same floodplain areas. The 15th Street LMF is not within a floodplain. Project features include the development and implementation of a Flood Protection Plan that will include specific measures to minimize development within floodplains and prevent increases in 100-year WSEs (as required by **HYD-IAMF#2**). A preliminary hazards analyses will determine and address facility hazards and vulnerabilities to prevent risks of flooding that may occur during operations (**SS-IAMF#3**).

[3] The Los Angeles River and the Santa Ana River are also Section 408 facilities in the project section, but these facilities would not be altered by the project. The Los Angeles River would be crossed on an existing bridge, but the river would not be modified.

Permanent BMPs identified by **HYD-IAMF#1** will be implemented to reduce effects from stormwater runoff from new impervious surfaces. Furthermore, the Authority will apply Environmental Management System and hazardous materials monitoring plans to limit the potential for spills and establish cleanup protocols to prevent accidental spills of hazardous materials during construction (**HMW-IAMF#9** and **HMW-IAMF#10**). A spill prevention and emergency response plan (**HYD-IAMF#3**) will also be applied to handle potential fuel or hazardous material spills. The project includes **HYD-IAMF#1**, **HYD-IAMF#2**, **HYD-IAMF#3**, **HMW-IAMF#9**, **HMW-IAMF#10**, and **SS-IAMF#3** to avoid or minimize permanent impacts resulting from risk release of pollutants because of inundation, as stated above for Shared Passenger Track Alternative A. No tsunami or seiche hazard is anticipated because of the location of the project. Shared Passenger Track Alternative B would require review from USACE under Section 408 where the project would include modifications or alterations of federal flood control facilities built to ensure that their usefulness is not impaired. The Rio Hondo, San Gabriel River, North Fork Coyote Creek, and Coyote Creek crossings are USACE facilities under Section 408.[4] Therefore, during the design phase, the Authority would be required to coordinate with the Los Angeles County Flood Control District and USACE to obtain Section 408 review for these bridge crossings to ensure their usefulness is not impaired.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within the same area that would be modified under the Shared Passenger Track Alternatives, which is not within a floodplain. Furthermore, construction will conform to **HYD-IAMF#1**, and the introduction of substantial quantities of pollutants is not anticipated. The Authority will apply Environmental Management System, hazardous materials monitoring plans, and a spill prevention and emergency response plan to limit the potential for spills and establish cleanup protocols to prevent accidental spills of hazardous materials during construction (**HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3**). The station improvements include design measures to avoid or minimize the potential for permanent impacts resulting in risk of release of pollutants because of inundation, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Construction of the HSR station platform, facilities, and parking would occur within a larger area than what would be modified under the Shared Passenger Track Alternatives, but the site is not within a floodplain. Application of an SWMTP will reduce effects from risk of pollutants in the event of a flood hazard by identifying stormwater management designs that capture runoff and provide treatment prior to discharge of pollutant-generating surfaces (**HYD-IAMF#1**). The Authority will apply Environmental Management System, hazardous materials monitoring plans, and a spill prevention and emergency response plan to limit the potential for spills and establish cleanup protocols of hazardous materials during construction (**HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3**). The station improvements include design measures to avoid or minimize the potential for permanent impacts resulting in risk of release of pollutants because of inundation, as stated above for Shared Passenger Track Alternative A.

[4] The Los Angeles River and the Santa Ana River are also Section 408 facilities in the project section, but these facilities would not be altered by the project. The Los Angeles River would be crossed on an existing bridge, but the river would not be modified.

CEQA Conclusion

Permanent impacts resulting in risk of release of pollutants from inundation could result during construction in floodplains. Application of **HYD-IAMF#1**, **HYD-IAMF#2**, **HYD-IAMF#3**, **SS-IAMF#3**, **HMW-IAMF#9**, and **HMW-IAMF#10** and adherence to the requirements set forth in Executive Order 11988 will ensure that the impact from risk of release of pollutants from inundation is less than significant under CEQA because construction of the project includes effective measures to avoid or minimize the potential for exposure of the project to flooding and related risk of pollutant release, and new or additional exposure to flooding risk and hazards from inundation would not occur. Permanent impacts on flood hazard, tsunami, or seiche zones resulting in the risk of release of pollutants would be less than significant under CEQA. Therefore, CEQA does not require mitigation.

Operational Impacts

Impact HWR-9: Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Operations

Shared Passenger Track Alternative A

Routine maintenance activities, such as repairing overcrossings or bridges, drainage channels, or drainage infrastructure, could temporarily affect drainage patterns and streamflows and could cause temporary increases of suspended sediment and turbidity within a surface waterbody. Specifically, this could occur during activities requiring temporary stream diversion or coffer dams, or other activities conducted in or near surface waters. These activities are likely to be performed intermittently during operation. If not properly managed, maintenance and repair of drainages or drainage infrastructure could temporarily affect existing drainage patterns, resulting in a short-term increase in localized erosion or siltation. Maintenance or repair crews would temporarily divert surface flows, if necessary, to a nearby storm drain(s) to maintain proper drainage and apply BMPs to minimize the potential for erosion and siltation. The contractor will implement measures (as detailed in **BIO-IAMF#11**) during maintenance activities to avoid or minimize impacts on drainage patterns, stormwater runoff, hydraulic capacity, or additional sources of polluted runoff. **BIO-IAMF#11** includes standard stormwater housekeeping BMPs required to be applied by maintenance personnel to reduce the discharge of pollutants from maintenance areas. The Authority will implement an SWMTP such that operational activities associated with Shared Passenger Track Alternative A will comply with applicable MS4 permits to manage the quality and quantity of runoff (**HYD-IAMF#1**).

Shared Passenger Track Alternative B

Intermittent impacts on permanent drainage patterns, stormwater runoff, and hydraulic capacity during operation of Shared Passenger Track Alternative B would result in the same type and magnitude of potential impacts as Shared Passenger Track Alternative A because the same types of maintenance activities would occur. Standard stormwater housekeeping BMPs will be applied by maintenance personnel to reduce the discharge of pollutants from maintenance areas (**BIO-IAMF#11**). Implementation of an SWMTP will manage the quantity of runoff, as required by the applicable MS4 permits (**HYD-IAMF#1**). Shared Passenger Track Alternative B includes design measures to avoid or minimize the potential for intermittent permanent surface water hydrology impacts, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option would occur within a larger area than what would be required under the Shared Passenger Track Alternatives, but the types of intermittent impacts on drainage patterns, stormwater runoff, and hydraulic capacity at the site would be the same. Good housekeeping BMPs, which include proper handling and managing of construction materials, will be incorporated during maintenance activities (**BIO-IAMF#11**). The quantity of runoff will be managed, as required by the applicable MS4 permits (**HYD-IAMF#1**). The station improvements

include design measures to avoid or minimize the potential for intermittent permanent surface water hydrology impacts, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option would occur within a larger area than what would be required under the Shared Passenger Track Alternatives, but the types of intermittent impacts on drainage patterns, stormwater runoff, and hydraulic capacity at the site would be the same. Good housekeeping BMPs will be incorporated during maintenance activities to reduce the discharge of pollutants from maintenance areas (**BIO-IAMF#11**). The quantity of runoff will be managed, as required by the applicable MS4 permits (**HYD-IAMF#1**). The station improvements include design measures to avoid or minimize the potential for intermittent permanent surface water hydrology impacts, as stated above for Shared Passenger Track Alternative A.

CEQA Conclusion

Intermittent permanent impacts on drainage patterns, stormwater runoff, and hydraulic capacity could temporarily affect streamflows and cause temporary increases of suspended sediment and turbidity within a surface waterbody. With application of project design measure **BIO-IAMF#11**, the project will not substantially alter the existing drainage patterns and result in substantial increases in the rate or amount of runoff during maintenance, causing erosion or siltation off site, flooding, or additional sources of polluted runoff. Furthermore, implementation of an SWMTP will manage the quantity of runoff, as required by the applicable MS4 permits (**HYD-IAMF#1**). Impacts on drainage patterns, stormwater runoff, hydraulic capacity, or additional sources of polluted runoff associated with operation of the project would be less than significant under CEQA because stormwater housekeeping BMPs would be applied during maintenance of the project. Therefore, CEQA does not require mitigation.

