4.10 Hydrology and Water Quality

4.10.1 Introduction

This section describes the regulatory and environmental setting for hydrology and water quality in in the vicinity of the Altamont Corridor Express (ACE) Extension. It also describes the impacts on hydrology and water quality that would result from implementation of the ACE Extension and the mitigation measures that would reduce significant impacts, where feasible and appropriate. Appendix N, *Dam Inundation Maps*, contains additional technical information for this section.

Section 4.16, *Safety and Security*, discusses the potential for accident conditions involving passenger trains that could affect water quality. Cumulative impacts on hydrology and water quality, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 5, *Other CEQA-Required Analysis.*

4.10.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to hydrology and water quality and applicable to the ACE Extension.

4.10.2.1 Federal

Clean Water Act

The primary federal law governing water quality is the Clean Water Act (CWA) of 1972. The CWA provides for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The CWA also limits the amount of pollutants that may be discharged and requires wastewater to be treated with the best treatment technology economically achievable regardless of receiving water conditions. The control of pollutant discharge is established through National Pollutant Discharge Elimination System (NPDES) permits that contain effluent limitations and standards. The U.S. Environmental Protection Agency (USEPA) has delegated responsibility for implementation of portions of the CWA, such as Sections 303, 401, and 402 (discussed in this section), to the State Water Resources Control Board (State Water Board).

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

California adopts water quality standards to protect beneficial uses of waters of the state as required by Section 303(d) of the CWA and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act). Section 303(d) of the CWA established the total maximum daily load (TMDL) process to guide the application of state water quality standards. Implementation of this program for the ACE Extension is conducted by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) (see Section 4.10.2.2, *State*). To identify candidate waterbodies for TMDL analysis, a list of water quality–impaired segments is generated by the State Water Board. These stream or river segments are impaired by the presence of pollutants such as sediment and are more sensitive to disturbance because of this impairment.

In addition to the impaired waterbody list required by CWA Section 303(d), CWA Section 305(b) requires states to develop a report assessing statewide surface water quality. Both CWA requirements are being addressed through the development of a 303(d)/305(b) Integrated Report, which addresses both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board developed a statewide 2012 California Integrated Report based on the Integrated Reports from each of the nine Regional Water Quality Control Boards (Regional Water Boards). The 2012 California Integrated Report was approved by the State Water Board on April 8, 2012, and approved by USEPA on July 30, 2015.

Clean Water Act Section 401—Water Quality Certification

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

As described in Chapter 2, *Description of Phase I Improvements*, and Chapter 3, *Description of Phase II Improvements*, construction of Phase I and II improvements may require obtaining a Water Quality Certification if permanent facilities or construction disturbance are proposed within state jurisdictional waters.

Clean Water Act Section 402—National Pollutant Discharge Elimination System

The 1972 amendments to the Federal Water Pollutant Control Act established the NPDES permit program to control discharges of pollutants from point sources (Section 402). The 1987 amendments to the CWA created a new section of the CWA devoted to stormwater permitting (402(p)). USEPA has granted the State of California (the State Water Board and Regional Water Boards) primacy in administering and enforcing the provisions of CWA and NPDES. NPDES is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States. CWA Section 402 also includes waste discharge requirements (WDR) for dewatering activities.

National Pollutant Discharge Elimination System Construction General Permit

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

The construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation, but do not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility (AECOM 2016a). ACE Extension improvements would require a Construction General Permit because they would involve disturbances to more than an acre of ground, including clearing, grading, and excavation activities.

The Construction General Permit allows non-stormwater discharge (NSWD) of dewatering effluent if the water is not contaminated and is properly filtered or treated, using appropriate technologies such as retention in settling ponds and filtration using gravel and sand filters. If the dewatering activity is deemed by the local Regional Water Board not to be covered by the Construction General Permit, then the discharger would be required to prepare a Report of Waste Discharge (RWD), and if approved by the local Regional Water Board, be issued site-specific WDRs under NPDES regulations. Site-specific WDRs contain rigorous monitoring requirements and performance standards that, when implemented, ensure that receiving water quality is not substantially degraded.

The discharge of dewatering effluent is authorized under the Construction General Permit if the following conditions are met.

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

If any of the above conditions are not satisfied, the discharge of dewatering effluent is not authorized by the Construction General Permit. The discharger must notify the local Regional Water Board of any anticipated NSWDs not already authorized by the Construction General Permit or another NPDES permit, to determine whether a separate NPDES permit is necessary.

National Pollutant Discharge Elimination System Industrial General Permit

The NPDES General Permit for Stormwater Discharges Associated with Industrial Activities (Order 2014-0057-DWQ) (Industrial General Permit) regulates stormwater discharges and authorized NSWDs under CWA Section 402 from specific categories of industrial facilities, including rail transportation facilities with fueling and equipment cleaning operations. The Industrial General Permit does not apply to industrial stormwater discharges and NSWDs that are regulated by other individual or general NPDES permits. The Industrial General Permit requires the use of BMPs, best available technology economically achievable (BAT), and best conventional pollutant control technology (BCT) to reduce and prevent discharges of pollutants to meet applicable water quality standards. The Industrial General Permit includes requirements for: training of personnel responsible for implementation of permit requirements; preparation of a SWPPP; and sampling, visual observations, reporting and record keeping (State Water Resources Control Board 2014).

National Pollutant Discharge Elimination System Municipal Stormwater Permits

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

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

Stormwater runoff from new stations and improvements associated with existing stations (e.g., station parking lots, driveways, pedestrian paths, and landscaped areas) would be regulated by various NPDES permits under the Municipal Storm Water Permitting Program. Currently, stormwater runoff from railroad track alignments within the Union Pacific Railroad (UPRR) right-of-way (ROW) is not actively regulated under municipal NPDES permits because UPRR is not included on the list of non-traditional Small MS4 Permittees (State Water Resources Control Board 2013). The various NPDES permits that would be applicable to the ACE Extension improvements are those associated with stations and are discussed in this section.

Central Valley Region

Stormwater discharges in the Central Valley Region (which includes San Joaquin County, Stanislaus County, and Merced County) are regulated by various NPDES permits, including those discussed in this section.

Central Valley Regional Phase I MS4

A regional Phase I MS4 NPDES Permit for municipal stormwater discharges (NPDES Permit No. CAS0085324, State Water Board Order No. R5-2016-0040) (Central Valley Permit became effective for the Central Valley Region (which includes San Joaquin County, Stanislaus County, and Merced County) beginning on October 1, 2016 (Central Valley Regional Water Quality Control Board 2016b). The Central Valley Permit will be locally overseen by the Central Valley Water Board. Owners and operators of large and medium MS4s (i.e., municipalities with populations greater than 100,000) are expected to enroll under the Central Valley Permit as their current individual Phase I MS4 Permits expire. Owners and operators of small regulated MS4s (i.e., municipalities with populations less than 100,000) that are currently enrolled under the State Water Board's Statewide General Phase II MS4 Permit may voluntarily enroll under the Central Valley Permit. Current individual Phase I MS4 Permits and the Statewide General Phase II MS4 Permit that are applicable to ACE Extension improvements are described in this section.

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

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

Although the permittee's Storm Water Management Plan may include its own definition of Priority Development Projects, that definition must be designed to achieve equivalent protection of water quality as that achieved with the above criteria (Central Valley Regional Water Quality Control Board 2016b). ACE Extension improvements associated with new stations in the Central Valley Region and layover facilities would be Priority Development Projects under the Central Valley Permit because they would add or create more than 5,000 square feet of impervious surface, with the exception of improvements at the **Existing Lathrop/Manteca Station**, where the improvements would be within the UPRR ROW.

San Joaquin County Phase I MS4 and City of Modesto Phase I MS4

Municipal stormwater discharges in San Joaquin County are currently regulated under the Phase I MS4 NPDES Permit No. CAS083470, State Water Board Order No. R5-2015-0024 (San Joaquin County Permit) (Central Valley Regional Water Quality Control Board 2015a). Municipal stormwater discharges in Modesto are currently regulated under the Phase I MS4 NPDES Permit No. CAS083526, State Water Board Order No. R5-2015-0025 (Modesto Permit) (Central Valley Regional Water Quality Control Board 2015b). The San Joaquin County Permit and Modesto Permit are locally overseen by the Central Valley Water Board. The San Joaquin County Permit and Modesto Permit indicate that the following Priority Development Projects will be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan for their respective projects.

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

ACE Extension improvements associated with new stations in San Joaquin County and Modesto would be Priority Development Projects because they would add or create more than 5,000 square feet of impervious surface, with the exception of improvements at the **Existing Lathrop/Manteca Station**, where the improvements would be within the UPRR ROW.

Statewide General Phase II MS4

Municipal stormwater discharges in Merced County and in areas of Stanislaus County outside Modesto are currently regulated under the State Water Board's Statewide General Phase II MS4 NPDES Permit No. CAS000004, State Water Board Order No. 2013-0001-DWQ (Small MS4 Permit) (State Water Resources Control Board 2013). The Small MS4 Permit is locally overseen by local municipalities and the Central Valley Water Board in the Central Valley Region. The Small MS4 Permit indicates that regulated projects are required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan for projects that create or replace 5,000

square feet or more of impervious surface, including development, redevelopment, and roadwork projects.

ACE Extension improvements associated with new stations and layover facilities in areas of Stanislaus County outside Modesto and in Merced County would be regulated projects because they add or create more than 5,000 square feet of impervious surface.

Clean Water Act Section 404—Dredge/Fill Permitting

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

A Section 404 Permit would be required for the ACE Extension improvements, if structure foundations, other permanent features, or construction activities occur within federal jurisdictional waters.

National Flood Insurance Program

In response to increasing costs of disaster relief, Congress passed the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The intent of these acts was to reduce the need for large, publicly funded, flood-control structures and disaster relief by restricting development on floodplains. The National Flood Insurance Program (NFIP) was created as a result of the passage of the National Flood Insurance Act of 1968. The Federal Emergency Management Agency (FEMA) administers the NFIP to provide subsidized flood insurance to communities that comply with FEMA regulations by limiting development in floodplains. FEMA issues Flood Insurance Rate Maps (FIRM) for communities participating in the NFIP. These maps delineate flood hazard zones in the community. A FIRM is the official map of a community prepared by FEMA to delineate both the special flood hazard areas (SFHA) and the flood risk premium zones applicable to the community.

The NFIP applies to ACE Extension improvements because portions of the corridor are in FEMA-designated SFHAs, as discussed in Section 4.10.3, *Environmental Setting*. SFHAs are defined as the areas that will be inundated by a flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1 percent annual chance flood is also referred to as the *base flood* or *100-year flood*. Other areas of flood hazards identified by FEMA include areas with reduced flood risk due to protection by levees.

Levees are also evaluated by FEMA as part of flood risk studies performed under the NFIP. Levees that meet the design, operation, and maintenance criteria outlined in Code of Federal Regulations (C.F.R.), Title 44, Part 65.10 are accredited by FEMA as providing protection from a 100-year flood when determining risk zones for NFIP maps. As described in C.F.R., Title 44, Part 65.10, for levee systems to continue being recognized by FEMA as providing protection from a 100-year flood, regular maintenance of the levees must be performed in accordance with an officially adopted maintenance plan that documents the formal procedure ensuring the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. All maintenance activities must be under the jurisdiction of a federal or state agency, an agency created by federal or

state law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance.

4.10.2.2 State

Porter-Cologne Water Quality Control Act

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

The act requires project proponents whose projects would result in discharging, or proposing to discharge, wastes that could affect the quality of the state's water to file a RWD with the appropriate Regional Water Board. The Porter-Cologne Act also requires that State Water Board or a Regional Water Board adopt basin plans for the protection of water quality. Basin plans are updated and reviewed every 3 years and provide the technical basis for determining WDRs, taking enforcement actions, and evaluating clean water grant proposals. A basin plan must include the following sections.

- A statement of beneficial water uses that the Regional Water Board will protect.
- Water quality objectives needed to protect the designated beneficial water uses.
- Strategies and time schedules for achieving the water quality objectives.

ACE Extension improvements lie within the jurisdiction of the Central Valley Water Board. Waters in the Sacramento River Basin and San Joaquin River Basin are under the jurisdiction of the Central Valley Water Board. The basin plan for these areas is *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region* (Central Valley Basin Plan), revised in 2016 (Central Valley Regional Water Quality Control Board 2016c). Counties within Central Valley Water Board's jurisdiction in which the ACE Extension improvements are located include San Joaquin, Stanislaus, and Merced Counties.

Regional Water Boards designate beneficial uses for all waterbody segments in their jurisdictions, and then set criteria necessary to protect these uses. Consequently, the water quality objectives developed for particular water segments are based on the designated use and vary depending on such use. The Central Valley Basin Plan specify region-wide and waterbody-specific beneficial uses. They have set numeric and narrative water quality objectives for several substances and parameters in numerous surface waters in their regions. Specific objectives for concentrations of chemical constituents are applied to bodies of water based on their designated beneficial uses (Central Valley Regional Water Quality Control Board 2016c). In addition, the State Water Board identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If it is determined that waters of the state are impaired for one or more constituents and the standards cannot be met through point-source or nonpoint-source controls (e.g., NPDES permits or WDRs), the CWA requires the establishment of TMDLs.

California Department of Fish and Game 1602

Under Chapter 6 of the California Fish and Game Code (Fish & G. Code), the California Department of Fish and Wildlife (CDFW) is responsible for the protection and conservation of the state's fish and wildlife resources. Section 1602 et seq. of the code defines the responsibilities of CDFW and

indicates that an entity may not "divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake," unless the CDFW informs the entity, in writing, that the activity will not substantially adversely affect an existing fish or wildlife resource; or if CDFW determines that the activity may substantially adversely affect an existing fish or wildlife resource and issues a final streambed alteration agreement to the entity that includes reasonable measures necessary to protect the resource, and the entity conducts the activity in accordance with the agreement.

ACE Extension improvements would involve permanent and temporary disturbances to the beds and banks of stream and rivers for the construction of bridges. Therefore, written notification of the construction activities would be provided to CDFW, in accordance with the notification requirements described in Fish & G. Code Section 1602. Streambed alteration agreements would be required for those construction activities that could adversely affect an existing fish or wildlife resource, as determined by CDFW.

California Department of Pesticide Regulation

California Department of Pesticide Regulation (DPR) is the lead agency for regulating the registration, sale, and use of pesticides in California. It is required by law to protect the environment, including surface waters, from adverse effects of pesticides by prohibiting, regulating, or controlling the use of such pesticides. DPR has surface water and groundwater protection programs that address sources of pesticide residues in surface waters and has preventive and response components that reduce the presence of pesticides in surface water and groundwater. The preventive component includes local outreach and promotion of management practices that reduce pesticide runoff and prevent continued movement of pesticides to groundwater in contaminated areas. To promote cooperation and to protect water quality from the adverse effects of pesticides, DPR and the State Water Board signed a Management Agency Agreement (MAA). The MAA, and its companion document, *The California Pesticide Management Plan for Water Quality* (Cal EPA and SWRCB 1997*)*, are intended to coordinate interaction, facilitate communication, promote problem solving, and ultimately protect water quality.