Impact HWR-10: Impacts on Surface Water Quality During Operations

Shared Passenger Track Alternative A

Increases in rail services are expected to result in associated hydrology and water quality impacts. Operation of Shared Passenger Track Alternative A could increase the amount of the pollutants associated with existing railroad operations (pollutants that may already exist in the watershed) because of more frequent rail service. Pollutants from brake dust (brake-pad particles) are of particular concern. Typical pathways, deposition areas, and impacts are discussed in the context of brake dust released from petroleum-fueled railroads in Section 3.8.5.6, Existing Groundwater Quality. Brake dust released by Shared Passenger Track Alternative A could be conveyed to surface waters by surface runoff. The electrically powered trains would use regenerative braking technology, resulting in reduced physical braking and associated wear compared to conventional petroleum-fueled trains. Brake dust would not be generated equally throughout the project section. Brake dust would be generated mostly in areas where the trains must reduce their speed, such as approaches to stations, turns, and elevation changes, primarily descents. The Authority will prepare an SWMTP that complies with applicable MS4 permits (as detailed in **HYD-IAMF#1**). Pervious areas, biofiltration devices, infiltration devices, and media filters are permanent BMPs capable of removing both particulate and dissolved metals from runoff. Brake dust that flows through these stormwater treatment measures would be filtered out before being discharged into a waterbody or storm drainage system. Because stormwater treatment facilities would be provided for impervious surfaces, runoff from at-grade and embankment profiles, which do not contain impervious surfaces, would not generally flow through stormwater treatment measures; however, brake dust would generally be retained in track ballast material in these areas.

Certain heavy metals have the potential to bioaccumulate within the aquatic environment or stimulate the growth of microbes, such as algae, resulting in effects on aquatic life. However, the amount of metal discharge into surface waterbodies is not anticipated to cause a violation of the water quality objectives for bioaccumulation, biostimulatory substances, toxicity, and settleable materials. Because Shared Passenger Track Alternative A would apply treatment BMPs using the

best available technology to reduce the quantity and improve the quality of runoff generated on new and replaced impervious surfaces, these measures would minimize water quality impacts from brake dust to the maximum extent practicable. Accordingly, permanent stormwater treatment BMPs would minimize potential continuous impacts from brake dust deposited on impervious surfaces by capturing and treating the runoff prior to discharge into waterbodies.

Shared Passenger Track Alternative A would require maintenance activities and the storage of oil and other materials for equipment maintenance. The majority of materials used for maintenance would be nontoxic and would be stored in covered areas. State and federal laws regulate the storage of hazardous materials; regulated materials will be in maintenance areas with secondary containment to prevent spills, in compliance with good housekeeping practices (**HMW-IAMF#6** and **HMW-IAMF#10**).

The 26th Street LMF proposed as part of Shared Passenger Track Alternative A would require intermittent maintenance activities, and would provide storage of lubricants, fuels, metal filings, hydraulic fluids, paints, cleaning products, oil, and other materials for equipment maintenance. Most materials used for maintenance would be nontoxic and stored in covered areas. State and federal laws regulate the storage of hazardous materials; regulated materials would be in maintenance areas with secondary containment to contain accidental spills, in compliance with good housekeeping practices. The Stormwater General Permit requires dischargers to apply BMPs that comply with Best Available Technology/Best Conventional Pollutant Control Technology requirements to reduce or prevent discharges of pollutants in their stormwater discharge in a manner that reflects best industry practice, considering technological availability and economic practicability and achievability. The Authority would limit the amount of hazardous materials used for project operations and have specific cleanup protocols and trained personnel to prevent accidental spills of hazardous materials from reaching surface waterbodies. The Authority will apply **HYD-IAMF#4** at the LMF to control materials required for operations and maintenance activities and prevent them from posing a risk to surface water quality. In general, this would consist of conducting maintenance activities under a canopy or garage whenever possible and storing hazardous materials indoors. Prior to operation, a Stormwater General Permit SWPPP will be prepared for the LMF with Standard Industrial Codes regulated by the Industrial General Permit (as detailed in **HYD-IAMF#4**) to minimize the potential for contaminated surface runoff, if applicable. The primary receiving water limitation requires that industrial stormwater discharges not cause or contribute to an exceedance of applicable water quality standards. Water quality standards apply to the quality of the receiving water. If stormwater discharge causes or contributes to an exceedance of a water quality standard within the receiving water, the site must apply additional BMPs or other control measures in order to attain compliance with the receiving water limitation.

The Stormwater General Permit requires application of minimum BMPs and applicable advanced BMPs to reduce or prevent pollutants in industrial stormwater discharges, and would document BMPs to be applied at the facility to manage the quality of stormwater runoff. The LMF would be required to adhere to Basin Plan water quality standards (numeric and narrative). Therefore, stormwater and overland flows could percolate into natural and landscaped areas without substantially affecting water quality.

The SWRCB identifies TMDLs for waterbodies that contain high levels of specific pollutants. TMDLs have been identified for several of the surface water features in the direct RSA. With respect to the pollutants on the 303(d) list, the project could contribute additional pollutants to the waterbodies, including copper, lead, oil, and trash. However, because operational activities associated with Shared Passenger Track Alternative A will conform to **HYD-IAMF#1**, the introduction of these pollutants, including pollutants that will increase existing 303(d)-listed impairments, is not anticipated. The Authority will incorporate design features and measures to prevent or minimize pollutant discharges, such as stormwater management and treatment.

With application of permanent stormwater BMPs, stormwater runoff would be collected, treated, and discharged in a manner that would not produce excessive erosion or pollutants. Potential sources of pollutants would be controlled and managed to prevent exposure to stormwater.

On-site stormwater treatment BMPs, such as bioretention and infiltration, would capture runoff and treat the runoff. The application of these permanent BMPs would reduce the discharge of sediment and sediment-bound pollutants into surface waters.

Routine vegetation removal along the tracks and associated infrastructure for maintenance activities may require land disturbance resulting in increased susceptibility to erosion and sedimentation along slopes. The Authority may also use herbicides and pesticides along the project corridor's right-of-way to control weeds and vermin, as required by state and federal regulations. Applicators would apply herbicides and pesticides in a manner that minimizes effects on the environment and follows listed precautions and regulatory requirements to prevent sediment, pesticides, and herbicides from entering surface waters through surface runoff. The Authority would limit the potential for spills, limit the amount of hazardous materials used for operation of the project, and have specific cleanup protocols and trained personnel to prevent accidental spills of hazardous materials and other pollutants from reaching surface waterbodies during operation. **HMW-IAMF#6** requires BMPs to prevent hazardous material releases and ensure cleanup of hazardous material releases. The Authority will also apply a hazardous materials monitoring plan to limit the potential for spills (**HMW-IAMF#10**). As a result of these IAMFs, the project will neither contribute to a violation of regulatory standards or waste discharge requirements nor conflict with or obstruct implementation of a water quality control plan. Furthermore, operation of Shared Passenger Track Alternative A would not create or contribute substantial runoff water that would provide additional sources of polluted runoff, or otherwise degrade water quality.

Shared Passenger Track Alternative B

Impacts on surface water quality during operation of Shared Passenger Track Alternative B would be the same as those of Shared Passenger Track Alternative A because similar types of maintenance activities would occur including operation of the 15th Street LMF. The Authority will prepare an SWMTP to accommodate project runoff and identify stormwater management designs to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces (**HYD-IAMF#1**). Prior to operation, a site-specific SWPPP will be prepared for the LMF to minimize the potential for contaminated surface runoff (**HYD-IAMF#4**). In compliance with good housekeeping practices, hazardous materials and regulated materials will be stored in maintenance areas with secondary containment to prevent spills (**HMW-IAMF#6** and **HMW-IAMF#10**). Furthermore, **HMW-IAMF#6** requires BMPs to prevent hazardous material releases and ensure cleanup of hazardous material releases. The Authority will also apply a hazardous materials monitoring plan to limit the potential for spills (**HMW-IAMF#10**). The project includes design measures **HYD-IAMF#1**, **HYD-IAMF#4**, **HMW-IAMF#6**, and **HMW-IAMF#10** to avoid or minimize the potential for impacts on surface water quality, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. Existing pervious areas, biofiltration devices, infiltration devices, and media filters are permanent BMPs capable of removing both particulate and dissolved metals from runoff. Brake dust that flows through these stormwater treatment measures would be filtered out before being discharged into a waterbody or storm drainage system, reducing impacts on surface water quality. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives. The station improvements include **HYD-IAMF#1**, **HMW-IAMF#6**, and **HMW-IAMF#10** to avoid or minimize the potential for impacts on surface water quality, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option

would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. Existing pervious areas, biofiltration devices, infiltration devices, and media filters are permanent BMPs capable of removing both particulate and dissolved metals from runoff. Brake dust that flows through these stormwater treatment measures would be filtered out before being discharged into a waterbody or storm drainage system, reducing impacts on surface water quality. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives. The station improvements include **HYD-IAMF#1**, **HMW-IAMF#6**, and **HMW-IAMF#10** to avoid or minimize the potential for impacts on surface water quality, as stated above for Shared Passenger Track Alternative A.

CEQA Conclusion

Impacts on surface water quality could be increased because of more frequent rail service. With application of **HYD-IAMF#1**, **HYD-IAMF#4**, **HMW-IAMF#6**, and **HMW-IAMF#10**, the impact would be less than significant under CEQA because operation of the Shared Passenger Track Alternatives would not result in the violation of water quality standards, degrade surface quality, or conflict with or obstruct implementation of a water quality control plan. An SWMTP designed to manage runoff from new and impervious surfaces and minimize erosion, sedimentation, and pollutant loading in receiving waters will avoid creating a substantial additional source of polluted runoff. The design of stormwater BMPs in local rights-of-way will be built according to the jurisdictional agency's MS4 permit. An industrial SWPPP will be prepared for the proposed LMF to reduce the discharge of pollutants. Therefore, CEQA does not require mitigation.

Impact HWR-11: Impacts on Groundwater Volume, Quality, and Recharge During Operations

Shared Passenger Track Alternative A

Because Shared Passenger Track Alternative A would be electrically powered, the track runoff would carry few pollutants. Pollutants from brake-pad particles (i.e., brake dust) are of particular concern. Typical pathways, deposition areas, and impacts are discussed in the context of brake dust released from petroleum-fueled railroads in Section 3.8.5.6, Existing Groundwater Quality. Although not quantifiable at this time, the amount of brake dust that could enter the groundwater table is not likely to be sufficient to substantially alter groundwater quality or violate the groundwater quality objectives for inorganic chemicals, which include metals. Similarly, brake dust released from Shared Passenger Track Alternative A could infiltrate groundwater through surface water runoff in pervious areas and during storm events. However, even in areas with infiltrative (i.e., pervious) soils, stormwater could percolate into the natural and landscaped areas without affecting groundwater quality; pollutants would not likely reach the groundwater table because of the depth to groundwater in several areas along the alignment. Furthermore, electric trains use a regenerative braking technology that results in reduced physical braking and associated wear and brake dust compared to conventional petroleum-fueled trains. Because of the limited amounts of brake dust likely to be generated and the application of stormwater BMPs, the amount of brake dust that could percolate into groundwater aquifers is not likely to alter groundwater quality or violate groundwater quality standards.

The Authority will prepare an SWMTP that includes permanent stormwater BMPs that have the capacity to filter particulate and dissolved metals from runoff (as detailed in **HYD-IAMF#1**). A Rio Hondo spreading grounds facility and the Raymond Retarding Basin are adjacent to the project footprint; however, no project facilities are proposed to be located within the spreading grounds or basin. No other portions of the direct groundwater RSA include recharge facilities. Use of existing pervious areas for infiltration, biofiltration devices, infiltration devices, and media filters BMPs would remove both particulate and dissolved metals from runoff. Stormwater treatment facilities would be provided for impervious surfaces; accordingly, runoff from at-grade and embankment profiles would not generally flow through stormwater treatment measures. However, longitudinal earthen drainage ditches would convey runoff from at-grade and embankment profiles to drainage systems. Because pervious areas (i.e., soil) can filter both particulate and dissolved metals from runoff, these earthen drainage ditches would provide filtration of metals for runoff that infiltrates into the subsurface in these ditches. Therefore, permanent stormwater BMPs

and earthen drainage ditches would minimize potential effects on groundwater quality from brake dust and other potential pollutants.

Shared Passenger Track Alternative A would result in a small increase in impervious surfaces. However, stormwater management measures such as infiltration basins (Table 3.8-10) will be incorporated into the design to allow for infiltration (as detailed in **HYD-IAMF#1**), which will avoid or minimize effects on groundwater recharge. Operations of Shared Passenger Track Alternative A would not involve excavation or other activities that would expose potential pollutants to underlying groundwater aquifers or require ongoing dewatering. Recharge conditions would remain similar to existing conditions during operation.

Shared Passenger Track Alternative B

Impacts on groundwater volume, quality, and recharge during operation of Shared Passenger Track Alternative B would be the same as those of Shared Passenger Track Alternative A because similar types of operation and associated train brake dust and petroleum-related pollutants would occur that could impair groundwater basins. The Authority will prepare an SWMTP that includes permanent stormwater BMPs that have the capacity to filter particulate and dissolved metals from runoff (as detailed in **HYD-IAMF#1**). The project includes design measures to avoid or minimize the potential for impacts on groundwater resources during operations, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. Stormwater treatment measures would filter particulate and dissolved metals associated with brake dust before being discharged into a waterbody or storm drainage system, reducing potential impacts on groundwater. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives. The Authority will implement permanent stormwater BMPs that have the capacity to filter particulate and dissolved metals from runoff (**HYD-IAMF#1**). The station improvements include design measures to avoid or minimize the potential for impacts on groundwater resources, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be similar to those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. Stormwater treatment measures would filter particulate and dissolved metals associated with brake dust before being discharged into a waterbody or storm drainage system, reducing impacts on groundwater. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives. The Authority will implement permanent stormwater BMPs that have the capacity to filter particulate and dissolved metals from runoff (**HYD-IAMF#1**). The station improvements include design measures to avoid or minimize the potential for impacts on groundwater resources, as stated above for Shared Passenger Track Alternative A.

CEQA Conclusion

Impacts on groundwater volume, quality, and recharge could be increased because of more frequent rail service. With application of **HYD-IAMF#1**, the impact would be less than significant under CEQA because operation of the project will not violate groundwater quality standards or waste discharge requirements, will not conflict with or obstruct implementation of a sustainable groundwater management plan, and will not impede sustainable groundwater management of the basin. Furthermore, the project would not otherwise substantially degrade groundwater quality, substantially deplete groundwater supplies, or interfere with groundwater recharge. The project includes project features that would minimize permanent impacts on groundwater, such as designing track drainage systems and stormwater BMPs to facilitate infiltration of runoff and

managing the quality and quantity of runoff. These project features would minimize the exposure of pollutants to runoff and directly improve the quality of runoff that could percolate to groundwater. Therefore, CEQA does not require mitigation.