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

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

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

- Control flooding along the Sacramento and San Joaquin rivers and their tributaries in cooperation with USACE.

- Cooperate with various agencies of the federal, state, and local governments in establishing, planning, constructing, operating, and maintaining flood-control works.
- Maintain the integrity of the existing flood-control system and designated floodways through the board's regulatory authority by issuing permits for encroachments.

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

The Central Valley Flood Protection Act of 2008 directed the California Department of Water Resources (DWR) to prepare the Central Valley Flood Protection Plan (CVFPP) for CVFPB adoption (California Department of Water Resources 2012). The Central Valley Flood Protection Act of 2008 establishes that urban areas (i.e., any contiguous area in which more than 10,000 residents are protected by State Plan of Flood Control levees) require protection from flooding that has a 1-in-200 chance of occurring in any given year (200-year flood). ACE Extension improvements would encroach on levees and floodways under CVFPB's jurisdiction; therefore, compliance with the CVFPP would be required.

CEQA Court Rulings on "Reverse CEQA" and Sea Level Rise

The California Second District Court of Appeals has held that, although an environmental impact report (EIR) must analyze the environmental effects that may result from a project, an EIR is not required to examine the effects of the environment on a project (see *Ballona Wetlands Land Trust v. City of Los Angeles*, 201 Cal. App. 4th 455).

The California Supreme Court concluded in the *California Building Industry Association vs. Bay Area Air Quality Management District* (CBIA v. BAAQMD) decision, that "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or residents." The CBIA v. BAAQMD ruling provided for several exceptions to the general rule where an analysis of the project on the environment is warranted.

1. If the project would exacerbate existing environmental hazards (such as exposing hazardous waste that is currently buried)
2. If the project qualifies for certain specified exemptions (certain housing projects and transportation priority projects per California Public Resources Code [Public Res. Code] 21159.21 (f),(h); 21159.22 (a),(b)(3); 21159.23 (a)(2)(A); 21159.24 (a)(1),(3); or 21155.1 (a)(4),(6));
3. If the project is exposed to potential noise and safety impacts on the project occupants due to proximity to an airport (per Public Res. Code 21096)
4. School projects requiring specific assessment of certain environmental hazards (per Public Res. Code 21151.8).

4.10.2.3 Regional and Local

The San Joaquin Regional Rail Commission (SJRRC), a state joint powers agency, proposes improvements located within and outside of the UPRR ROW. The Interstate Commerce Commission Termination Act (ICCTA) affords railroads engaged in interstate commerce[1] considerable flexibility in making necessary improvements and modifications to rail infrastructure, subject to the requirements of the Surface Transportation Board. ICCTA broadly preempts state and local regulation of railroads and this preemption extends to the construction and operation of rail lines. As such, activities within the UPRR ROW are clearly exempt from local building and zoning codes and other land use ordinances. ACE Extension improvements proposed outside of the UPRR ROW, however, would be subject to regional and local plans and regulations. Though ICCTA does broadly preempt state and local regulation of railroads, SJRRC intends to obtain local agency permits for construction of facilities that fall outside of the UPRR ROW even though SJRRC has not determined that such permits are legally necessary and such permits may not be required.

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

4.10.3 Environmental Setting

This section describes the environmental setting related to hydrology and water quality by geographic segment for the ACE Extension improvements. For the purposes of this analysis, the study area for hydrology and water quality includes the watersheds, tributaries, and receiving streams that are connected to the environmental footprints for ACE Extension improvements, which may be affected by changes within the improvement footprint. Figure 4.10-1 depicts hydrologic basins and large watersheds and Figure 4.10-2 depicts the groundwater basins and subbasins of the study area for hydrology and water quality.

The information presented in this section regarding locations of watersheds, subwatersheds, and surface waters was obtained from the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) (U.S. Geological Survey 2014).

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

[1] ACE operates within a ROW and on tracks owned by the UPRR, which operates interstate freight rail service in the same ROW and on the same tracks.

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

4.10.3.1 Regional Hydrology, Water Quality, and Flooding

Regional Hydrology and Water Quality

As shown in Figure 4.10-1, the ACE Extension improvements are located in watersheds of the San Joaquin River Basin, which drains to the San Joaquin River. The San Joaquin River discharges to the Sacramento–San Joaquin Delta (Delta), which discharges to San Francisco Bay. The San Joaquin River Basin includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Unless otherwise designated by the Central Valley Water Board, all groundwater in the San Joaquin River Basin is considered suitable or potentially suitable, at a minimum, for beneficial uses listed in Table 4.10-1 (Central Valley Regional Water Quality Control Board 2016c).

In general, groundwater quality throughout the region is suitable for most urban and agricultural uses with only local impairments. A variety of historical and ongoing industrial, urban, and agricultural activities and their associated discharges degrade groundwater quality (California Department of Water Resources 2003). The primary pollutant sources and constituents of concern are listed in Table 4.10-1. The existing and potential beneficial uses of the San Joaquin River are listed in Table 4.10-1. The State Water Board has listed various segments of the San Joaquin River as an impaired waterbody due to impacts from pollutants (State Water Resources Control Board 2012a). The San Joaquin River Basin has both currently underway and completed TMDL projects (Central Valley Regional Water Quality Control Board 2016a). Pollutants causing impairment and TMDLs that have been approved by USEPA and officially incorporated into the Central Valley Basin Plan are listed in Table 4.10-1.

Table 4.10-1. Overview of Watershed Basin Traits

Watershed Basin	Groundwater Beneficial Uses	Primary Sources of Groundwater Contamination and Constituents of Concern	Surface Water Beneficial Uses	Surface Water Pollutants and Established TMDLs
San Joaquin River Basin	Municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply.	Concentration of salts due to evaporation and poor drainage, disposal of human and animal waste products and fertilizer, agricultural pesticides and herbicides, and industrial organic contaminants. Constituents of Concern are TDS, nitrate, boron, chloride, organic compounds.	Municipal and domestic supply, agricultural supply, industrial supply, contact and non-contact recreation, warm and cold freshwater habitat, fish migration and spawning, and wildlife habitat.	Pesticides and heavy metals. TMDLs established for pesticides including diazinon and chlorpyrifos, metals including selenium and boron, salt, and dissolved oxygen.

Sources: Central Valley Regional Water Quality Control Board 2016c; California Department of Water Resources 2003; State Water Resources Control Board 2012a.
TDS = total dissolved solids
TMDL = total maximum daily load

Regional Flooding

Flooding hazards can potentially occur in the Central Valley region, where the ACE Extension improvements would be located, as a result of storms, dam or levee failure, and rarely, seiches. Because the ACE Extension improvements would not be located in coastal areas, the ACE Extension would not be subject to tsunamis, extreme high tide, or sea level rise (SLR) and these topics are not discussed.

Storm-Related Flooding

Storm-related flooding can occur as a result of heavy rainfall and overflowing of watercourses. Storm-related flooding hazards are mapped by FEMA for areas throughout the United States. Additional mapping and evaluation of flood hazards has been performed by DWR for the Sacramento-San Joaquin Valley, where flood risks are among the highest in the nation (California Department of Water Resources 2012). The storm-related flooding hazards for the study area are based on information obtained from FEMA's National Flood Hazard Layer (NFHL) (Federal Emergency Management Agency 2015) and DWR's Best Available Maps (California Department of Water Resources 2015a). In the Sacramento-San Joaquin Valley, DWR has mapped areas of potential flood risks that may warrant further studies or analyses for land-use decision making, including areas that would be inundated by a flood event having a 0.5 percent chance of being equaled or

exceeded in any given year, also referred to as a 200-year flood (California Department of Water Resources 2015a).

Dam and Levee Failure

Dam or levee failure can be caused by earthquakes or overflow and can result in flooding of large areas below the dam or levee. The safety of dams in California falls under the jurisdiction of the DWR, Division of Safety of Dams, except for dams that are owned and operated by the federal government, which are under the jurisdiction of the U.S. Bureau of Reclamation. The safety of dams that produce hydroelectric power are also under the jurisdiction of the Federal Energy Regulatory Commission. Existing dams under state and federal jurisdiction are periodically inspected to ensure that they are adequately maintained and that identified deficiencies are corrected. Regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure.

Appendix N provides the dam inundation maps for San Joaquin, Stanislaus, and Merced Counties—where ACE Extension improvements are proposed. Areas of potential dam failure inundation in the study area are not discussed in detail because the potential dam failure inundation would be widespread, shallow, and would include slower-moving floodwaters due to the large distances across relatively flat land located between the ACE Extension improvements and dams.

As discussed in Section 4.10.2.1, *Federal*, levees are evaluated by FEMA as part of flood risk studies performed under the NFIP. For levee systems to continue being recognized by FEMA as providing protection from a 100-year flood, regular maintenance of the levees must be performed in accordance with an officially adopted maintenance plan. The maintenance plan documents the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained.

Seiche

A *seiche* is the oscillation of a body of water. Seiches occur most frequently in enclosed or semi-enclosed basins such as lakes, bays, or harbors. They can be triggered in an otherwise still waterbody by strong winds, changes in atmospheric pressure, earthquakes, tsunamis, or tides. Triggering forces that produce a seiche are most effective if they operate at specific frequencies relative to the size of an enclosed basin. Coastal measurements of sea level often show seiches with amplitudes of a few centimeters and periods of a few minutes due to oscillations of the local harbor, estuary, or bay superimposed on the normal tidal changes. To produce significant seiching in a waterbody, the forcing periods must be close to the natural period of the waterbody or one of the overtones[3] of the waterbody. Seiching could potentially occur in reservoirs, which could cause overtopping of dams and flooding of areas down-gradient of dams. The flooding resulting from overtopping of a dam by seiching would be expected to be similar to or less severe than the flooding caused by catastrophic failure of a dam. Therefore, the impacts related to the potential for seiching in reservoirs to cause flooding by overtopping dams would be similar to the discussion of flooding caused by dam failures.

[3] *Overtones* are natural oscillation frequencies that are higher than the fundamental oscillation frequency.

4.10.3.2 Lathrop to Ceres

Watersheds

As illustrated in Figure 4.10-1, the Lathrop to Ceres segment is in the San Joaquin Delta watershed, Upper Stanislaus watershed, Upper Tuolumne watershed, and Lower San Joaquin Delta watershed of the San Joaquin River Basin. The San Joaquin Delta watershed drains an area of approximately 1,230 square miles extending from the east side of the Diablo Range to the east side of the Central Valley, and from the Stanislaus River to the south to the Delta to the north, where it discharges into the Delta. The Upper Stanislaus watershed drains an area of approximately 1,200 square miles surrounding the Stanislaus River extending from the Sierra Nevada to the Central Valley where the Stanislaus River discharges into the San Joaquin River. The Upper Tuolumne watershed drains an area of approximately 1,900 square miles surrounding the Tuolumne River extending from the Sierra Nevada to the Central Valley where the Tuolumne River discharges into the San Joaquin River. The Lower San Joaquin Delta watershed drains an area of approximately 920 square miles into the San Joaquin River extending from the east side of the Diablo Range to the east side of the Central Valley, between the Tuolumne River to the north and the Merced River to the south.

Subwatersheds and Surface Waters

Figures 4.10-3 and 4.10-4 illustrate the subwatersheds and surface waters that may receive runoff from the ACE Extension improvements in the Lathrop to Ceres segment. Table 4.10-2 lists the subwatersheds intersected by the ACE Extension improvements in the Lathrop to Ceres segment and surface waters crossed by or within 0.5 mile that may receive runoff.

Table 4.10-2. Lathrop to Ceres—Subwatersheds and Surface Waters That May Receive Runoff

ACE Extension Improvements	Subwatersheds Intersected	Surface Waters Crossed or Within 0.5 Mile That May Receive Runoff
Existing Lathrop/Manteca Station	Oakwood Lake-San Joaquin River, Town of French Camp-San Joaquin River	Unnamed canal ditch tributary to French Camp Slough
Relocated Lathrop/Manteca Station alternative	Oakwood Lake-San Joaquin River	Unnamed canal ditch tributary to French Camp Slough
North Lathrop Station	Town of French Camp-San Joaquin River	Unnamed canal ditch tributary to French Camp Slough
Oakland-Fresno Subdivision Connection	Town of French Camp-San Joaquin River	Unnamed canal ditches tributary to French Camp Slough
Ceres Extension Alignment	Town of French Camp-San Joaquin River, Oakwood Lake-San Joaquin River, Walthall Slough-San Joaquin River, Boscha Lake (Historical)-Stanislaus River, Miller Lake, Riley Slough, Town of Riverdale Park-Tuolumne River, Turlock Lake	Unnamed canal ditches tributary to French Camp Slough, unnamed canal ditches tributary to Stanislaus River, Stanislaus River, Lateral Number Six (canal), Lateral Number Seven (canal), unnamed canal, Root Lateral (canal), Tuolumne River, and an unnamed canal ditch
Downtown Manteca Station	Town of French Camp-San Joaquin River	None

ACE Extension Improvements	Subwatersheds Intersected	Surface Waters Crossed or Within 0.5 Mile That May Receive Runoff
Ripon Station	Walthall Slough-San Joaquin River	Stanislaus River
Modesto Station	Town of Riverdale Park-Tuolumne River	None
Ceres Station	Turlock Lake	None
Ceres Layover Facility, variant 1 alternative	Turlock Lake	Unnamed canal ditch
Ceres Layover Facility, variant 2	Lake Ramona-San Joaquin River	Unnamed canal ditch

Source: U.S. Geological Survey 2014

Beneficial Use of Surface Waters and Water Quality

Table 4.10-3 lists the existing and potential beneficial uses designated in the Central Valley Basin Plan for surface waters that could receive runoff from the ACE Extension improvements in the Lathrop to Ceres segment. Surface waters listed in Table 4.10-2 but not listed in Table 4.10-3 are not surface waters with beneficial uses identified in the Central Valley Basin Plan.

Table 4.10-3. Lathrop to Ceres—Beneficial Uses of Surface Waters

Waterbodies	Agricultural Water Supply	Municipal & Domestic Water Supply	Industrial Process & Service Supply	Commercial and Sport Fishing	Hydropower Generation	Cold Freshwater Habitat	Fish Migration	Fish Spawning	Warm Freshwater Habitat	Wildlife Habitat	Water Contact Recreation	Non-Contact Water Recreation	Navigation
Delta Waterways (includes French Camp Slough)[a]	E	E	E	E		E	E	E	E	E	E	E	E
Stanislaus River	E	P	E	E		E	E	E	E	E	E	E	
Tuolumne River	E	P				E	E	E	E	E	E	E	

Source: Central Valley Regional Water Quality Control Board 2016c.
E = existing beneficial use
P = potential beneficial use
[a] Beneficial uses vary throughout the Delta and are evaluated on a case-by-case basis.

Table 4.10-4 lists impaired waterbodies included on the State Water Board's 303(d) list that could receive runoff, the pollutants of concern and whether they have approved TMDLs, potentially contributing tributaries to the impaired waterbodies, and the ACE Extension improvements in the vicinity of the tributaries or the impaired waterbodies.

Table 4.10-4. Lathrop to Ceres—Impaired Waterbodies

Impaired Waterbody	Pollutants	Potentially Contributing Tributaries to Impaired Waterbody	ACE Extension Improvements in the Vicinity of Tributaries or the Impaired Waterbody
French Camp Slough	Chlorpyrifos, diazinon, E.coli, dissolved oxygen, unknown toxicity	Unnamed canal ditches	Existing Lathrop/Manteca Station, Relocated Lathrop/Manteca Station alternative, North Lathrop Station
Stanislaus River	Chlorpyrifos, diazinon, group A pesticides, mercury, temperature, unknown toxicity	Unnamed canal ditches	Ceres Extension Alignment
Tuolumne River	Chlorpyrifos, diazinon, group A pesticides, mercury, temperature, unknown toxicity	None	Ceres Extension Alignment

Source: State Water Resources Control Board 2012a.
TMDL = total maximum daily load
DDT = Dichlorodiphenyltrichloroethane
E.coli = Escherichia coli

Groundwater

As illustrated on Figure 4.10-2, the Lathrop to Ceres segment is in the Eastern San Joaquin Subbasin (Basin ID 5-22.15), the Modesto Subbasin (Basin ID 5-22.02), and the Turlock Subbasin (Subbasin ID 5-22.03) of the San Joaquin Valley Groundwater Basin (Basin ID 5-22) (California Department of Water Resources 2015b). As a result of declining water levels in the Eastern San Joaquin Subbasin, saline groundwater has been moving east along the east side of the Delta. Large areas of elevated nitrate in groundwater also exist within the Eastern San Joaquin Subbasin (California Department of Water Resources 2015b). The Modesto Subbasin contains areas of hard groundwater and localized areas of high chloride, boron, 1,2-dibromo-3-chloropropane (DBCP), nitrate, iron, and manganese (California Department of Water Resources 2015b). The Turlock Subbasin contains localized areas of hard groundwater and elevated nitrate, chloride, boron, and DBCP.

Flooding Hazards

Figures 4.10-5 and 4.10-6 illustrate potential flooding hazards for the Lathrop to Ceres segment including 100- and 200-year flood zones and areas with reduced flood risk due to levees. Table 4.10-5 lists the types of flood hazards applicable to the San Joaquin River Basin, and indicates which types of flood hazard zones are intersected by the Lathrop to Ceres segment.

Table 4.10-5. Lathrop to Ceres—Types of Flood Hazard Zones Intersected by ACE Extension Improvements

ACE Extension Improvement	100-Year Flood[a]	200-Year Flood[b]	Areas with Reduced Flood Risk Due to Levees[a]	Dam Failure Inundation[c]
Existing Lathrop/Manteca Station	--	X	X	X
Relocated Lathrop/Manteca Station alternative	--	X	X	X
North Lathrop Station	--	X	X	X
Oakland Fresno Subdivision Connection	--	--	X	X
Ceres Extension Alignment	X	X	--	X
Downtown Manteca Station	--	--	--	X
Ripon Station	--	--	--	X
Modesto Station	--	--	--	X
Ceres Station	--	--	--	--
Ceres Layover Facility, variant 1 alternative	--	--	--	--
Ceres Layover Facility, variant 2	--	--	--	--

Sources:
[a] Federal Emergency Management Agency 2015
[b] California Department of Water Resources 2015a
[c] County of San Joaquin 1992, County of Stanislaus 2016

4.10.3.3 Ceres to Merced

Watersheds

As illustrated in Figure 4.10-1, the Ceres to Merced segment is in the Lower San Joaquin Delta watershed, Upper Merced watershed, and Middle San Joaquin-Lower Chowchilla watershed of the San Joaquin River Basin. The Lower San Joaquin Delta watershed drains an area of approximately 920 square miles into the San Joaquin River extending from the east side of the Diablo Range to the east side of the Central Valley, between the Tuolumne River to the north and the Merced River to the south. The Upper Merced watershed drains an area of approximately 1,270 square miles surrounding the Merced River extending from the Sierra Nevada to the Central Valley where the Merced River discharges into the San Joaquin River. The Middle San Joaquin-Lower Chowchilla watershed drains an area of approximately 3,500 square miles into the San Joaquin River extending from the east side of the Diablo Range to the foothills of the Sierra Nevada, between the Merced River to the north and the east-west trending section of the San Joaquin River to the south.

Subwatersheds and Surface Waters

Figure 4.10-7 and 4.10-8 illustrates the subwatersheds and surface waters that may receive runoff from the ACE Extension improvements in the Ceres to Merced segment. Table 4.10-6 lists the subwatersheds intersected by ACE Extension improvements in the Ceres to Merced segment and surface waters crossed by or within 0.5 mile that may receive runoff.

Table 4.10-6. Ceres to Merced—Subwatersheds and Surface Waters That May Receive Runoff

ACE Extension Improvement	Subwatersheds Intersected	Surface Waters Crossed or Within 0.5 Mile That May Receive Runoff
Merced Extension Alignment	Turlock Lake, Lake Ramona-San Joaquin River, Pear Slough-San Joaquin River, Jones Drain-Merced River, Shag Slough-San Joaquin River, City of Winton-Bear Creek, Black Rascal Creek-Bear Creek, Canal Creek, Lower Black Rascal Creek, Bear Creek, Lower Owens Creek	Unnamed canal ditches, Upper Lateral Number Three (canal), Upper Lateral Number Four (canal), unnamed canal ditches tributary to Highline Canal, Highline Canal, Merced River, Hammatt Lateral (canal), Arena Canal, unnamed canal ditches, Atwater Canal, Atwater Drain (canal ditch), unnamed canal ditches tributary to Canal Creek, Canal Creek, Hesse Lateral (canal), unnamed canal tributary to Bear Creek, Bear Creek
Turlock Bus Stop	Pear Slough-San Joaquin River	Upper Lateral Number Four (canal)
Turlock Station	Pear Slough-San Joaquin River	Upper Lateral Number Four(canal)
Livingston Bus Stop	City of Winton-Bear Creek	Hammatt Lateral (canal)
Livingston Station	City of Winton-Bear Creek	Hammatt Lateral (canal)
Atwater Station	City of Winton-Bear Creek	Atwater Drain (canal ditch)
Atwater Bus Stop	City of Winton-Bear Creek	Atwater Drain (canal ditch)
Merced Layover Facility	Bear Creek	Hesse Lateral (canal), unnamed canal tributary to Bear Creek, Bear Creek
Merced Bus Stop	Lower Owens Creek	None
Merced Station	Lower Owens Creek	None

Source: U.S. Geological Survey 2014

Beneficial Uses of Surface Waters and Water Quality

Table 4.10-7 lists the existing and potential beneficial uses designated in Central Valley Basin Plan for surface waters that could receive runoff from the ACE Extension improvements in the Ceres to Merced segment. Surface waters listed in Table 4.10-6 but not listed in Table 4.10-7 are not surface waters with beneficial uses identified in the Central Valley Basin Plan.

Table 4.10-7. Ceres to Merced—Beneficial Uses of Surface Waters

Waterbodies	Agricultural Water Supply	Municipal & Domestic Water Supply	Industrial Process & Service Supply	Hydropower Generation	Commercial and Sport Fishing	Cold Freshwater Habitat	Fish Migration	Fish Spawning	Warm Freshwater Habitat	Wildlife Habitat	Water Contact Recreation	Non-Contact Water Recreation	Navigation
Merced River	E	E	E	E		E	E	E	E	E	E	E	

Source: Central Valley Regional Water Quality Control Board 2016c.
E = existing beneficial use

Table 4.10-8 lists impaired waterbodies included on the State Water Board's 303(d) list that could receive runoff from alternatives in the Ceres to Merced segment, the pollutants of concern and whether they have approved TMDLs, potentially contributing tributaries to the impaired waterbodies, and the ACE Extension improvements in the vicinity of the tributaries or the impaired waterbodies.

Table 4.10-8. Ceres to Merced—Impaired Waterbodies

Impaired Waterbody	Pollutants	Potentially Contributing Tributaries to Impaired Waterbody	ACE Extension Improvement in the Vicinity of Tributaries or the Impaired Waterbody
Highline Canal	Chlorpyrifos, sediment toxicity, simazine, unknown toxicity	Unnamed canal ditches	Merced Extension Alignment
Merced River	Chlorpyrifos, diazinon, E.coli, group A pesticides, mercury, temperature, unknown toxicity	None	Merced Extension Alignment
Bear Creek	E. coli, unknown toxicity	None	Merced Extension Alignment, Merced Layover Facility

Source: State Water Resources Control Board 2012a

Groundwater

As illustrated on Figure 4.10-2, the Ceres to Merced segment is in the Turlock Subbasin (Subbasin ID 5-22.03) and Merced Subbasin (Subbasin ID 5-22.04) of the San Joaquin Valley Groundwater Basin (California Department of Water Resources 2015b). The Turlock Subbasin contains localized areas

of hard groundwater and elevated nitrate, chloride, boron, and DBCP. The Merced Subbasin contains localized areas of hard groundwater and elevated iron, nitrate, and chloride (California Department of Water Resources 2015b).

Flooding Hazards

Figures 4.10-9 and 4.10-10 illustrates potential flooding hazards for the Ceres to Merced segment including 100- and 200-year flood zones. Table 4.10-9 lists the types of flood hazards applicable to the San Joaquin River Basin, and indicates which types of flood hazard zones are intersected by alternatives of the Ceres to Merced segment.

Table 4.10-9. Ceres to Merced—Types of Flooding Hazard Zones Intersected by ACE Extension Improvements

ACE Extension Improvement	100-Year Flood[a]	200-Year Flood[b]	Areas with Reduced Flood Risk Due to Levees[a]	Dam Failure Inundation[c]
Merced Extension Alignment	X	--	--	X
Turlock Bus Stop	--	--	--	--
Turlock Station	--	--	--	--
Livingston Bus Stop	--	--	--	X
Livingston Station	--	--	--	X
Atwater Station	--	--	--	--
Atwater Bus Stop	--	--	--	--
Merced Layover Facility	X	--	--	--
Merced Bus Stop	X	--	--	--
Merced Station	X	--	--	--

Sources:
[a] Federal Emergency Management Agency 2015
[b] California Department of Water Resources 2015a
[c] County of Stanislaus 2016, County of Merced 2013

4.10.4 Impact Analysis

This section describes the environmental impacts of the ACE Extension improvements on hydrology and water quality. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate significant impacts are provided, where appropriate.

4.10.4.1 Methods for Analysis

Potential impacts related to hydrology and water quality were evaluated based on a review of available information regarding watersheds, surface waters, groundwater, flooding hazards, and stormwater control and treatment requirements within the study area. Principle sources consulted during the analysis are listed here.

- The Central Valley Basin Plan (Central Valley Regional Water Quality Control Board 2016c).
- MS4 Permits for cities and counties intersected by ACE Extension improvements.

- Construction General Permit (State Water Resources Control Board 2012b).
- Industrial General Permit (State Water Resources Control Board 2014)
- USGS's NHD (U.S. Geological Survey 2014).
- The State Water Board's 303(d) List (State Water Resources Control Board 2012a).
- FEMA's NFHL (Federal Emergency Management Agency 2015).
- DWR's Best Available Maps (California Department of Water Resources 2015a).
- General plans from cities and counties intersected by ACE Extension improvements.
- Hydrology studies performed for the project including Preliminary Hydrology and Drainage Reports (AECOM 2015, 2016b), a Preliminary Stormwater Management Plan (AECOM 2016a), and a Preliminary Floodplain Impact Report (AECOM 2016c).

The approach to evaluating impacts on hydrology and water quality is generally the same for both Phase I and Phase II improvements. The following approaches were used to evaluate the potential for hydrology and water quality–related impacts as a result of Phase I and Phase II improvements.

- Evaluation of potential discharges of contaminants and sediments from Phase I and Phase II improvements that could affect surface waters and/or groundwater.
- Evaluation of Phase I and Phase II improvements that would require dewatering or increase impervious surfaces to evaluate potential impacts on groundwater supplies.
- Evaluation of Phase I and Phase II improvements that would alter drainage to determine potential impacts on stormwater drainage systems and surface waters.
- Evaluation of encroachments into drainage courses (e.g., rivers, creeks, sloughs, canals, ditches) and floodplains to determine whether Phase I and Phase II improvements could be affected by, impede, or redirect flood flows from flood events.
- Evaluation of Phase I and Phase II improvements that may be subject to flooding hazards such as seiche, tsunami, mudflow, levee failure, and dam failure to determine whether the Phase I and Phase II improvements could contribute to inundation associated with such flooding hazards.

Increases in impervious surfaces associated with Phase I improvements have been determined, and therefore the specific MS4 Permit requirements for stormwater controls that would be applicable to the Phase I improvements are presented in this analysis. However, increases in impervious surfaces associated with Phase II improvements have not been quantified at this time, and therefore potentially applicable MS4 Permit requirements for stormwater control are described generally in this analysis.

4.10.4.2 Thresholds of Significance

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

An impact would be considered significant if construction or operations of the project would have any of the following consequences.

- Violate any water quality standards or WDRs.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or FIRM or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Contribute to inundation by seiche, tsunami, or mudflow.[4]

4.10.4.3 Phase I Improvements Impacts and Mitigation Measures

Impact HYD-1	Construction of Phase I improvements could violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality.
Level of Impact	Potentially significant
Mitigation Measures	HAZ-2.3: Implement construction risk management plan HYD-1.1: Avoid water quality impacts from groundwater or dewatering discharges HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters HYD-7.1: Limit groundwater or dewatering discharge flow rates
Level of Impact after Mitigation	Less than significant

[4] Mudflows are a type of landslide. Impacts associated with landslides and unstable soils are discussed in Section 4.7, *Geology and Soils*, and potential impacts associated with mudflows are not discussed in this section.

Impact Characterization

Construction of the Phase I improvements could violate water quality standards or WDR or provide substantial sources of polluted runoff in the following ways.