Impact HWR-12: Impact on Floodplains During Operations

Shared Passenger Track Alternative A

Effects on flooding could occur during in-water bridge maintenance activities, such as those requiring temporary coffer dams or other activities conducted in or near waters or drainages. Maintenance activities may temporarily disturb the following floodplains: Los Angeles River, Rio Hondo, San Gabriel River, Lakeland Road Storm Drain, North Fork Coyote Creek, Brea Creek, Lakeside Drive Storm Drain, Fullerton Creek, Gilbert Street and Artesia Avenue Storm Drain, Lawrence Avenue, Yale Avenue, Balcom Avenue Storm Drain, Carbon Creek, and the Southeast Anaheim Channel. Project operations and maintenance activities could result in increases in the potential for flooding from the impedance of materials or structures during a storm event. The Authority would avoid effects on floodflows by applying flood protection measures during maintenance-related activities; not conducting work during a storm event; and maintaining the ability to efficiently move maintenance equipment out of the floodplain. This would prevent conditions within the floodplain from exceeding the capacity of the flood control and drainage systems. During maintenance activities, maintenance workers would monitor weather conditions for heavy storms (and potential floodflows) so that maintenance crews would be able to relocate construction equipment used for maintenance activities that could impede flows and increase flood risks, thereby minimizing the potential flood risk.

Shared Passenger Track Alternative B

Impacts on floodplains during operation of Shared Passenger Track Alternative B would be the same as those of Shared Passenger Track Alternative A because similar in-water bridge maintenance activities may be necessary. The 15th Street LMF does not cross additional or different floodplains. The Authority would avoid effects on floodflows by applying flood protection measures during maintenance-related activities, would not conduct work during a storm event, and would maintain the ability to efficiently move maintenance equipment out of the floodplain. As a result, the project would avoid or minimize the potential for impacts on floodplains, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option would occur within a larger area than what would be required under the Shared Passenger Track Alternatives, but the site is not within a floodplain. In the event of a flood, the Authority would avoid effects on floodflows by applying flood protection measures during maintenance-related activities and would not conduct work during a storm event to ensure the capacity of drainage systems are not exceeded. As a result, the station improvements would avoid or minimize the potential for impacts on floodplains, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. Operation of the HSR station option would occur within a larger area than what would be required under the Shared Passenger Track Alternatives, but the site is not within a floodplain. In the event of a flood, the Authority would avoid effects on floodflows by applying flood protection measures during maintenance-related activities and would not conduct work during a storm event. As a result, the station improvements would avoid or minimize the potential for impacts on floodplains, as stated above for Shared Passenger Track Alternative A.

CEQA Conclusion

Impacts on floodplains would be less than significant under CEQA because operation of the project would not substantially alter drainage patterns resulting in flooding, impede or redirect floodflows, or expose people or structures to flood hazards during maintenance or operational activities. Therefore, CEQA does not require mitigation.

Impact HWR-13: Impact from Risk of Release of Pollutants from Inundation During Operations

Shared Passenger Track Alternative A

The project would be susceptible to potential flooding and associated risk of pollutant release in floodflows from dam failure during operation. Where the alignment passes near a waterbody or reservoir, operations could be affected by flooding during a seismic event. Portions of the project alignment are within the flood inundation zones of Hansen Dam, Carbon Canyon Dam, and Prado Dam. However, Shared Passenger Track Alternative A would not exacerbate the existing condition or potential for flooding as a result of dam failure.

In the unlikely event of a catastrophic failure of the Hansen Dam, water and pollutants could be conveyed downstream into the Los Angeles River. Depending on the volume of water released, there could be flooding effects at the river crossing that could result in inundation of portions of the project right-of-way. In the event of maximum dam release of Hansen Dam, the project site could be inundated by up to 2 feet average overbank depth (Cal OES 2018a). However, because of the distance between Hansen Dam and the project (approximately 20 miles), there would be sufficient warning to apply BMPs such as silt/sediment basins and traps, check dams, and sandbag dikes to control the release of pollutants. Portions of the project are also within the flood inundation zones of Whittier Narrows Dam, Brea Dam, Garvey Reservoir, Fullerton Dam, and Carbon Canyon Dam. There are no available data regarding inundation depths. Effects resulting from dam failure could include overland floodflows that inundate the project, such as tracks and roadways, as well as erosion of the railbed and ballast in at-grade or embankment track sections at locations within the dam inundation areas.

The eastern portions of the project corridor are within the mapped dam inundation areas for Prado Dam. USACE prepared an emergency plan indicating the inundation pathway of a complete breach of the dam at maximum reservoir capacity (Cal OES 1985). The worst-case inundation pathway would spread to the southwest and cross a portion of the project corridor in Buena Park, Fullerton, and Anaheim. Effects resulting from dam failure could include overland floodflows that would inundate the project corridor, such as tracks and roadways, as well as erosion of the railbed and ballast in at-grade or embankment track sections at locations within the dam inundation areas. In the event of maximum dam release for Prado Dam, portions of the project corridor could be inundated by up to 4 feet average overbank depth in Buena Park and to up to 6 feet average overbank depth in Fullerton and Anaheim (Cal OES 1985). However, the water would take up to 6 hours to arrive in Buena Park, and approximately 4.5 hours to arrive in Fullerton and Anaheim, so there would be sufficient warning provided to the public by the dam owner in coordination with emergency service providers (Cal OES 1985). In addition, dam owners in coordination with emergency service providers would apply temporary BMPs such as sandbag dikes and silt/sediment basins and traps to control the release of pollutants in a flood hazard.

Pursuant to Senate Bill 92 and as required by California Office of Emergency Services and FEMA, dam owners are required to develop emergency action plans for warning, evacuation, and post-flood actions (Cal OES 2018b). Train operation would cease in the event of dam failure and inundation that would endanger train and public safety. Shared Passenger Track Alternative A will include requirements to conduct a preliminary hazards analysis during design to determine and address facility hazards and vulnerabilities, thereby preventing impacts—such as risks of flooding and associated release of pollutants—that may occur during operations (as detailed in **SS-IAMF#3**). The Authority will apply the recommendations contained in the preliminary hazards analyses. With incorporation of these measures into project design, it is not anticipated that there would be a release of pollutants related to flood inundation.

Within the new project right-of-way, applicable site design, source control, LID design standards, stormwater treatment, and hydromodification management measures would be applied. Project-specific BMPs, such as bioswales or infiltration basins, would be developed and applied to treat a portion of floodflows before entering the stormwater drainage system or recharge basins. The Authority will prepare an SWMTP that complies with applicable MS4 permits (as detailed in **HYD-IAMF#1**). Existing pervious areas, biofiltration devices, infiltration devices, and media filters are permanent BMPs that are capable of removing pollutants such as particulate and dissolved metals from runoff. With application of permanent stormwater BMPs, a portion of floodflows would be treated and discharged in a manner that would reduce the release of pollutants from inundation. The Authority will implement Environmental Management System and hazardous materials monitoring plans to limit the potential for spills, limit the amount of hazardous materials used for operations, and establish cleanup protocols and trained personnel to prevent accidental spills of hazardous materials (as specified in **HMW-IAMF#9** and **HMW-IAMF#10**). In addition, **HYD-IAMF#3** requires application of a spill prevention and emergency response plan to handle potential fuel or hazardous material spills. With proper handling and storage of hazardous materials and proper cleanup of accidental spills, Shared Passenger Track Alternative A would not increase the risk of release of pollutants during inundation.