- Improper management of soils, fill, and hazardous materials
- Construction of Phase I improvements involving dewatering or within or adjacent to surface waters

Improper Management of Soils, Fill, and Hazardous Materials

Construction of the Phase I improvements would involve disturbing and handling existing soil and imported fill materials, and the use and storage of hazardous materials (e.g., fuels and lubricants for construction equipment) during construction activities. The improper handling and management of disturbed soil and imported fill could result in pollution of stormwater runoff with sediment and contaminants that may be in the existing soil or imported fill materials, potentially reducing the quality of the receiving waters. If spilled or improperly stored, substances such as fuels and oils could directly enter nearby surface waters or be transported to nearby surface waters in stormwater runoff, potentially reducing the quality of the receiving waters. Polluted stormwater runoff and spills of hazardous materials can also infiltrate through pervious surfaces and degrade groundwater quality. Handling and management of existing soil, imported fill material, and hazardous materials in upland construction areas would be performed in accordance with a SWPPP, as required by the Construction General Permit, to ensure that stormwater runoff, surface waters, and groundwater are not polluted by these construction activities.

The Construction General Permit uses a risk-based permitting approach and mandates certain requirements based on the project risk level (i.e., Level 1, Level 2, or Level 3). The project risk level is based on the risk of sediment discharge and the receiving water risk. The sediment discharge risk depends on the project location and timing (i.e., wet season versus dry season activities). The receiving water risk depends on whether the project would discharge to a sediment-sensitive receiving water. A sediment-sensitive waterbody is one that appears on the most recent 303(d) list for waterbodies impaired for sediment; has a USEPA-approved TMDL implementation plan for sediment; or has the beneficial uses of cold freshwater habitat, fish migration, and fish spawning. The determination of the project risk level would be made by the project applicant when the Notice of Intent is filed and more details of the timing of the construction activity are known.

The performance standard in the Construction General Permit is that dischargers would be required to minimize or prevent pollutants in stormwater discharges and authorized NSWDs through the use of controls, structures, and BMPs that achieve BAT for treatment of toxic and nonconventional pollutants and BCT for treatment of conventional pollutants. A SWPPP must be prepared by a Qualified SWPPP Developer that meets the certification requirements in the Construction General Permit. The purpose of the SWPPP is: 1) to help identify the sources of sediment and other pollutants that could affect the quality of stormwater discharges; and 2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater as well as NSWDs resulting from construction activity. Operation of BMPs must be overseen by a Qualified SWPPP Practitioner that meets the requirements outlined in the permit (State Water Resources Control Board 2012b).

According to the Preliminary Stormwater Management Plan (AECOM 2016a), at a minimum the following BMPs would be implemented to provide temporary and permanent erosion and sediment control during construction of Phase I improvements.

- Preserve existing vegetation where required and when feasible.
- Control the disturbed area such that erosion control BMPs can be implemented quickly and effectively.
- Stabilize non-active areas of construction activities.
- Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding, or alternate methods.
- Prior to the completion of construction, apply permanent erosion control to remaining disturbed soil areas.
- Use erosion control techniques suitable for temporary, permanent, and wind conditions (types of erosion control to be considered include rolled erosion control products and hydraulically applied mulches).
- Use sediment control techniques with the specific objective of maintaining sediment loads consistent with preconstruction levels (types of sediment control BMPs to be considered include fiber rolls, silt fence, drainage inlet protection, and sediment traps and basins).

According to the Preliminary Stormwater Management Plan (AECOM 2016a), BMPs to control potential pollution sources during construction of Phase I improvements would include the following practices.

- Covering and containing pollutants such as petroleum products, chemicals, and fertilizers.
- Covering stockpiles when not in active use.
- Inspecting all vehicles, equipment, and petroleum product storage and dispensing areas regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills.
- Incorporating secondary containment for onsite fueling tanks and petroleum product storage containers.
- Using spill prevention measures, such as drip pans, when fueling or performing maintenance and repair of vehicles or equipment. These activities should occur no closer than 100 feet from any stream, ditch, or other stormwater conveyance.
- Using temporary plastic sheeting beneath, and if it is raining, over a vehicle when performing emergency repairs onsite.
- Cleaning contaminated surfaces immediately, and removing contaminated soils.

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

The performance standard in the Construction General Permit and requirements for preparation and implementation of a SWPPP would ensure proper handling and management of existing soil, imported fill material, and hazardous materials. In addition, according to the Preliminary Stormwater Management Plan (AECOM 2016a), BMPs would be implemented to provide temporary and permanent erosion and sediment control and to control potential pollution sources during construction of the Phase I improvements.

Construction of Phase I Improvements Involving Dewatering or within or Adjacent to Surface Waters

Construction of the **Relocated Lathrop/Manteca Station** alternative, **Downtown Manteca Station**, **Modesto Station**, **Ceres Station,** and **Merced Bus Stop** would not involve construction adjacent to surface waters or the discharge of groundwater or dewatering effluent. In addition, there are no physical improvements associated with the **Turlock, Atwater** and **Livingston Bus Stops.** Thus, construction of these Phase I improvements would not result in the discharge of contaminated water or water containing sediments into nearby surface waters.

However, several of the Phase I improvements would include construction activities adjacent to, within, and crossing over surface waters. In addition, construction of several Phase I improvements could require the discharge of groundwater or dewatering effluent. Track improvements at the **Existing Lathrop/Manteca Station** would be located adjacent to an unnamed canal ditch that is tributary to French Camp Slough. Construction of the **North Lathrop Station** may involve the discharge of groundwater or dewatering effluent for the construction of a pedestrian bridge. Construction of the **Oakland-Fresno Subdivision Connection** would involve construction of a new culvert crossing over an irrigation canal. The **Ceres Extension Alignment** would entail construction of a new bridge within, adjacent to, and over the Stanislaus and Tuolumne Rivers, and construction of a new culvert over Lateral Number Six (canal), which would involve the discharge of groundwater or dewatering effluent. Construction of the pedestrian bridge at the **Ripon Station** may also involve handling and management of groundwater/dewatering effluent. Construction of the **Ceres Layover Facility, variant 1** alternative would be located adjacent to an irrigation canal and **Ceres Layover Facility, variant 2** would involve construction of a new culvert crossing over an unnamed canal ditch.

Construction activities associated with the **Existing Lathrop/Manteca Station**; **North Lathrop Station**; **Oakland-Fresno Subdivision Connection**; **Ceres Extension Alignment**; **Ripon Station**; and **Ceres Layover Facility, variants 1 and 2** could violate water quality standards or WDRs because disturbance of soil along the banks of surface waters or sediment within surface waters could result in increased turbidity and potentially release contaminants entrained in soil or sediments. Construction materials that are not appropriately handled and installed could potentially be released into surface waters, which could increase turbidity and contribute pollutants to the surface water. Also, surface waters could be polluted by spills or leaks of hazardous materials (e.g., fuels and lubricants for construction equipment) directly into or adjacent to surface waters.

According to the Preliminary Stormwater Management Plan (AECOM 2016a), work done above and adjacent to waterways would include specific BMPs to protect water quality.

- Minimizing demolition and construction activities within or over stream channels during the wet season.
- Using non-shattering demolition methods rather than methods that would normally scatter debris.

- Securing all materials adjacent to streams to prevent discharges into receiving waters via wind.
- Using attachments on equipment to catch debris from small demolition operations.
- Stockpiling accumulated debris and waste generated from demolition away from streams.
- Isolating work areas within streams from flow using sheet piling, k-rails, or other methods of isolation.
- Pumping stream flow within pipes around the construction area.
- Using drip pans during equipment operation, maintenance, cleaning, fueling, and storage for spill prevention.
- Keeping equipment used in streams leak-free.
- Directing water from concrete curing and finishing operations away from inlets and watercourses to collection areas for dewatering.

In addition, all construction activities within the banks of surface waters would require compliance with resource agency permit requirements that would reduce potential impacts on water quality during construction activities along the banks of surface waters and within surface waters. All construction activities within the banks of surface waters would require a USACE Section 404 permit and associated Section 401 Water Quality Certification from the State Water Board. Work within a stream or on a streambank would require a CDFW Streambed Alteration Agreement. These permit applications must include a discussion of construction BMPs, including erosion and sediment control BMPs, which would minimize impacts on water quality. The permits would include any additional requirements for protection of water quality as deemed necessary by the reviewing agencies.

The improper handling and management of groundwater or dewatering discharges could result in the discharge of contaminated water or water containing sediments into nearby surface waters, which could violate water quality standards or WDRs. The Construction General Permit allows the discharge of dewatering effluent to storm drains or directly to surface waters if the groundwater is not contaminated, is properly filtered or treated using appropriate technology, and the Construction General Permit conditions (Section 4.10.2.1) are met, to ensure that receiving water quality is not substantially degraded.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Handling and management of existing soil, imported fill material, and hazardous materials in upland construction areas in accordance with a SWPPP would ensure that construction of Phase I improvements that are not adjacent to, within, or crossing surface water and would not involve discharge of groundwater or dewatering effluent would result in less-than-significant impacts on water quality.

Because improvements associated with the **Relocated Lathrop/Manteca Station** alternative, **Downtown Manteca Station, Modesto Station, Ceres Station, Turlock Bus Stop, Atwater Bus Stop, Livingston Bus Stop,** and **Merced Bus Stop** would not involve construction activities adjacent to, within, or crossing over surface waters or handling and management of groundwater or dewatering effluent, impacts from these Phase I improvements would be less than significant.

Construction activities associated with the **North Lathrop Station**, **Oakland-Fresno Subdivision Connection, Ceres Extension Alignment, Ripon Station,** and **Ceres Layover Facility, variant 2** would have the potential to result in the discharge of groundwater or dewatering effluent to nearby surface waters. In addition, construction activities associated with the **Existing Lathrop/Manteca Station, Oakland-Fresno Subdivision Connection, Ceres Extension Alignment,** and **Ceres Layover Facility, variants 1 and 2** would have the potential for soil, sediment, construction materials, and hazardous materials to be released into surface water during work adjacent to, within, or crossing surface water. Thus, construction activities associated with **Existing Lathrop/Manteca Station**; **North Lathrop Station**; **Oakland-Fresno Subdivision Connection**; **Ceres Extension Alignment**; **Ripon Station**; and **Ceres Layover Facility, variants 1 and 2** could violate water quality standards or WDRs. These impacts would be potentially significant.

Significance with Application of Mitigation

Mitigation Measure HYD-1.1 requires specific procedures for the construction of Phase I improvements entailing the discharge of groundwater or dewatering effluent. Mitigation Measure HYD-1.2 requires specific procedures for construction work for Phase I improvements adjacent to, within, or crossing surface water. With implementation of Mitigation Measures HYD-1.1 and HYD-1.2, impacts on water quality during construction of Phase I improvements would be less than significant.

Mitigation Measures

Mitigation Measures HAZ-2.3, HYD-1.1, and HYD-7.1 would apply to the **North Lathrop Station**, **Oakland-Fresno Subdivision Connection, Ceres Extension Alignment, Ripon Station,** and **Ceres Layover Facility, variant 2** for construction activities involving the discharge of groundwater or dewatering effluent. Mitigation Measure HYD-1.2 would apply to the **Existing Lathrop/Manteca Station, Oakland-Fresno Subdivision Connection, Ceres Extension Alignment,** and **Ceres Layover Facility, variants 1 and 2** for construction work adjacent to, within, or crossing surface water. Descriptions of Mitigation Measures HAZ-2.3 and HYD-7.1 is presented in Section 4.9, *Hazardous Materials*, and Impact HYD-7, respectively.

Mitigation Measure HAZ-2.3: Implement construction risk management plan

Mitigation Measure HYD-1.1: Avoid water quality impacts from groundwater or dewatering discharges

Groundwater and dewatering effluent generated by temporary construction dewatering activities will be contained by the construction contractor(s) in an appropriately-sized storage tank and tested to determine whether the effluent is contaminated prior to discharging. Testing and discharging of the effluent will be performed in accordance with the Construction General Permit, risk management plan (RMP) (per Mitigation Measure HAZ-2.3 in Section 4.9, *Hazardous Materials*), and applicable resource agency permit requirements, including treating the effluent prior to discharge, if necessary. If groundwater is discharged to storm drains or directly to surface water, the discharge will be performed at appropriate flow rates to ensure that drainage capacity of storm drains and receiving waters is not exceeded (as required by Mitigation Measure HYD-7.1, see discussion in Impact HYD-7), and to ensure that the flow rate of the receiving waters would not increase substantially, which could result in erosion of stream banks and affect water quality.

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

Mitigation Measure HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters

The construction contractor(s) will obtain applicable resource agency permits and approvals and comply with permit requirements to prevent impacts on water quality and demonstrate that water quality standards and/or WDRs are not violated. Prior to the start of construction activities that could disturb potentially contaminated soil or sediment adjacent to or within surface waters, sampling and analysis of the potentially contaminated soil or sediment will be performed as required by Mitigation Measure HAZ-2.2 (see Section 4.9, *Hazardous Materials*), to ensure that the soil or sediment is appropriately handled, reused, or disposed of based on the sampling and analysis results. The sampling and analysis results will be presented to the State Water Board for review so that appropriate water quality monitoring parameters can be designated in permit requirements. CDFW, USACE, and/or the State Water Board may require the following permit requirements and avoidance measures.

a) Installation of temporary physical barriers (e.g., coffer dams, silt curtains) in water around construction activities to prevent potential localized impacts on water quality (e.g., increase in turbidity) from spreading within the surface water.

b) Installation of temporary physical barriers (e.g., elevated platforms, netting, floating platforms) over surface waters and beneath elevated construction activities to prevent construction materials from being released into the surface water below.

c) The design and installation of temporary physical barriers as part of permit requirements and avoidance measures will ensure that stream flow (including storm flows) would not be impeded to the degree that adverse flooding impacts could occur.

d) Performing water quality monitoring including sampling and analysis for constituents required by resource agency permits, which may include total suspended solids, pH, temperature, conductivity, pollutants of concern identified in soil or sediment during preconstruction sampling and analysis, and pollutants with TMDLs established for the surface water if construction activities could result in the release of these pollutants.

e) The results of water quality monitoring will be compared to performance standards established by the State Water Board in the CWA Section 401 certification. If water quality monitoring indicates that performance standards are not being achieved, additional avoidance measures (e.g., installation of additional silt curtains) will be implemented until water quality monitoring indicates that performance standards are being achieved.

Mitigation Measure HYD-7.1: Limit groundwater or dewatering discharge flow rates

Impact HYD-2	Operation and maintenance of Phase I improvements could violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality.
Level of Impact	Potentially significant
Mitigation Measures	HAZ-2.3: Implement construction risk management plan
Level of Impact after Mitigation	Less than significant

Impact Characterization

Operation and maintenance of the Phase I improvements could violate water quality standards or WDR or provide substantial sources of polluted runoff in the following ways.

- Reuse of contaminated soils or fill for the Phase I improvements
- Alteration of existing drainage patterns and creation of new sources of polluted runoff where the Phase I improvements are located
- Use of pesticides for track maintenance
- Train operations and accident conditions

Use of Contaminated Soils or Fill

The Phase I improvements would involve grading and reuse of existing soil and use of imported fill materials. If contaminants are present in reused existing soil or fill materials that are placed in a location exposed to stormwater, contaminants could leach into stormwater runoff from the reused existing soil or imported fill and result in pollution of stormwater runoff and surface water, potentially reducing the quality of the receiving waters. This is a potentially significant impact.

Alteration of Existing Drainage Patterns and New Sources of Polluted Runoff

Phase I improvements located within the UPRR ROW would alter drainage patterns (e.g., altering or creating drainage systems) along tracks. If adequate stormwater control and treatment systems are not designed or constructed as part of Phase I improvements, pollutants that may be entrained in sediments could be transported from tracks to surface waters in stormwater runoff. The Construction General Permit includes post-construction stormwater performance standards that address water quality and channel protection for construction projects that are not in an area subject to post-construction standards of an active Phase I or II MS4 Permit with an approved Stormwater Management Plan. The Construction General Permit requires post-construction runoff to match preconstruction runoff for the 85th-percentile storm event, which not only reduces the risk of impacts on the receiving water's channel morphology but also provides some protection of water quality. The Construction General Permit also requires implementation of post-construction BMPs to reduce pollutants in stormwater discharges that are reasonably foreseeable after all construction phases have been completed. Compliance with the post-construction requirements of the Construction General Permit must be demonstrated by submitting a map and post-construction runoff calculation worksheets with the Notice of Intent (State Water Resources Control Board 2012b).

According to the Preliminary Stormwater Management Plan (AECOM 2016a), it appears unlikely that hydromodification management measures would be required for the Phase I improvements that involve improvements within the UPRR ROW because improvements to tracks would not create new impervious surfaces. However, detailed design-level studies may conclude that increases in the post-construction runoff would exceed the Construction General Permit criteria in some locations. If estimated post-construction runoff volumes are found to exceed the criteria, the improvements within the UPRR ROW would be required to incorporate hydromodification management to control flows and reduce the post-construction flow rates and durations for management of erosion and sediment. Hydromodification management may include facilities to retain, detain, bypass, split, or infiltrate runoff to mimic preconstruction flows, durations, and associated sediment transport.

According to the Preliminary Stormwater Management Plan, stormwater control and treatment BMPs would be designed and constructed for improvements within the UPRR ROW in accordance with the Project Planning and Design Guide (PPDG) developed by the California Department of Transportation (Caltrans) (California Department of Transportation 2010), and may include biofiltration swales, biofiltration strips, infiltration devices, detention devices, media filters, wet basins, and dry weather diversion (AECOM 2016a). Design and construction of stormwater control and treatment BMPs in accordance with the PPDG would ensure that Phase I operations involving improvements within the UPRR ROW would have a less-than-significant impact on water quality.

The **Relocated Lathrop/Manteca Station** alternative**, North Lathrop Station, Downtown Manteca Station, Ripon Station, Modesto Station,** and **Ceres Station** would alter existing drainage through the construction of station platforms, driveways, parking areas, and modification of at-grade crossings and undercrossings. Improvements associated with these stations would create new impervious pavement surfaces. The **Relocated Lathrop/Manteca Station** alternative**, North Lathrop Station, Downtown Manteca Station, Ripon Station, Modesto Station,** and **Ceres Station** improvements within the UPRR ROW would be required to comply with the post-construction stormwater performance standards of the Construction General Permit, and stormwater control systems for these improvements would be designed and constructed in accordance with the PPDG. Based on the construction of more than 5,000 square feet of parking lot, improvements outside of the UPRR ROW for the **Relocated Lathrop/Manteca Station** alternative**, North Lathrop Station, Downtown Manteca Station,** and **Ripon Station** would be regulated as Priority Development Projects under the San Joaquin County or Central Valley Permit; improvements outside of the UPRR ROW for the **Modesto Station** would be regulated as a Priority Development Project under the Modesto or Central Valley Permit; and improvements outside of the UPRR ROW for the **Ceres Station** would be regulated as a Priority Development Project under the Small MS4 Permit or Central Valley Permit, and the improvements outside of the UPRR ROW would be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan.

The track improvements at the **Existing Lathrop/Manteca Station** would alter existing drainage through construction of a new track; however, these improvements would not create new impervious pavement surfaces. The improvements at the **Existing Lathrop/Manteca Station** within the UPRR ROW would be required to comply with the post-construction stormwater performance standards of the Construction General Permit, and stormwater control systems for these improvements would be designed and constructed in accordance with the PPDG.

The **Oakland-Fresno Subdivision Connection** would alter existing drainage through the construction of a new track connection. The **Ceres Extension Alignment** would alter existing drainage through replacement of existing tracks, modification of at-grade crossings and undercrossings, and construction of a new main track and supporting bridges. The creation of new impervious pavement surfaces is not anticipated with the **Oakland-Fresno Subdivision Connection** and the **Ceres Extension Alignment**. Improvements within the UPRR ROW for the **Oakland-Fresno Subdivision Connection**[5] and the **Ceres Extension Alignment** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit, and stormwater control systems for these improvements would be designed and constructed in accordance with the PPDG.

The **Ceres Layover Facility, variants 1 and 2** would alter existing drainage through construction of new layover tracks and support areas. Improvements associated with the **Ceres Layover Facility, variants 1 and 2** would create new impervious pavement surfaces. Improvements within the UPRR ROW for **Ceres Layover Facility, variants 1 and 2** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit, and stormwater control systems for these improvements would be designed and constructed in accordance with the PPDG. Improvements located outside the UPRR ROW for **Ceres Layover Facility, variants 1 and 2** would be regulated as a Priority Development Project under the Small MS4 Permit or Central Valley Permit based on the construction of more than 5,000 square feet of new impervious surface for a parking lot or industrial/commercial facility, and would be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan. The realignment of Lucas Road for **Ceres Layover Facility, variant 1** alternative would also be regulated as a Priority Development Project under the Small MS4 Permit based on the construction of a new roadway.

Because **Ceres Layover Facility, variants 1 and 2** would include train fueling/cleaning operations, these improvements would be required to comply with the Industrial General Permit which requires the use of BMPs, BAT, and BCT to reduce and prevent discharges of pollutants to meet applicable water quality standards. Both the Small MS4 Permit and Central Valley Permit require source control measures to be developed for pollutant-generating activities including fueling areas and vehicle/equipment wash areas. **Ceres Layover Facility, variants 1 and 2** would therefore be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan. The Small MS4 Permit requires that the source control measures for these pollutant-generating activities be designed in accordance with the recommendations of the California Stormwater Quality Association (CASQA) Stormwater BMP Handbook for New Development and Redevelopment (California Stormwater Quality Association 2003) or equivalent manual. The CASQA Stormwater BMP Handbook for New Development and Redevelopment includes the following information and recommendations regarding fueling areas and vehicle/equipment washing areas.

- **Fueling Areas**—Spills at vehicle and equipment fueling areas can be a significant source of pollution because fuels contain toxic materials and heavy metals that are not easily removed by stormwater treatment devices. Project plans must be developed for emergency spill cleanup, containment, and leak prevention. Fuel dispensing areas should provide an overhanging roof

[5] As described in Chapter 2, the **Oakland-Fresno Subdivision Connection** would be located within parcels currently under UPRR acquisition and planned for new UPRR ROW.

structure or canopy. If fueling large equipment or vehicles that would prohibit the use of covers or roofs, the fueling island should be designed to sufficiently accommodate the larger vehicles and equipment and to prevent stormwater run-on and runoff. Fuel dispensing areas should be paved with Portland cement concrete (or equivalent smooth impervious surface). Fueling areas should be graded to drain toward a dead-end sump. Runoff from downspouts/roofs should be directed away from fueling areas. Do not locate storm drains in the immediate vicinity of the fueling area. In the case of an emergency, provide storm drain seals, such as isolation valves, drain plugs, or drain covers, to prevent spills or contaminated stormwater from entering the stormwater conveyance system.

- **Vehicle/Equipment Washing Areas**—Vehicle washing, equipment washing, and steam cleaning may contribute high concentrations of metals, oil and grease, solvents, phosphates, and suspended solids to wash waters that drain to stormwater conveyance systems. Project plans should include appropriately designed area(s) for washing/steam cleaning of vehicles and equipment. Depending on the size and other parameters of the wastewater facility, wash water may be conveyed to a sewer, an infiltration system, recycling system or other alternative. Pretreatment may be required for conveyance to a sanitary sewer. Areas for washing/steam cleaning should incorporate one of the following features.
    - Be self-contained and/or covered with a roof or overhang
    - Be equipped with a clarifier or other pretreatment facility
    - Have a proper connection to a sanitary sewer
    - Include other features which are comparable and equally effective

    It is generally advisable to cover areas used for regular washing of vehicles, trucks, or equipment, surround them with a perimeter berm, and clearly mark them as a designated washing area. Sumps or drain lines can be installed to collect wash water, which may be treated for reuse or recycling, or for discharge to the sanitary sewer. Jurisdictions may require some form of pretreatment, such as a trap, for these areas.

    Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit (California Stormwater Quality Association 2003).

There are no physical improvements associated with the **Turlock** and **Livingston Bus Stops**; thus these improvements would not alter drainage patterns or create new impervious pavement surfaces. Improvements required for the **Merced Bus Stop** entail installing infrastructure (such as charging stations) to support electric bus operations at the existing Merced Transportation Center. Improvements associated with the **Merced Bus Stop** would not create new impervious pavement surfaces, because the existing Merced Transportation Center is already fully paved, and would not result in changes in the existing drainage patterns onsite.

In summary, the **Relocated Lathrop/Manteca Station** alternative, **North Lathrop**, **Downtown Manteca Station**, **Ripon Station**, **Modesto Station**, and **Ceres Station** would include construction of new paved surfaces for parking lots, driveways, and pedestrian paths. **Ceres Layover Facility, variants 1 and 2** would involve the construction of new paved surfaces and buildings for layover facility support areas including an administrative office, crew facilities, small parts storage, fueling facilities, wayside power, and train cleaning function areas. These improvements would alter

drainage patterns (e.g., increase runoff from new impervious surfaces and create new stormwater drainage systems) and provide new sources of polluted runoff associated with motor vehicle traffic and train fueling/cleaning. Increasing runoff can cause erosion of unlined drainage courses (e.g., natural creeks and earthen canals and ditches) that would receive runoff from these Phase I improvements, which can increase the turbidity of surface waters and cause sedimentation downstream. Pollutants that may be transported in runoff from parking lots, roadways, and temporary layover facility support facilities include sediment; metals; organic compounds including diesel, gasoline, oil, and grease; and trash and debris. **Ceres Layover Facility, variants 1 and 2** support areas that would include train fueling/cleaning operations would be required to comply with the Industrial General Permit, which requires the use of BMPs, BAT, and BCT to reduce and prevent discharges of pollutants to meet applicable water quality standards. For Phase I improvements that meet the criteria of regulated projects under local MS4 Permits, design and construction of stormwater controls and treatment systems would be performed in accordance with local MS4 Permit requirements, including hydromodification requirements. As discussed under *National Pollutant Discharge Elimination System Municipal Stormwater Permits* in Section 4.10.2.1, the criteria for determining regulated projects under local MS4 Permits includes the amount of new impervious surface area that would be created and proposed land uses (e.g., parking lots). Design and construction of stormwater controls and treatment systems in accordance with local MS4 Permit requirements (e.g., use of source controls, infiltration features, vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to manage stormwater to maintain predevelopment runoff rates, volumes, and quality) would ensure that stormwater runoff would not contain significant levels of pollutants or cause erosion and sedimentation in receiving waters.

New station platforms at the **Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station**, **Downtown Manteca Station**, **Ripon Station**, **Modesto Station**, and **Ceres Station** and improvements that would alter existing drainage within the UPRR ROW (**Ceres Extension Alignment,** the **Oakland-Fresno Subdivision Connection,** and portions of the **Ceres Layover Facility, variants 1 and 2**) would not be regulated under local MS4 Permits. Stormwater runoff from station platforms would not contain significant levels of pollutants because the station platforms would have only foot traffic. Compliance with the post-construction stormwater performance standards of the Construction General Permit would be required for new station platforms and other improvements within the UPRR ROW (e.g., new or improved tracks and drainage systems), and would ensure that stormwater runoff from station platforms and tracks would not cause erosion and sedimentation in receiving waters.

Use of Pesticides

Pesticides would be used (similar to current operations) to maintain and clear vegetation from tracks. The future use of pesticides for vegetation removal near the tracks would be required to comply with DPR regulations that are intended to protect human health and the environment (see discussion under *California Department of Pesticide Regulation* in Section 4.10.2.2). DPR puts special controls on pesticides that can be especially dangerous to human health or the environment if not used correctly, limiting their use to trained individuals and only at times and places approved by a permit from the County Agricultural Commissioners (California Department of Pesticide Regulation 2017). Use of pesticides for vegetation removal near the tracks would therefore result in a less-than-significant impact on water quality.

Train Operations and Accident Conditions

Trains can be sources of pollutants such as petroleum products (e.g., oil, grease, and diesel) and metals. Under normal operating conditions, the amount of these pollutants released by modern trains is minimal (i.e., only minor drips) because trains undergo regular inspections and maintenance to prevent and fix leaks. Impacts from minor drips would be limited to the area immediately below the railroad tracks, and the track ballast material would minimize stormwater runoff from the area of localized impacts and prevent significant impacts on water quality. Therefore, Phase I operations within the UPRR ROW would not contribute new significant sources of pollutants to stormwater runoff unless an accidental release of hazardous materials occurs along the tracks.

As described in Impact SAF-4 in Section 4.16, *Safety and Security*, the potential increases in accident conditions resulting from Phase I operations of passenger trains include the accidental release of hazardous materials. However, based on historic Federal Railroad Administration (FRA) accident/incident data, these occurrences are rare and travel by rail remains one of the safest modes of transportation. Phase I operations would comply with stringent federal and state protocols and regulations intended to reduce the likelihood of accident conditions. Accident conditions, including the accidental release of hazardous materials, are not expected to increase with Phase I operations.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Compliance with existing regulations (such as the Construction General Permit; requirements for Priority Development Projects under the San Joaquin County, Modesto, Central Valley Permit, or Small MS4 Permit; and Industrial General Permit) and the design and construction of stormwater control systems in the UPRR ROW in accordance with the PPDG would ensure that stormwater runoff from Phase I improvements would not cause erosion and sedimentation in receiving waters and that runoff from impervious surface areas is managed and treated to remove contaminants. Use of pesticides for vegetation removal near tracks would be required to comply with DPR regulations which would ensure runoff would not affect water quality of receiving waters. Phase I operations would comply with stringent federal and state protocols and regulations intended to reduce the likelihood of accident conditions, and similarly not affect water quality of receiving waters for accident conditions. Compliance with existing regulations would ensure that these potential sources of polluted runoff would result in less-than-significant impacts on the water quality of receiving waters.