Shared Passenger Track Alternative B

Impacts from risk of release of pollutants from inundation during operation of Shared Passenger Track Alternative B would be the same as those of Shared Passenger Track Alternative A because similar inundation events could occur, and Shared Passenger Track Alternative A is within the same inundation zones. The project will include requirements to conduct a preliminary hazards analysis during design to determine and address facility hazards and vulnerabilities, thereby preventing impacts—such as risks of flooding and associated release of pollutants—that may occur during operations (**SS-IAMF#3**). The Authority will prepare an SWMTP that complies with applicable MS4 permits (as detailed in **HYD-IAMF#1**). Project-specific BMPs, such as bioswales or infiltration basins, would be developed and applied to treat a portion of floodflows before entering the stormwater drainage system. In addition, the Authority will implement system and hazardous materials monitoring plans to limit the potential for spills, limit the amount of hazardous materials used for operations, and establish cleanup protocols to prevent accidental spills of hazardous materials (**HMW-IAMF#9, HMW-IAMF#10**, and **HYD-IAMF#3**). Shared Passenger Track Alternative B includes **SS-IAMF#3**, **HYD-IAMF#1**, **HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3** to avoid or minimize the potential for impacts from risk of release of pollutants because of inundation, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Options

High-Speed Rail Station Option: Norwalk/Santa Fe Springs

With inclusion of the Norwalk/Santa Fe Springs HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. The HSR station option is within the same area that could potentially be affected in an inundation event. The Authority will prepare an SWMTP that identifies project-specific BMPs, such as bioswales or infiltration basins, which will treat a portion of floodflows before entering the stormwater drainage system in the event of a flood hazard (**HYD-IAMF#1**). In addition, the Authority will implement system and hazardous materials monitoring plans to limit the potential for spills and the amount of hazardous materials used for operations (**HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3**). The project design includes **SS-IAMF#3**, **HYD-IAMF#1**, **HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3** to avoid or minimize the potential for impacts from risk of release of pollutants because of inundation, as stated above for Shared Passenger Track Alternative A.

High-Speed Rail Station Option: Fullerton

With inclusion of the Fullerton HSR Station Option, impacts would be the same as those of the Shared Passenger Track Alternatives within the station area. The HSR station option is within the same area that could potentially be affected in an inundation event. The Authority will prepare an SWMTP that identifies project-specific BMPs, which will treat a portion of floodflows before entering the stormwater drainage system in the event of a flood hazard (**HYD-IAMF#1**). In

addition, the Authority will implement system and hazardous materials monitoring plans to limit the potential for spills and the amount of hazardous materials used for operations (**HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3**). The project design includes **SS-IAMF#3**, **HYD-IAMF#1**, **HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3** to avoid or minimize the potential for impacts from risk of release of pollutants because of inundation, as stated above for Shared Passenger Track Alternative A.

CEQA Conclusion

Impacts from risk of release of pollutants could result from inundation including dam failure. With application of **SS-IAMF#3**, **HYD-IAMF#1**, **HMW-IAMF#9**, **HMW-IAMF#10**, and **HYD-IAMF#3**, the impact under CEQA would be less than significant. The design of the project would not exacerbate existing flood conditions and would include effective measures to avoid or minimize the potential for exposure of the project to flooding and related risk of pollutant release. Therefore, CEQA does not require mitigation.

3.8.7 Mitigation Measures

The Authority has identified the mitigation measure described in this section for impacts under NEPA and significant impacts under CEQA that cannot be adequately avoided or minimized by IAMFs.

The Authority would implement **BIO-MM#62**, discussed in Section 3.7, as appropriate to further reduce the impacts of the project on hydrology and water quality resources, as identified in Section 3.8.6. Prior to initiating construction activity that occurs within open or flowing water, the Authority would prepare a dewatering plan, which will be subject to review and approval by the applicable regulatory agencies. The plan will incorporate measures to minimize turbidity and siltation. The Project Biologist would monitor the dewatering or water diversion sites, including collection of water quality data, as applicable.

3.8.7.1 Impact of Mitigation

This section evaluates the potential for mitigation measures (described in Section 3.8.7) to result in indirect (secondary) environmental effects. The types of impacts identified in this section are common to large infrastructure construction projects and are typically minimal and not significant. Adhering to applicable regulations and agency guidelines, coordinating with resource agencies, obtaining regulatory permits, and implementing standard BMPs and mitigation measures would further reduce potential indirect impacts. **BIO-MM#62** is not anticipated to result in secondary impacts. The dewatering plan will identify how to divert water from the work area in a manner that avoids or minimizes effects on resources to the maximum extent possible, and will avoid or minimize potential water quality impacts from dewatering activities.

3.8.7.2 Early Action Projects

None of the early action projects that are evaluated as part of the project would result in significant impacts related to hydrology and water resources under CEQA or result in an adverse impact under NEPA. Therefore, no mitigation measures specific to early action projects are required.

3.8.8 NEPA Impacts Summary

This section summarizes the impacts of the project and compares them to the anticipated impacts of the No Project Alternative. Under NEPA, project effects are evaluated based on the context, intensity, and duration. The project would have no adverse hydrology or water quality impacts with incorporation of project IAMFs as described in Section 3.8.4.2 and implementation of **BIO-MM#62**. Effects are assessed after mitigation measures.

3.8.8.1 No Project Alternative

Under the No Project Alternative, the Shared Passenger Track Alternatives and the HSR station options would not be built, and impacts on water resources would not be anticipated beyond those that could occur as a result of other approved projects. Under the No Project Alternative,

recent development trends in the project section are anticipated to continue, including operation of the existing regional transportation systems, and growth of the population in the RSA. Proposed highway, airport, and conventional rail systems described in adopted regional transportation plans and municipal general plans would likely be implemented. There are also planned industrial, residential, and associated infrastructure development projects such as shopping centers and wastewater conveyance upgrades. These growth initiatives and planned improvements could result in conversion of nontransportation lands to transportation uses and would also result in changes in hydrology and water quality from construction and operational activities, particularly for projects requiring crossings of watercourses. This conversion of land and construction and operation of highway, rail, and transit projects could modify local drainage patterns and runoff rates and could result in additional runoff entering waterways, potentially degrading water quality. Development and planned projects could place structures within the floodplains of nearby waterways and place these structures at risk of inundation, or floodflows could be diverted such that there could be off-site flooding. Development of structures within groundwater basins would increase areas of impermeable surfaces, potentially changing runoff volumes and contributing to declines in regional groundwater levels and quality.

An increase in traffic and vehicle miles traveled is expected with the No Project Alternative because more cars would be on the roadways compared to what would occur with implementation of the Shared Passenger Track Alternatives, as stated in Section 3.2, Transportation. Therefore, traffic congestion is likely to worsen with the No Project Alternative compared to the Shared Passenger Track Alternatives, resulting in a need for additional transportation facilities, which could result in associated hydrology and water quality impacts. For example, adding travel lanes for vehicles adds more impervious surfaces than rail facilities that could increase surface runoff and associated pollutants from the vehicles into receiving waterbodies. Water resources and water quality impacts related to construction and operation of the project, as summarized below, would not occur.

3.8.8.2 Shared Passenger Track Alternatives

Construction of the Shared Passenger Track Alternatives could result in temporary and permanent impacts on hydrology and water resources:

- **Impacts HWR-1, HWR-2, HWR-3, HWR-4, and HWR-11:** Design features for stormwater management (**HYD-IAMF#1**) and flood protection (**HYD-IAMF#2**), erosion and sedimentation controls (**HYD-IAMF#3**, **HYD-IAMF#4**), and protection of groundwater quality will minimize impacts on hydrology and water resources.
- **Impacts HWR-3, HWR-7, and HWR-8:** Transport, storage, use, and disposal of hazardous materials and generation, storage, or disposal of hazardous wastes, including primarily fuel in construction vehicles, during construction of the project could result in the release of runoff and pollutants into hydrology and water resources. **HMW-IAMF#6**, **HMW-IAMF#7**, **HMW-IAMF#8**, and **HMW-IAMF#9** will minimize effects from the release of hazardous materials into hydrology and water resources by ensuring that hazardous materials are transported in compliance with state and federal regulations, BMPs for hazardous materials storage and handling are followed, procedures for spill prevention are in place prior to construction, and the full inventory of hazardous materials in use during project construction is available to first responders.
- **Impacts HWR-3 and HWR-7:** Construction could result in erosion and release of sediments into hydrology and water resources as a result of stormwater runoff and during the transport, shipping, and use of construction materials and wastes. With **HYD-IAMF#3** and **HYD-IAMF#4**, the potential for inadvertent erosion and release of stormwater pollution into hydrology and water resources will be reduced.
- **Impacts HWR-3, HWR-7, and HWR-8:** During project construction, trenching and other ground-disturbing activities could encounter or disturb previously undocumented or unknown hazardous materials or contamination. These hazardous materials and contamination can be mobilized by wind or runoff and conveyed into surface waters or infiltrate into groundwater

resources. The Authority will require construction to comply with regulations that control the transport, use, storage, and disposal of hazardous materials (**HMW-IAMF#7**) and with the SWRCB CWA Section 402 CGP conditions and requirements (**HMW-IAMF#8**). These provisions would minimize the potential for hazardous materials exposure of workers or the public and release to the environment as a result of inadvertent disturbance of undocumented contamination.