However, all Phase I improvements would require earthwork, with the exception of the **Turlock**, **Livingston** and **Atwater Bus Stops**. If contaminants are present in reused existing soil or imported fill materials that are exposed to stormwater, contaminants could leach into stormwater runoff from the reused existing soil or imported fill and result in pollution of stormwater runoff and surface water, potentially reducing the quality of the receiving water. This is a potentially significant impact.

Significance with Application of Mitigation

Implementation of Mitigation Measure HAZ-2.3 requires preparation of a RMP. The RMP would include guidelines for testing and reuse of existing soil to ensure that potentially contaminated existing soil would not be reused in a manner that could pollute stormwater runoff, surface waters, or groundwater. The RMP would include guidelines for testing and use of imported fill material to

ensure that contaminated fill materials are not used in a manner that could pollute stormwater runoff, surface waters, or groundwater. Implementation of Mitigation Measure HAZ-2.3, design and construction of stormwater controls and treatment systems in accordance with the PPDG, compliance with the post-construction requirements of the Construction General Permit, and compliance with requirements of applicable MS4/NPDES permits for stormwater control and treatment would ensure that operation of the Phase I improvements would have a less-than-significant impact on water quality.

Mitigation Measures

Mitigation Measure HAZ-2.3 would apply to the operation and maintenance of all Phase I improvements (except the **Turlock**, **Livingston** and Atwater **Bus Stops**, for which there are no physical improvements) that could result in impacts on water quality a result of using contaminated soils or fill. The description of Mitigation Measure HAZ-2.3 presented in Section 4.9, *Hazardous Materials*.

Mitigation Measure HAZ-2.3: Implement construction risk management plan

Impact HYD-3	Construction of Phase I improvements could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
Level of Impact	Less than significant

Impact Characterization and Significance Conclusion

As discussed under Impact HYD-1, when temporary and limited groundwater dewatering would be required for construction activities, dewatering effluent would be treated and discharged (in accordance with provisions of the Construction General Permit, RMP, and Mitigation Measure HYD-1.1) back to the nearby surface water, if possible, providing an opportunity for groundwater recharge.

There are no physical improvements associated with the **Turlock**, **Livingston,** and **Atwater Bus Stops.** Construction of the **Relocated Lathrop/Manteca Station** alternative; **Existing Lathrop/Manteca Station**; **Downtown Manteca Station**; **Modesto Station**; **Ceres Station**; **Ceres Layover Facility, variant 1** alternative; and **Merced Bus Stop** would not involve groundwater dewatering. The **Oakland-Fresno Subdivision Connection** would involve construction of a new culvert crossing over an irrigation canal, likely requiring dewatering activities. Construction of the **Ripon Station** would involve groundwater dewatering for construction of a new pedestrian bridge. Similarly, construction of the **North Lathrop Station** may involve groundwater dewatering for the construction of a pedestrian bridge crossing over the railroad tracks. Construction of the **Ceres Extension Alignment** would involve groundwater dewatering for construction of new railroad bridges supporting the new main track over the Stanislaus and Tuolumne Rivers and a new culvert crossing over Lateral Number Six (canal). Construction of the **Ceres Layover Facility, variant 2** would involve construction of a new culvert crossing over an unnamed canal ditch.

Dewatering effluent generated during construction of the Phase I improvements would be treated and discharged (in accordance with provisions of the Construction General Permit, RMP, and

Mitigation Measure HYD-1.1) back to the nearby surface water, if possible, providing an opportunity for groundwater recharge. Since dewatering activities for construction of bridges and culverts would be short term and limited to bridge and culvert locations, and the discharged effluent would have the opportunity to recharge the aquifer, the dewatering activities associated with construction of Phase I improvements would have a less-than-significant impact on groundwater resources and groundwater recharge.

Impact HYD-4	Phase I operations could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
Level of Impact after Mitigation	Less than significant

Impact Characterization and Significance Conclusion

Phase I operations would not involve dewatering or other use of groundwater that could deplete groundwater resources. Phase I improvements associated with new stations would create new impervious surfaces, which can impede groundwater recharge as stormwater would runoff of the impervious surfaces rather than infiltrating the ground surface and recharging aquifers. As discussed under Impact HYD-2, Phase I improvements associated with new station platforms creating new impervious surfaces within the UPRR ROW would be required to comply with the post-construction requirements of the Construction General Permit, which requires post-construction runoff to match preconstruction runoff for the 85th-percentile storm event. Other Phase I improvements that would create new impervious surfaces, such as the construction of parking areas, driveways, pedestrian paths, and layover facility support areas at new stations and facilities would be required to comply with requirements of the applicable MS4/NPDES permits for stormwater control and treatment, which include LID source control, site design, stormwater treatment, and hydromodification management. Stormwater control and treatment systems may include vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to maintain predevelopment runoff rates, volumes, and quality and enhance infiltration and groundwater recharge.

The **Relocated Lathrop/Manteca Station** alternative**, North Lathrop Station, Downtown Manteca Station, Ripon Station, Modesto Station,** and **Ceres Station** would involve creation of new impervious pavement surfaces as part of establishing new stations. Improvements within the UPRR ROW for these stations would be required to comply with the post-construction stormwater performance standards of the Construction General Permit and improvements outside the UPRR ROW would be regulated as a Priority Development Project under the applicable MS4 permits. Track improvements associated with the **Existing Lathrop/Manteca Station** and installation of infrastructure to support electric bus operations at the **Merced Bus Stop** would not involve creation of new impervious pavement surfaces. In addition, there are no physical improvements associated with the **Turlock**, **Livingston** and **Atwater Bus Stops.**

Improvements associated with the **Ceres Layover Facility, variants 1 and 2** would involve creation of new impervious pavement surfaces as part of establishing new layover facility support areas. Improvements within the UPRR ROW for the layover facility would be required to comply with the post-construction stormwater performance standards of the Construction General Permit

and improvements outside the UPRR ROW would be regulated as Priority Development Projects under the Small MS4 Permit or Central Valley Permit. The **Oakland-Fresno Subdivision Connection** and **Ceres Extension Alignment** would not involve creation of new impervious pavement surfaces.

Design and construction of stormwater controls and treatment systems for the Phase I improvements, in accordance with the PPDG, and in compliance with the post-construction requirements of the Construction General Permit and with requirements of the applicable MS4/NPDES permits for stormwater control and treatment, would ensure that operation of the Phase I improvements that include the creation of new impervious surfaces would have a less-than-significant impact on groundwater recharge.

Impact HYD-5	Construction of the Phase I improvements could expose people or structures or property to significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam; placing structures within 100-year flood hazard areas that could impede or redirect flood flows; or substantially altering the existing drainage courses of the site or area.
Level of Impact	Potentially significant
Mitigation Measures	HYD-5.1: Prevent construction workers, materials, and equipment from being exposed to storm flooding hazards
Level of Impact after Mitigation	Less than significant

Impact Characterization

Potential flooding hazards were identified for areas intersected by the Phase I improvements including storm-related flooding (100-year flood zones and 200-year flood zones), areas protected from flooding by levees, and dam failure inundation areas. The Phase I improvements are not located near the coast and are therefore not susceptible to coastal flooding hazards, such as tsunamis, extreme high tides, or SLR.

The **Relocated Lathrop/Manteca Station** alternative, **Existing Lathrop/Manteca Station** and **North Lathrop Station** would intersect flood hazard areas including 200-year flood zones, areas with reduced flood risk due to levees, and dam failure inundation areas. In addition, the **Relocated Lathrop/Manteca Station** alternative and improvements at the **Existing Lathrop/Manteca Station** would involve construction activities on and adjacent to a FEMA-accredited levee. The **Downtown Manteca Station**, **Ripon Station**, and **Modesto Station** would be located in dam inundation areas and the **Ceres Station** would not intersect any flood hazard zones or drainage courses. There are no physical improvements associated with the **Turlock**, **Livingston and Atwater Bus Stops** and the **Merced Bus Stop** would be located in a 100-year flood zone.

The **Oakland-Fresno Subdivision Connection** would intersect areas with reduced flood risk due to levees and dam failure inundation areas, and would involve the construction of a new culvert crossing and new tracks over an irrigation canal. The **Ceres Extension Alignment** would intersect flood hazard zones including dam failure inundation areas, 100-year flood zones, and 200-year flood zones around the Stanislaus and Tuolumne Rivers. Construction of the **Ceres Extension Alignment** would also entail a new bridge over the Stanislaus and Tuolumne Rivers and a new culvert crossing over Lateral Number Six (canal) to support the new main track. The **Ceres Layover Facility,**

variant 1 alternative would not intersect flood hazard zones or drainage courses. **Ceres Layover Facility, variant 2** would not intersect flood hazard zones, but would involve construction of a new culvert crossing and new tracks over an unnamed canal ditch.

Construction of the Phase I improvements may be located within drainage courses during construction of bridges and culverts, which could also alter drainage courses and cause flooding during construction because the placement of construction materials, equipment, and new structures (e.g., culverts, bridge supports, fill material, and temporary bridges for equipment access) within drainage courses and potential diversion of surface water around work areas within drainage courses could obstruct flood flows. The Phase I improvements would also require construction within 100-year and 200-year floodplains. If flooding of construction areas occurs, construction workers could be exposed to risk of injury. Construction materials and equipment could also be inundated, which could result in pollution of surface waters. Construction materials and equipment could be carried downstream by flood flows, creating a greater risk of damage to property and injury to people.

As discussed under *Dam and Levee Failure* in Section 4.10.3.1, *Regional Hydrology, Water Quality, and Flooding*, levees systems accredited by FEMA to provide protection from a 100-year flood require regular maintenance to maintain the stability, height, and overall integrity of the levee and its associated structures and systems. The potential for inundation of Phase I improvements from failure of a FEMA-accredited levee is therefore considered low. The Phase I improvements would involve construction activities on and adjacent to FEMA-accredited levees and therefore construction of the Phase I improvements could potentially affect the integrity of levees and increase the risk of flooding related to levee failure.

In potential dam failure inundation areas that are intersected by the Phase I improvements, existing dams under state and federal jurisdiction are periodically inspected to ensure that they are adequately maintained and that identified deficiencies are corrected. The regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure, and the Phase I improvements would not increase the likelihood of dam failure.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Catastrophic dam failure is considered a low-likelihood event because regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure. Therefore, potential flooding impacts associated with dam failure during construction of the Phase I improvements would be less than significant.

The **Existing Lathrop/Manteca Station** and **Relocated Lathrop/Manteca Station** alternative would involve construction on and adjacent to levees and therefore construction of these Phase I improvements could affect the integrity of these levees and increase the risk of flooding related to levee failure. In the Central Valley Region, Phase I improvements that encroach on levees would require encroachment permits from CVFPB. Review and approval of Phase I improvements that would encroach on levees by CVFPB would ensure that the potential for flooding impacts associated with levee failure resulting from construction of the **Existing Lathrop/Manteca Station** and **Relocated Lathrop/Manteca Station** alternative would be less than significant.

There are no physical improvements associated with the **Turlock**, **Livingston and Atwater Bus Stops** and thus no impacts related to flooding hazards during construction. Construction of the **Downtown Manteca Station**, **Ripon Station**, **Modesto Station, Ceres Station** and **Ceres Layover Facility, variant 1** alternative would not entail activities within drainage courses or flood zones, and therefore would result in less-than-significant impacts related to flooding hazards during construction. However, construction of the **Existing Lathrop/Manteca Station**; **Relocated Lathrop/Manteca Station** alternative; **North Lathrop Station; Oakland-Fresno Subdivision Connection**; **Ceres Extension Alignment; Ceres Layover Facility, variant 2;** and the **Merced Bus Stop** would include activities within drainage courses or flood zones. If storm-related flooding of construction areas occurs, construction workers could be exposed to risk of injury, and construction materials and equipment within drainage courses could impede flood flows. Construction materials and equipment could also be inundated, which could result in pollution of surface waters. Construction materials and equipment could be carried downstream by flood flows, creating a greater risk of damage to property and injury to people. This is a potentially significant impact.

Significance with Application of Mitigation

Mitigation Measure HYD-5.1 would prevent construction workers, materials, and equipment from being exposed to storm flooding hazards. This measure would mitigate potential construction impacts related to flooding hazards to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-5.1 would apply to the **Existing Lathrop/Manteca Station**; **Relocated Lathrop/Manteca Station** alternative**; North Lathrop Station; Oakland-Fresno Subdivision Connection; Ceres Extension Alignment; Ceres Layover Facility, variant 2;** and the **Merced Bus Stop** for construction flooding hazard impacts related to improvements within drainage courses and flood zones.

Mitigation Measure HYD-5.1: Prevent construction workers, materials, and equipment from being exposed to storm flooding hazards

When working within areas of potential storm flooding inundation (100-year or 200-year flood zones and within drainage courses), the construction contractor(s) will closely monitor weather forecasts and will ensure that construction workers, materials, and equipment are temporarily moved out of areas of potential flooding inundation prior to the start of a storm that has the potential to cause significant flooding.

Impact HYD-6	Phase I operations could expose people or structures or property to significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam; placing structures within 100-year flood hazard areas that could impede or redirect flood flows; or substantially altering the existing drainage courses of the site or area.
Level of Impact	Potentially significant
Mitigation Measures	HYD-6.1: Perform detailed hydraulic evaluations and modify designs for improvements within drainage courses and flood zones if required to reduce potential flooding impacts
Level of Impact after Mitigation	Less than significant

Impact Characterization

As discussed under Impact HYD-5, Phase I improvements intersect various flood hazard areas including storm-related flooding (100-year flood zones and 200-year flood zones), areas with reduced flood risk due to levees, and dam failure inundation areas. The Phase I improvements are not located near the coast and are therefore not susceptible to coastal flooding hazards, such as tsunamis, extreme high tides, or SLR. The potential for the Phase I improvements to be subject to flooding impacts related to dam or levee failure during operation is very low because regular inspection and maintenance of dams and levees substantially reduces the potential for their failure. Therefore potential impacts of flooding related to dam or levee failure during operation of the Phase I improvements are not discussed further.

For Phase I improvements located within drainage courses and/or flood zones, if the improvements are not appropriately designed, they could potentially impede or redirect flood flows during operation, and railroad tracks could be inundated. Under existing standard procedures, trains would not operate on railroad tracks that are inundated due to the increased risk of derailment. Railroad tracks could be damaged by inundation and increase the risk of future derailment, which can result in serious injuries or deaths and spills of pollutants that can affect surface water and/or groundwater. However, under existing standard procedures, if tracks were to be inundated by flooding, the line would be shut down, the tracks would be inspected, repairs and removal of debris would be performed if needed, and operation would begin again once the water has receded and the tracks are determined to be safe and free of debris. Therefore damage to tracks from flooding inundation would not expose people or structures or property to significant risk of loss, injury, or death.

As presented in Table 4.10-10, the required design storm interval for new stormwater drainage systems and improvements over drainage courses would depend on the location (rural or urban) and type of drainage systems. In the Central Valley Region, encroachment permits would be required from the CVFPB to construct bridges, and the CVFPB requires new bridges to be designed for 200-year flood events. If a bridge design cannot meet the 200-year flood criteria, the bridge would have to go through a CVFPB hearing process for approval. The review and approval of bridge designs by CVFPB would ensure that operation of new bridges in the Central Valley Region would not impede or redirect flood flows.

Table 4.10-10. Design Storm Intervals

Storm Drainage System	Rural	Urban
Drainage facilities crossing the track (e.g., large culverts)	2% (50-year)	1% (100-year)
Drainage systems crossing under bridge structures	1% (100-year) and 0.5% (200-year) for Central Valley[a]	

Source: AECOM 2016b
[a] Applies to both rural and urban.

There are no physical improvements associated with the **Turlock**, **Livingston, and Atwater Bus Stops**. Similarly, the **Downtown Manteca Station**, **Ripon Station**, **Modesto Station, Ceres Station** and **Ceres Layover Facility, variant 1** alternative are not located within a drainage courses or flood zones.

The **Relocated Lathrop/Manteca Station** alternative, **Existing Lathrop/Manteca Station,** and **North Lathrop Station** would intersect 200-year flood zones, but would not alter a drainage course. The **Oakland-Fresno Subdivision Connection** would not intersect any flood zones, but would involve the construction of a new culvert crossing and new tracks over an irrigation canal. The **Ceres Extension Alignment** would intersect flood zones, including 100-year and 200-year flood zones around the Stanislaus and Tuolumne Rivers. The construction of a new bridge over the Stanislaus and Tuolumne Rivers and a new culvert crossing over Lateral Number Six (canal) associated with the **Ceres Extension Alignment** would alter a drainage course. **Ceres Layover Facility, variant 2** would not intersect any flood zones, but construction would involve a new culvert crossing over an unnamed canal ditch. The **Merced Bus Stop** would be located in a 100-year flood zone.

Phase I improvements within drainage courses and flood zones could impede or redirect flood flows if not appropriately designed, which could result in flooding of offsite areas. This is a potentially significant impact.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

There are no physical improvements associated with the **Turlock**, **Livingston,** and **Atwater Bus Stops** and thus no impacts related to flooding hazards during operation. Similarly, the **Downtown Manteca Station**, **Ripon Station**, **Modesto Station, Ceres Station** and **Ceres Layover Facility, variant 1** alternative are not located within drainage courses or flood zones, and therefore would result in less-than-significant impacts related to flooding hazards during operation.

The **Existing Lathrop/Manteca Station, Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station, Oakland-Fresno Subdivision Connection, Ceres Extension Alignment, Ceres Layover Facility, variant 2,** and **Merced Bus Stop** would include improvements within drainage courses and/or flood zones that could potentially impede or redirect flood flows during operation if the improvements are not appropriately designed. This is a potentially significant impact.

Significance with Application of Mitigation

Implementation of Mitigation Measure HYD-6.1 would require detailed hydraulic evaluations and modifications of project designs if required to reduce potential flooding hazards. This measure would reduce potential operation flooding impacts within drainage courses and flood zones to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-6.1 would apply to the **Existing Lathrop/Manteca Station, Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station, Oakland-Fresno Subdivision Connection, Ceres Extension Alignment, Ceres Layover Facility, variant 2,** and **Merced Bus Stop** for operational flooding hazard impacts related to improvements within drainage courses and flood zones.

Mitigation Measure HYD-6.1: Perform detailed hydraulic evaluations and modify designs for improvements within drainage courses and flood zones if required to reduce potential flooding impacts

Improvements within drainage courses, 100-year flood zones, and 200-year flood zones will be analyzed using detailed hydraulic evaluations to be completed during the next design phase of the improvements to ensure that the improvements would not impede or redirect flood flows. The detailed hydraulic evaluations will be performed and certified by a professional engineer and will be based on the most current and best available information regarding existing flooding hazards, and will quantify the following information.

- The potential for improvements within drainage courses, 100-year flood zones, and 200-year flood zones to impede or redirect flood flows including storm-related flooding.
- The potential for improvements within drainage courses, 100-year flood zones, and 200-year flood zones to result in changes to floodplain extent and depth, and receptors and properties that would be affected by the potential changes to floodplain conditions.

If ACE Extension improvements could result in any increase in offsite flooding conditions compared to existing conditions, project designs will be modified to reduce the potential flooding impacts to be equivalent to the existing conditions. Modifications to designs may include the following measures.

- Increasing culvert sizes.
- Installation of cross-drainage facilities to balance the floodplain elevations across new tracks.
- Creating no net fill for improvements within floodplains.
- Modifying bridge designs to reduce the restriction of flood flows through drainage courses.

The detailed hydraulic evaluations will be submitted to the regulatory agencies that have jurisdiction over improvements within drainage courses. For improvements requiring encroachment permits from the CVFPB, the detailed hydraulic evaluations will be submitted to the CVFPB for review and approval.

Impact HYD-7	Construction of the Phase I improvements could alter drainage patterns and/or create or contribute runoff water that could exceed the capacity of existing or planned stormwater drainage systems and result in flooding.
Level of Impact	Potentially significant
Mitigation Measures	HYD-7.1: Limit groundwater or dewatering discharge flow rates
Level of Impact after Mitigation	Less than significant

Impact Characterization

The potential for exceedance of stormwater drainage system capacity and flooding associated with alteration of drainage patterns and creation of new impervious surfaces is discussed under Impact HYD-8 because these potential impacts would occur during operations.

Construction of several Phase I improvements could require the discharge of groundwater or dewatering effluent. Groundwater or dewatering effluent discharged into stormwater drainage systems could potentially exceed the capacity of the stormwater drainage systems if the discharge is not performed at an appropriate flow rate. There are no physical improvements associated with the **Turlock**, **Livingston** and **Atwater Bus Stops.** Construction of the **Relocated Lathrop/Manteca Station** alternative; **Existing Lathrop/Manteca Station**; **Downtown Manteca Station**; **Modesto Station**; **Ceres Station**; **Ceres Layover Facility, variant 1** alternative; and **Merced Bus Stop** would not involve dewatering discharges.

Construction of the **North Lathrop Station** may involve groundwater dewatering for the construction of a pedestrian bridge crossing over the railroad tracks. Construction of the **Oakland-Fresno Subdivision Connection** would involve construction of a new culvert crossing over an irrigation canal, likely requiring dewatering activities. Similarly, construction of the **Ceres Extension Alignment** would involve dewatering for construction of new railroad bridges supporting the new main track over the Stanislaus and Tuolumne Rivers and a new culvert crossing over Lateral Number Six (canal). Construction of the **Ripon Station** would involve groundwater dewatering for construction of a new pedestrian bridge. Construction of the **Ceres Layover Facility, variant 2** would involve dewatering for the construction of a new culvert crossing over an unnamed canal ditch. Groundwater or dewatering effluent discharged into stormwater drainage systems could potentially exceed the capacity of the stormwater drainage systems if the discharge is not performed at an appropriate flow rate.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

There are no physical improvements associated with the **Turlock**, **Livingston and Atwater Bus Stops** and thus no impacts related to storm drainage system capacity during construction**.** Construction of the **Relocated Lathrop/Manteca Station** alternative; **Existing Lathrop/Manteca Station**; **Downtown Manteca Station**; **Modesto Station**; **Ceres Station**; **Ceres Layover Facility, variant 1** alternative; and **Merced Bus Stop** would result in less-than-significant impacts on storm drainage system capacity because these improvements would not involve the discharge of groundwater or dewatering effluent to storm drainage systems.

Construction activities associated with the **North Lathrop Station**, **Oakland-Fresno Subdivision Connection**, **Ceres Extension Alignment, Ripon Station** and **Ceres Layover Facility, variant 2** for new pedestrian bridges and new culvert crossing and railroad bridges over waterways would require the discharge of groundwater or dewatering effluent. The discharge of groundwater or dewatering effluent could exceed the capacity of storm drainage systems and cause flooding. This is a potentially significant impact.

Significance with Application of Mitigation

Mitigation Measure HYD-7.1 would limit flow rates for groundwater or dewatering discharges. This measure would reduce potential construction impacts on storm drainage system capacity to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-7.1 would apply to the **North Lathrop Station**, **Oakland-Fresno Subdivision Connection**, **Ceres Extension Alignment, Ripon Station** and **Ceres Layover Facility, variant 2** for construction impacts on storm drainage system capacity and associated flooding.

Mitigation Measure HYD-7.1: Limit groundwater or dewatering discharge flow rates

If groundwater or dewatering effluent would be discharged to storm drainage systems (e.g., storm drains, conveyance pipes, canals, ditches, creeks, and rivers) in accordance with permit requirements and Mitigation Measure HYD-1.1, the discharge flow rates will be limited to ensure that the capacity of storm drainage systems would not be exceeded by the discharge. The construction contractor(s) will determine the capacity of storm drainage systems that would receive discharges by coordinating with the local government agencies that have jurisdiction over the protection and maintenance of the storm drainage systems. The capacity of storm drainage systems will be determined for various times of year and various storm events. If the capacity of the storm drainage systems cannot be determined through coordination with local government agencies, evaluations of the capacity of the storm drainage systems that would receive discharges will be performed and certified by a professional engineer. The discharge flow rates will not exceed the capacity determined for various times of year and various storm events.

Impact HYD-8	Phase I operations could alter drainage patterns or create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems and result in flooding.
Level of Impact	Potentially significant
Mitigation Measures	HYD-8.1: Perform detailed hydraulic evaluations and modify designs for stormwater controls if required to prevent storm drainage system capacity exceedance and/or reduce potential flooding impacts
Level of Impact after Mitigation	Less than significant

Impact Characterization

Phase I improvements within the UPRR ROW would include altering drainage patterns by modifying or creating trackside ditches and drainage systems. Phase I improvements would also create new impervious surfaces and stormwater drainage systems at stations and the temporary layover facility, which would alter drainage patterns and create new sources of runoff. If stormwater control systems are not appropriately designed for these improvements, stormwater runoff could exceed the capacity of stormwater drainage systems and result in flooding.

According to the Preliminary Stormwater Management Plan (AECOM 2016a) and Preliminary Hydrology and Drainage Report (AECOM 2016b), at many places along the extension alignment,

trackside drainage ditches are not connected to downstream drainage systems and act as retention and infiltration basins, and excess runoff from these ditches may flow overland into adjacent properties during extreme storm events. In developed urban areas, Phase I improvements cross several major arterial roads with existing storm drain systems, and new drainage systems may be connected to the existing local roadway drainage system. In rural areas, drainage systems may be connected to adjacent canal ditches, creeks, or rivers after implementing appropriate stormwater management systems. In general, the drainage design concepts would include the following features.

- Construct trackside swales or ditches to collect runoff from the tracks within the UPRR ROW.
- Allow infiltration, and detention onsite and offsite, if feasible.
- Evaluate or improve the capacity of the existing drainage system to carry runoff from Phase I improvements, if required.
- Construct catch basins as required to convey excess flows from Phase I improvements to the local drainage system.
- Construct cross-culverts under the existing or new tracks to carry runoff across the trackway system to maintain the flow pattern.

The design storm interval for new ditches and stormwater drainage systems adjacent to tracks would be a 25-year flood for rural areas and a 50-year flood for urban areas (AECOM 2016b). Stormwater controls would be designed and constructed for Phase I improvements within UPRR ROW in accordance with the PPDG, and may include biofiltration swales, biofiltration strips, infiltration devices, detention devices, media filters, wet basins, and dry weather diversion (AECOM 2016a). Compliance with the post-construction stormwater performance standards of the Construction General Permit would ensure that the stormwater controls are designed so that runoff from tracks would match existing runoff conditions (up to the 85th-percentile storm event).

The **Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station**, **Downtown Manteca Station**, **Ripon Station**, **Modesto Station**, and **Ceres Station** would alter existing drainage through station platforms, driveways, parking areas, and new tracks, and modification of at-grade crossings and undercrossings. Improvements associated with these stations would create new impervious pavement surfaces. The **Relocated Lathrop/Manteca Station** alternative**, North Lathrop Station, Downtown Manteca Station, Ripon Station, Modesto Station,** and **Ceres Station** improvements within the UPRR ROW would be required to comply with the post-construction stormwater performance standards of the Construction General Permit and improvements outside the UPRR ROW would be regulated as a Priority Development Project under the applicable MS4 permits.

The track improvements at the **Existing Lathrop/Manteca Station** would alter existing drainage through construction of a new track and associated ditches/drainage systems; however, these improvements would not create new impervious pavement surfaces. The improvements at the **Existing Lathrop/Manteca Station** within the UPRR ROW would be required to comply with the post-construction stormwater performance standards of the Construction General Permit.

The **Oakland-Fresno Subdivision Connection** and **Ceres Extension Alignment** would alter existing drainage through replacement of existing tracks, modification of at-grade crossings and undercrossings, and construction of a new main track and supporting bridges/culverts and associated ditches/drainage systems. The creation of new impervious pavement surfaces is not anticipated with the **Oakland-Fresno Subdivision Connection** and the **Ceres Extension**

Alignment. Improvements within the UPRR ROW for the **Oakland-Fresno Subdivision Connection** and the **Ceres Extension Alignment** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit.

The **Ceres Layover Facility, variants 1 and 2** would alter existing drainage through construction of new layover tracks and support areas. Improvements associated with the **Ceres Layover Facility, variants 1 and 2** would create new impervious pavement surfaces and stormwater drainage systems. Improvements within the UPRR ROW for **Ceres Layover Facility, variants 1 and 2** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit and improvements located outside the UPRR ROW would be regulated as a Priority Development Project under the Small MS4 Permit or Central Valley Permit.

There are no physical improvements associated with the **Turlock**, **Livingston** and **Atwater Bus Stops**; thus these improvements would not alter drainage patterns or create new impervious pavement surfaces. Improvements required for the **Merced Bus Stop** entail installing infrastructure (such as charging stations) to support electric bus operations at the existing Merced Transportation Center. Improvements associated with the **Merced Bus Stop** would not create new impervious pavement surfaces because the existing Merced Transportation Center is already fully paved, and would not result in changes in the existing drainage patterns onsite.

In summary, the Phase I improvements establishing new stations (**Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station**, **Downtown Manteca Station**, **Ripon Station**, **Modesto Station**, and **Ceres Station**) would create new paved surfaces for station platforms, driveways, parking areas, and pedestrian paths; and improvements associated with the **Ceres Layover Facility, variants 1 and 2** would create new paved surfaces for layover facility support areas and driveways/roadways. These Phase I improvements would alter drainage patterns (e.g., increase runoff from new impervious surfaces and creating new stormwater drainage systems). For the Phase I improvements that meet the criteria of regulated projects under applicable MS4 permits, design and construction of stormwater controls would be performed in accordance with applicable MS4 permit requirements, including hydromodification requirements, which may include the use of vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to manage stormwater to maintain predevelopment runoff rates and volumes.