- **Impacts HWR-3, HWR-5, HWR-7, HWR-8, and HWR-13:** Construction could expose workers, the public, or the environment to hazardous materials. These hazardous materials can be mobilized and conveyed into surface waters or infiltrate into groundwater resources. The following IAMFs would minimize, reduce, or avoid the impacts associated with construction on or near these sites:
  - An Environmental Management System (**HMW-IAMF#9**) establishing procedures to minimize potential accidents during transport of contaminated soils or groundwater and during remediation as a result of operational failure of treatment systems
  - Storage of excavated materials produced by construction activities (**BIO-IAMF#9**), in areas at or near construction sites
  - A construction site BMP field manual (**BIO-IAMF#11**) containing standard construction sites housekeeping practices required to be implemented by construction personnel
  - A hazards assessment (**SS-IAMF#3**) conducted prior to construction that includes an assessment of associated risk and application of control measures to reduce the risk to an acceptable level, such as flooding
  - A construction management plan that includes a component for controlling the amount of groundwater withdrawal (**GEO-IAMF#1**)
- **Impact HWR-6:** Construction has the potential to result in permanent impacts on groundwater volume, quality, and recharge. Increases in impervious cover could decrease infiltration, which can decrease the amount of water that is able to recharge the aquifer/ groundwater basin. Implementation of infiltration basins will promote additional surface water infiltration on site (**HYD-IAMF#1**) and will improve runoff quality from new or replaced impervious surfaces. The increase in the total new impervious surfaces would not affect existing groundwater recharge capabilities and would not interfere substantially with groundwater recharge.

Operation of the Shared Passenger Track Alternatives could result in temporary and permanent impacts on hydrology and water resources:

- **Impact HWR-9**: Operation and maintenance have the potential to affect drainage patterns and stormwater runoff. If necessary, surface flows would be temporarily diverted to nearby storm drains to maintain proper drainage and BMPs would be applied to minimize the potential for erosion and siltation. Standard stormwater housekeeping BMPs and measures would be implemented during maintenance activities to avoid or minimize impacts on drainage patterns, stormwater runoff, hydraulic capacity, or additional sources of polluted runoff (**BIO-IAMF#11**). The Authority will implement an SWMTP such that operational activities will comply with applicable MS4 permits to manage the quality and quantity of runoff (**HYD-IAMF#1**).
- **Impacts HWR-10 and HWR-13:** Operation and maintenance have the potential to affect the environment and the public through the transport, use, storage, and disposal of hazardous materials into hydrology and water resources for maintenance of HSR trains, track, LMF, track or equipment. The transport, use, storage, and disposal of hazardous materials would mainly occur at the LMF, although smaller quantities of hazardous materials could be intermittently used on tracks, at stations, or at yards. Storage and handling of hazardous materials, as well as disposal off site, would be done in accordance with applicable Certified Unified Program Agency, state, and federal regulations, which would reduce the potential for accidents and spills. Implementation of an Environmental Management System and

hazardous materials monitoring plans will reduce or avoid impacts (**HMW-IAMF#6, HMW-IAMF#7, HMW-IAMF#9, and HMW-IAMF#10**).

- **Impact HWR-12:** Operations and maintenance, including during in-water bridge maintenance activities, could result in effects on flooding. Effects on flooding could also result in increases in the potential for flooding from the impedance of materials or structures during a storm event. The Authority would avoid effects on floodflows by applying flood protection measures during maintenance-related activities, not conducting work during a storm event, and maintaining the ability to efficiently move maintenance equipment out of the floodplain. This would prevent conditions within the floodplain from exceeding the capacity of the flood control and drainage systems.
- **Impacts HWR-10 and HWR-13:** Operation and maintenance could result in the accidental release of hazardous materials, presenting health and safety risks to the public and workers, and contamination of the environment through mobilization into surface waters or groundwater resources. IAMFs include measures that require preparation of hazardous materials plans and an Environmental Management System that will limit the risks of upsets and accident conditions (**HMW-IAMF#7**, **HMW-IAMF#9**, and **HMW-IAMF#10**).
- **Impacts HWR-10 and HWR-11:** Operations could result in an intermittent degradation of water quality as a result of pollutant emissions associated with train braking, which generates brake dust, as well as from chemicals used during maintenance, such as herbicides and pesticides used for vegetation control.

Table 3.8-12 lists a comparison of the potential impacts of the project alternatives followed by a summary of the impacts.

Table 3.8-12 Comparison of Project Alternatives Impacts on Hydrology and Water Resources

Impacts	Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option		NEPA Conclusion Before Mitigation	Mitigation	NEPA Conclusion Post Mitigation			
			Norwalk/Santa Fe Springs	Fullerton			Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option	
									Norwalk/Santa Fe Springs	Fullerton
Impact HWR-1: Temporary Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Construction	Shared Passenger Track Alternative A would cross 11 water features. For water crossings with flowing water during construction, construction could alter existing drainage patterns and stormwater runoff. Up to approximately 891 acres of land would be disturbed. Construction activities could redirect and increase the volume and rate of shallow overland flows, increasing the potential for erosion and siltation in areas of exposed soils and along channel banks. Drainage patterns would be maintained to the extent feasible, and a SWPPP as prepared as part of compliance with the CGP and adherence with regulatory permits would minimize potential impacts on surface water hydrology.	Similar to Shared Passenger Track Alternative A. Up to approximately 939 acres of land would be disturbed, representing a larger footprint of similar types of impacts compared to Shared Passenger Track Alternative A. The increase in disturbed area is associated with the proposed 15th Street LMF, which would be on a larger area (63.1 acres) than the 26th Street LMF (54 acres). In addition, the 15th Street LMF would require deeper excavation depths than the 26th Street LMF. Greater excavation depths would result in increased soil disturbance. However, construction activities would be subject to a SWPPP as part of compliance with the CGP and would adhere to regulatory permits to minimize potential impacts on surface water hydrology.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Similar impacts to the Shared Passenger Alternatives within the station area. Construction of the Fullerton HSR Station Option platform, facilities, and parking would occur within a larger area than the area that would be disturbed as part of the Shared Passenger Track Alternatives. The additional area of temporary disturbance with inclusion of the Fullerton HSR Station Option would be up to 10 more acres.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A

Impacts	Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option		NEPA Conclusion Before Mitigation	Mitigation	NEPA Conclusion Post Mitigation			
			Norwalk/Santa Fe Springs	Fullerton			Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option	
									Norwalk/Santa Fe Springs	Fullerton
Impact HWR-2: Permanent Construction Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology)	Grading, impervious surfaces, new bridges and culverts, and modified drainage systems would result in minimal changes to drainage patterns and stormwater runoff. New rail and roadway crossings would maintain drainage patterns of waterbodies, and approximately 53 acres of new impervious surface would be built, increasing the percentage of impervious surfaces in the project section from 76% (existing) to 83%. Maintaining drainage patterns and preconstruction flow rates, a stormwater management and treatment plan, and the design of modified drainage systems would minimize permanent impacts on surface water hydrology.	Similar to Shared Passenger Track Alternative A. Approximately 61.5 acres of new impervious surface would be built. The percentage of impervious surfaces in the project section as part of Shared Passenger Track Alternative B would increase from 75% (existing) to 83%. Shared Passenger Track Alternative B would be similarly subject to an SWMTP, and the design of modified drainage systems would minimize permanent impacts on surface water hydrology.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Similar impacts to the Shared Passenger Track Alternatives within the station area. Inclusion of the Fullerton HSR Station Option would result in an additional 10 acres of disturbance and an additional 8.9 acres of new impervious surface cover.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A
Impact HWR-3: Temporary Impacts on Surface Water Quality During Construction	Grading, excavation, work in waterbodies and other activities that would disturb, destabilize, and stockpile soil would result in temporary impacts on surface water quality. Runoff from 891 acres of disturbed soil would be controlled to prevent elevated turbidity and sedimentation in receiving waterbodies. Construction activities would occur in waterbodies, which may be temporarily diverted and dewatered and physically disturb waterbodies. Applying construction site BMPs in accordance with a SWPPP and the CGP and adhering to regulatory permit conditions would reduce temporary water quality impacts.	Similar to Shared Passenger Track Alternative A. Construction activities associated with Shared Passenger Track Alternative B would disturb a larger area of soil (939 acres) than Shared Passenger Track Alternative A. However, Shared Passenger Track Alternative B would similarly apply construction BMPs in accordance with the SWPPP and CGP and adhere to regulatory permit conditions.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Similar impacts to the Shared Passenger Alternatives within the station area. Construction of the Fullerton HSR Station Option platform, facilities, and parking would occur within a larger area than the area necessary as part of the Shared Passenger Track Alternatives. The additional area of temporary disturbance with inclusion of the Fullerton HSR Station Option would be up to 10 more acres, but the types of temporary impacts would be similar in nature and no waterbodies would be crossed as part of construction of the station option.	Adverse effect (all alternatives and HSR station options)	BIO-MM#62	No adverse effect	No adverse effect	No adverse effect	No adverse effect

Impacts	Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option		NEPA Conclusion Before Mitigation	Mitigation	NEPA Conclusion Post Mitigation			
			Norwalk/Santa Fe Springs	Fullerton			Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option	
									Norwalk/Santa Fe Springs	Fullerton
Impact HWR-4: Permanent Impacts on Surface Water Quality During Construction	Land use change and impervious surfaces would have the potential to permanently affect surface water quality. Shared Passenger Track Alternative A would result in approximately 53 acres of new impervious surfaces, increasing the percentage of impervious surfaces in the project section from 76% (existing) to 83%. Implementing a stormwater management and treatment plan and application of BMPs and a SWPPP under the CGP would manage the quality and quantity of runoff generated by impervious surfaces and minimize potential impacts.	Similar to Shared Passenger Track Alternative A. Under Shared Passenger Track Alternative B, approximately 61.5 acres of new impervious surface would be built. The increase in the percentage of impervious surfaces in the project section as part of Shared Passenger Track Alternative B would increase from 75% (existing) to 83%.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Similar impacts as the Shared Passenger Track Alternatives within the station area. Inclusion of the Fullerton HSR Station Option would result in an additional 10 acres of disturbance and an additional 8.9 acres of impervious surface cover.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A
Impact HWR-5: Temporary Impacts on Groundwater Volume, Quality, and Recharge During Construction	Shared Passenger Track Alternative A would result in an increase of approximately 7%, or 53 acres, of impervious surfaces. Dewatering, excavations, and accidental leaks and spills of materials and waste throughout various locations in the project footprint would minimally affect groundwater quality and volume. Impacts would be reduced by adhering to the RWQCBs' dewatering requirements; a construction management plan; coordination with utility providers and the RWQCBs; and implementation of BMPs and project features regarding the management, transport, and disposal of construction waste and materials.	Similar to Shared Passenger Track Alternative A. Shared Passenger Track Alternative B would result in an increase of approximately 8%, or 61 acres, of impervious surfaces, as well as deeper excavation depths (up to 8 feet). Potential impacts would be reduced through similar means as described for Shared Passenger Track Alternative A.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Similar impacts as the Shared Passenger Alternatives within the station area. Construction of the Fullerton HSR Station Option platform, facilities, and parking would occur within a larger area than the area required as part of the Shared Passenger Track Alternatives. Although relocation of utilities could be up to 30 feet deep and would require dewatering during construction, the depth of excavation for the Fullerton HSR Station Option elements would likely not exceed 10 feet in depth for most of the site and the types of temporary impacts would be similar in nature as those described for the Shared Passenger Track Alternatives.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A

Impacts	Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option		NEPA Conclusion Before Mitigation	Mitigation	NEPA Conclusion Post Mitigation			
			Norwalk/Santa Fe Springs	Fullerton			Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option	
									Norwalk/Santa Fe Springs	Fullerton
Impact HWR-6: Permanent Impacts on Groundwater Volume, Quality, and Recharge During Construction	New impervious surfaces in groundwater subbasins (approximately 53 new acres or an increase from 76% to 83% of the project section), would minimally affect groundwater quality and volume, because implementation of stormwater BMPs to allow surface water infiltration would improve runoff quality that could affect groundwater resources and facilitate recharge.	Similar to Shared Passenger Track Alternative A. Approximately 61.5 new acres of impervious surface would be built. The new impervious surfaces in the project section as part of Shared Passenger Track Alternative B would increase the percentage of impervious surfaces within the project footprint from 75% (existing) to 83%. Shared Passenger Track Alternative B would similarly implement stormwater BMPs.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Similar impacts to the Shared Passenger Track Alternatives within the station area. Inclusion of the Fullerton HSR Station Option would result in an additional 8.9 acres of impervious surface cover.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A
Impact HWR-7: Temporary Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction	Shared Passenger Track Alternative A would disturb 891 acres. Construction would occur in 100-year floodplains. Temporary impacts would be minimized by implementation of a SWPPP under the CGP and an Environmental Management System and hazardous materials monitoring plans to prevent release of pollutants because of inundation. No tsunami or seiche hazards are anticipated because of the location of the project corridor.	Similar to Shared Passenger Track Alternative A. Shared Passenger Track Alternative B would disturb 939 acres, resulting in a greater area of temporary disturbance (48 acres) within the same floodplains as Shared Passenger Track Alternative A.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Same impacts as the Shared Passenger Track Alternatives within the station area.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A
Impact HWR-8: Permanent Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction	Construction would occur in 100-year floodplains. Implementation of a Flood Protection Plan would minimize development within floodplains; Implementation of BMPs and an Environmental Management System and hazardous materials monitoring plans would limit the potential for risk release of pollutants. No tsunami or seiche hazards are anticipated because of the location of the project corridor.	Same as Shared Passenger Track Alternative A.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Same impacts as the Shared Passenger Track Alternatives within the station area.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A

Impacts	Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option		NEPA Conclusion Before Mitigation	Mitigation	NEPA Conclusion Post Mitigation			
			Norwalk/Santa Fe Springs	Fullerton			Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option	
									Norwalk/Santa Fe Springs	Fullerton
Impact HWR-9: Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Operations	Operations and maintenance activities would result in minimal intermittent changes to drainage patterns and stormwater runoff. The quantity of runoff would be managed, as required by the applicable MS4 permits, which would minimize potential impacts.	Same as Shared Passenger Track Alternative A.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Same impacts as the Shared Passenger Track Alternatives within the station area.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A
Impact HWR-10: Impacts on Surface Water Quality During Operations	Brake dust and other contaminants released by trains during ongoing operation of the rail would be deposited into waterbodies. However, the electrically powered train technology with regenerative braking proposed for the HSR system and a SWMTP would minimize potential water quality impacts from brake dust and other contaminants to the maximum extent practicable using the best available technology. The design of stations and maintenance facilities would comply with the applicable MS4 permits, as well as the Industrial General Permit, and would include implementation of an SWMTP to minimize potential impacts.	Same as Shared Passenger Track Alternative A.	Similar impacts to the Shared Passenger Alternatives within the station area. Operation of the Norwalk/Santa Fe Springs HSR Station Option would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. However, brake dust would flow through stormwater treatment measures, reducing impacts on surface water quality. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives.	Similar impacts to the Shared Passenger Alternatives within the station area. Operation of the Fullerton HSR Station Option would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. However, brake dust would flow through stormwater treatment measures, reducing impacts on surface water quality. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A

Impacts	Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option		NEPA Conclusion Before Mitigation	Mitigation	NEPA Conclusion Post Mitigation			
			Norwalk/Santa Fe Springs	Fullerton			Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	With Inclusion of HSR Station Option	
									Norwalk/Santa Fe Springs	Fullerton
Impact HWR-11: Impacts on Groundwater Volume, Quality, and Recharge During Operations	There are new impervious surfaces that would be within groundwater recharge areas; however, stormwater management measures would allow for infiltration. The electrically powered train technology with regenerative braking proposed for the HSR system and a stormwater management and treatment plan would minimize potential water quality impacts from brake dust and other contaminants.	Same as Shared Passenger Track Alternative A.	Similar impacts to the Shared Passenger Alternatives within the station area. Operation of the Norwalk/Santa Fe Springs HSR Station Option would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. However, brake dust would flow through stormwater treatment measures, reducing impacts on groundwater quality. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives.	Similar impacts to the Shared Passenger Alternatives within the station area. Operation of the Fullerton HSR Station Option would result in greater amounts of brake dust, because trains must reduce their speed to approach the station. However, brake dust would flow through stormwater treatment measures, reducing impacts on groundwater quality. All other impacts related to surface water quality would be the same as those of the Shared Passenger Track Alternatives.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A
Impact HWR-12: Impact on Floodplains During Operations	Operations and maintenance activities would require intermittent activities in FEMA delineated floodplains, including in-water bridge maintenance. Potential impacts would be minimized through flood protection measures and by monitoring weather forecasts for intense storms and flood conditions.	Same as Shared Passenger Track Alternative A.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Same impacts as the Shared Passenger Track Alternatives within the station area.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A
Impact HWR-13: Impact from Risk of Release of Pollutants from Inundation During Operations	Operations and maintenance activities would require activities in areas susceptible to potential flooding. The Authority will prepare an SWMTP that complies with applicable MS4 permits. In addition, an Environmental Management System and hazardous materials monitoring plans would limit the potential for spills, limit the amount of hazardous materials used for operations, and establish cleanup protocols to prevent accidental spills of hazardous materials in the event of inundation.	Same as Shared Passenger Track Alternative A.	Same impacts as the Shared Passenger Track Alternatives within the station area.	Same impacts as the Shared Passenger Track Alternatives within the station area.	No adverse effect (all alternatives and HSR station options)	No mitigation needed	N/A	N/A	N/A	N/A

BMP = best management practice; CGP = Construction General Permit; FEMA = Federal Emergency Management Agency; HSR = high-speed rail; LMF = light maintenance facility; MS4 = Municipal Separate Storm Sewer System; N/A = not applicable; NEPA = National Environmental Policy Act; project section = Los Angeles to Anaheim Project Section; RWQCB = Regional Water Quality Control Board; SWMTP = stormwater management and treatment plan; SWPPP = stormwater pollution prevention plan

3.8.9 CEQA Significance Conclusions

As described in Section 3.8.4.5, Method for Determining Significance Under CEQA, the impacts of project actions under CEQA are evaluated against thresholds to determine whether a project action would result in no impact, a less-than-significant impact, or a significant impact. Table 3.8-13 provides a summary of the CEQA determination of significance for all construction and operational impacts for the project.

Table 3.8-13 CEQA Significance Conclusions for Hydrology and Water Resources

Impact	Impact Description and CEQA Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation	Source of Impact
Construction				
Impact HWR-1: Temporary Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Construction	Less than significant for both project alternatives and HSR station options: the project would comply with CGP requirements for minimizing surface water hydrology impacts during construction.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Impact HWR-2: Permanent Construction Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology)	Less than significant for both project alternatives and HSR station options: the project would comply with the CGP and applicable MS4 permit requirements for minimizing surface water hydrology impacts during construction.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Impact HWR-3: Temporary Impacts on Surface Water Quality During Construction	Significant for both project alternatives and HSR station options: there would be potential turbidity and siltation impacts from dewatering activities.	BIO-MM#62	Less than significant	All alternatives and HSR station options

Impact	Impact Description and CEQA Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation	Source of Impact
Impact HWR-4: Permanent Impacts on Surface Water Quality During Construction	Less than significant for both project alternatives and HSR station options: the project would comply with the CGP and applicable MS4 permit requirements for minimizing surface water quality impacts during construction.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Impact HWR-5: Temporary Impacts on Groundwater Volume, Quality, and Recharge During Construction	Less than significant for both project alternatives and HSR station options: the project would comply with dewatering requirements and would not result in temporary impacts on groundwater during construction.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Impact HWR-6: Permanent Impacts on Groundwater Volume, Quality, and Recharge During Construction	Less than significant for both project alternatives and HSR station options: the project would include stormwater BMPs and not result in permanent impacts on groundwater during construction.	No mitigation measures are required	Not applicable	All alternatives and HSR station options

Impact	Impact Description and CEQA Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation	Source of Impact
Impact HWR-7: Temporary Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction	Less than significant for both project alternatives and HSR station options: the project would comply with the CGP and apply BMPs to minimize the release of pollutants because of inundation during construction.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Impact HWR-8: Permanent Impacts on Flood Hazard, Tsunami, or Seiche Zones Resulting in the Risk of Release of Pollutants During Construction	Less than significant for both project alternatives and HSR station options: the project would comply with FEMA and applicable MS4 permit requirements to minimize the release of pollutants because of inundation during construction.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Operation				
Impact HWR-9: Impacts on Drainage Patterns, Stormwater Runoff, and Hydraulic Capacity (Surface Water Hydrology) During Operations	Less than significant for both project alternatives and HSR station options: the project would apply BMPs to minimize surface water hydrology impacts during operations.	No mitigation measures are required	Not applicable	All alternatives and HSR station options

Impact	Impact Description and CEQA Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation	Source of Impact
Impact HWR-10: Impacts on Surface Water Quality During Operations	Less than significant for both project alternatives and HSR station options: the project would comply with applicable MS4 permit and Stormwater General Permit requirements to minimize surface water hydrology impacts during operations.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Impact HWR-11: Impacts on Groundwater Volume, Quality, and Recharge During Operations	Less than significant for both project alternatives and HSR station options: the project would apply stormwater BMPs to minimize groundwater impacts during operations.	No mitigation measures are required	Not applicable	All alternatives and HSR station options
Impact HWR-12: Impact on Floodplains During Operations	Less than significant for both project alternatives and HSR station options: the project would apply flood protection measures to minimize impacts on floodplains during operations.	No mitigation measures are required	Not applicable	All alternatives and HSR station options

Impact	Impact Description and CEQA Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation	Source of Impact
Impact HWR-13: Impact from Risk of Release of Pollutants from Inundation During Operations	Less than significant for both project alternatives and HSR station options: the project would comply with FEMA and applicable MS4 requirements to minimize release of pollutants because of inundation during operations.	No mitigation measures are required	Not applicable	All alternatives and HSR station options

BMP = best management practice; CEQA = California Environmental Quality Act; CGP = Construction General Permit; FEMA = Federal Emergency Management Agency; HSR = high-speed rail; MS4 = Municipal Separate Storm Sewer System