New station platforms at the **Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station**, **Downtown Manteca Station**, **Ripon Station**, **Modesto Station**, and **Ceres Station** would be located in the UPRR ROW, and would therefore not be regulated under local MS4 permits. Stormwater controls within the UPRR ROW (which would be designed and constructed in accordance with the PPDG) would handle runoff from station platforms, and compliance with the post-construction stormwater performance standards of the Construction General Permit would ensure that the stormwater controls are designed so that runoff from station platforms would match existing runoff conditions (up to the 85th-percentile storm event).

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

There are no physical improvements associated with the **Turlock**, **Livingston** and **Atwater Bus Stops** and thus no impacts related to storm drainage system capacity during operation**.** The **Merced Bus Stop** would not create new impervious pavement surfaces or alter existing drainage patterns.

Thus, operational impacts on storm drainage system capacity and associated flooding for these Phase I improvements would be less than significant

Phase I improvements establishing new stations (**Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station**, **Downtown Manteca Station**, **Ripon Station**, **Modesto Station**, and **Ceres Station**) would create new paved surfaces for station platforms, driveways, parking areas, and pedestrian paths; and construction of the **Ceres Layover Facility, variants 1 and 2** would create new paved surfaces for layover facility support areas and driveways/roadways. The **Existing Lathrop/Manteca Station** would alter existing drainage through construction of a new track; and **Oakland-Fresno Subdivision Connection** and **Ceres Extension Alignment** would alter existing drainage through construction of new tracks, culverts, and bridges. These Phase I improvements would alter drainage patterns (e.g., increase runoff from new impervious surfaces and/or alter/create new stormwater drainage systems). Compliance with the applicable MS4/NPDES Permit requirements, including post-construction requirements of the Construction General Permit, would ensure that operation of these Phase I improvements would minimize increases in stormwater runoff compared to the existing condition; however, increases in stormwater runoff could still result from the Phase I improvements from creation of new impervious surfaces and new connections of trackside drainage ditches to existing storm drainage systems. The new impervious surfaces and connections to existing storm drainage systems could contribute toward exceeding the capacity of existing storm drainage systems and result in flooding. This is a potentially significant impact.

Significance with Application of Mitigation

Mitigation Measure HYD-8.1 would require detailed hydraulic evaluations and modification of stormwater controls. This mitigation measure would reduce potential impacts related to alteration of drainage patterns and creation of runoff that could result in exceeding storm drainage system capacity and flooding during operation to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-8.1 would apply to the **Existing Lathrop/Manteca Station, Relocated Lathrop/Manteca Station** alternative, **North Lathrop Station**, **Oakland-Fresno Subdivision Connection**, **Ceres Extension Alignment, Downtown Manteca Station**, **Ripon Station**, **Modesto Station**, **Ceres Station**, and **Ceres Layover Facility, variants 1 and 2** for operational impacts on storm drainage system capacity and associated flooding.

Mitigation Measure HYD-8.1: Perform detailed hydraulic evaluations and modify designs for stormwater controls if required to prevent storm drainage system capacity exceedance and/or reduce potential flooding impacts

Improvements that include alteration of drainage patterns such as alteration and construction of trackside ditches, construction of new impervious pavement and stormwater drainage systems at stations, and construction of new connections to existing stormwater drainage systems, will require detailed hydraulic evaluations to be completed during the next improvements design phase to ensure that the new stormwater control infrastructure is appropriately designed and that runoff from improvements would not exceed the capacity of storm drainage systems and result in flooding. The detailed hydraulic evaluations will be performed in accordance with the requirements of latest edition of the Caltrans Highway Design Manual (Caltrans 2017) for tracks and station platforms, and in accordance with regulations and design requirements of local

municipalities (including the local MS4 Permit requirements) for other improvements associated with stations. The detailed hydraulic evaluations will be based on the most current and best available information regarding existing stormwater drainage system capacity and existing flooding hazards. A professional engineer will perform and certify the following detailed hydraulic evaluations.

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

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

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

4.10.4.4 Phase II Improvements Impacts and Mitigation Measures

Impact HYD-9	Construction of the Phase II improvements could violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality.
Level of Impact	Potentially significant
Mitigation Measures	HAZ-2.3: Implement construction risk management plan
	HYD-1.1: Avoid water quality impacts from groundwater or dewatering discharges
	HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters
	HYD-7.1: Limit groundwater or dewatering discharge flow rates
Level of Impact after Mitigation	Less than significant

Impact Characterization

Construction of the Phase II improvements could violate water quality standards or WDR or provide substantial sources of polluted runoff in the following ways.

- Improper management of soils, fill, and hazardous materials
- Construction of Phase II improvements involving dewatering or within or adjacent to surface waters

Improper Management of Soils, Fill, and Hazardous Materials

Construction of the Phase II improvements would involve disturbing and handling existing soil and imported fill materials, and the use and storage of hazardous materials (e.g., fuels and lubricants for construction equipment) during construction activities. The improper handling and management of disturbed soil and imported fill could result in pollution of stormwater runoff with sediment and contaminants that may be in the existing soil or imported fill materials, potentially reducing the quality of the receiving waters. If spilled or improperly stored, substances such as fuels and oils could directly enter nearby surface waters or be transported to nearby surface waters in stormwater runoff, potentially reducing the quality of the receiving waters. Polluted stormwater runoff and spills of hazardous materials can also infiltrate through pervious surfaces and degrade groundwater quality. Handling and management of existing soil, imported fill material, and hazardous materials in upland construction areas would be performed in accordance with a SWPPP, as required by the Construction General Permit, to ensure that stormwater runoff, surface waters, and groundwater are not polluted by these construction activities.

The performance standard in the Construction General Permit and requirements for preparation and implementation of a SWPPP are described in Impact HYD-1. In addition, as described in Impact HYD-1, according to the Preliminary Stormwater Management Plan (AECOM 2016a), BMPs would be implemented to provide temporary and permanent erosion and sediment control and to control potential pollution sources during construction of the Phase II improvements.

Construction of Phase II Improvements Involving Dewatering or within or Adjacent to Surface Waters

Construction of the **Livingston Station, Atwater Station**, and **Merced Station** would not involve construction adjacent to surface waters or the discharge of groundwater or dewatering effluent. Thus, construction of these Phase II improvements would not result in the discharge of contaminated water or water containing sediments into nearby surface waters.

However, several of the Phase II improvements would include construction activities adjacent to, within, and crossing over surface waters. In addition, construction of several Phase II improvements could require the discharge of groundwater or dewatering effluent. The **Merced Extension Alignment** would entail construction of new bridges over the Merced River, Canal Creek, Weber Canal, Bear Creek, irrigation canals, and a drainage ditch, and new culverts over various canals, which would involve the discharge of groundwater or dewatering effluent. Construction of the pedestrian bridge at the **Turlock Station** may also involve handling and management of groundwater/dewatering effluent. Construction of the **Merced Layover Facility** would involve construction of a new bridge crossing an irrigation canal, which would involve the discharge of groundwater or dewatering effluent.

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

Impact HYD-1 describes the BMPs specified in the Preliminary Stormwater Management Plan (AECOM 2016a) that would be implemented for work done above and adjacent to waterways to protect water quality during construction of the Phase II improvements. In addition, all construction activities within the banks of surface waters would require compliance with resource agency permit requirements that would reduce potential impacts on water quality during construction activities along the banks of surface waters and within surface waters. All construction activities within the banks of surface waters would require a USACE Section 404 permit and associated Section 401 Water Quality Certification from the State Water Board. Work within a stream or on a streambank would require a CDFW Streambed Alteration Agreement. These permit applications must include a discussion of construction BMPs, including erosion and sediment control BMPs, which would minimize impacts on water quality. The permits would include any additional requirements for protection of water quality as deemed necessary by the reviewing agencies.

The improper handling and management of groundwater or dewatering discharges could result in the discharge of contaminated water or water containing sediments into nearby surface waters, which could violate water quality standards or WDRs. The Construction General Permit allows the discharge of dewatering effluent to storm drains or directly to surface waters if the groundwater is not contaminated, is properly filtered or treated using appropriate technology, and the Construction General Permit conditions (Section 4.10.2.1) are met, to ensure that receiving water quality is not substantially degraded.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Handling and management of existing soil, imported fill material, and hazardous materials in upland construction areas in accordance with a SWPPP would ensure that construction of Phase II improvements that are not adjacent to, within, or crossing surface water and would not involve discharge of groundwater or dewatering effluent would result in less-than-significant impacts on water quality.

Because improvements associated with the **Livingston Station, Atwater Station**, and **Merced Station** would not involve construction activities adjacent to, within, or crossing over surface waters or handling and management of groundwater or dewatering effluent, impacts from these Phase II improvements would be less than significant. Construction activities associated with the **Merced Extension Alignment, Turlock Station**, and **Merced Layover Facility** would have the potential to result in the discharge of groundwater or dewatering effluent to nearby surface waters. In addition, construction activities associated with the **Merced Extension Alignment** and **Merced Layover Facility** would have the potential for soil, sediment, construction materials, and hazardous materials to be released into surface water during work adjacent to, within, or crossing surface water. Thus, construction activities associated with **Merced Extension Alignment, Turlock Station**, and **Merced Layover Facility** could violate water quality standards or WDRs. These impacts would be potentially significant

Significance with Application of Mitigation

Mitigation Measure HYD-1.1 requires specific procedures the construction of Phase II improvements entailing the discharge of groundwater or dewatering effluent. Mitigation Measure HYD-1.2 requires specific procedures for construction work for Phase II improvements adjacent to, within, or crossing

surface water. With implementation of Mitigation Measures HYD-1.1 and HYD-1.2, impacts on water quality during construction of Phase II improvements would be less than significant.

Mitigation Measures

Mitigation Measures HAZ-2.3, HYD-1.1, and HYD-7.1 would apply to the **Merced Extension Alignment, Turlock Station**, and **Merced Layover Facility** for construction activities involving the discharge of groundwater or dewatering effluent. Mitigation Measure HYD-1.2 would also apply to the **Merced Extension Alignment** and **Merced Layover Facility** for construction work adjacent to, within, or crossing surface water. The description of Mitigation Measure HAZ-2.3 is presented in Section 4.9, *Hazardous Materials*. Descriptions of Mitigation Measures HYD-1.1 and HYD-1.2 are presented in Impact HYD-1 and the description of Mitigation Measure HYD-7.1 is presented in Impact HYD-7.

Mitigation Measure HAZ-2.3: Implement construction risk management plan

Mitigation Measure HYD-1.1: Avoid water quality impacts from groundwater or dewatering discharges

Mitigation Measure HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters

Mitigation Measure HYD-7.1: Limit groundwater or dewatering discharge flow rates

Impact HYD-10	Operation and maintenance of the Phase II improvements could violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality.
Level of Impact	Potentially significant
Mitigation Measures	HAZ-2.3: Implement construction risk management plan
Level of Impact after Mitigation	Less than significant

Impact Characterization

Operation and maintenance of the Phase II improvements could violate water quality standards or WDR or provide substantial sources of polluted runoff in the following ways.

- Reuse of contaminated soils or fill for the Phase II improvements
- Alteration of existing drainage patterns and creation of new sources of polluted runoff where the Phase II improvements are located
- Use of pesticides for track maintenance
- Train operations and accident conditions

Use of Contaminated Soils or Fill

The Phase II improvements would involve grading and reuse of existing soil and use of imported fill materials. If contaminants are present in reused existing soil or fill materials that are placed in a location exposed to stormwater, contaminants could leach into stormwater runoff from the reused

existing soil or imported fill and result in pollution of stormwater runoff and surface water, potentially reducing the quality of the receiving waters. This is a potentially significant impact.

Alteration of Existing Drainage Patterns and New Sources of Polluted Runoff

Phase II improvements located within the UPRR ROW would alter drainage patterns (e.g., altering or creating drainage systems) along tracks. If adequate stormwater control and treatment systems are not designed or constructed as part of Phase II improvements, pollutants that may be entrained in sediments could be transported from tracks to surface waters in stormwater runoff. The Construction General Permit includes post-construction stormwater performance standards that address water quality and channel protection for construction projects that are not in an area subject to post-construction standards of an active Phase I or II MS4 Permit with an approved Stormwater Management Plan. The Construction General Permit requires post-construction runoff to match preconstruction runoff for the 85th-percentile storm event, which not only reduces the risk of impacts on the receiving water's channel morphology but also provides some protection of water quality. The Construction General Permit also requires implementation of post-construction BMPs to reduce pollutants in stormwater discharges that are reasonably foreseeable after all construction phases have been completed. Compliance with the post-construction requirements of the Construction General Permit must be demonstrated by submitting a map and post-construction runoff calculation worksheets with the Notice of Intent (State Water Resources Control Board 2012b).

According to the Preliminary Stormwater Management Plan (AECOM 2016a), it appears unlikely that hydromodification management measures would be required for the Phase II improvements that involve improvements within UPRR ROW because improvements to tracks would not create new impervious surfaces. However, detailed design-level studies may conclude that increases in the post-construction runoff would exceed the Construction General Permit criteria in some locations. If estimated post-construction runoff volumes are found to exceed the criteria, the improvements within UPRR ROW would be required to incorporate hydromodification management to control flows and reduce the post-construction flow rates and durations for management of erosion and sediment. Hydromodification management may include facilities to retain, detain, bypass, split, or infiltrate runoff to mimic preconstruction flows, durations, and associated sediment transport.

According to the Preliminary Stormwater Management Plan, stormwater control and treatment BMPs would be designed and constructed for improvements within UPRR ROW in accordance with the PPDG developed by Caltrans (California Department of Transportation 2010), and may include biofiltration swales, biofiltration strips, infiltration devices, detention devices, media filters, wet basins, and dry weather diversion (AECOM 2016a). Design and construction of stormwater control and treatment BMPs in accordance with the PPDG would ensure that Phase II operations involving improvements within the UPRR ROW would have a less-than-significant impact on water quality.

The **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** would alter existing drainage through the construction of station platforms, driveways, and parking areas. Improvements associated with these stations would create new impervious pavement surfaces. The **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** improvements within the UPRR ROW would be required to comply with the post-construction stormwater performance standards of the Construction General Permit, and stormwater control systems for these improvements would be designed and constructed in accordance with the PPDG. Improvements outside the UPRR ROW would be regulated as a Priority Development Project under the Small MS4

Permit or Central Valley Permit based on the construction of more than 5,000 square feet of parking lot, and would be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan.

The **Merced Extension Alignment** would alter existing drainage through replacement of existing tracks, modification of at-grade crossings and undercrossings, and construction of a new main track and supporting bridges. The creation of new impervious pavement surfaces is not anticipated with the **Merced Extension Alignment**. Improvements within the UPRR ROW for the **Merced Extension Alignment** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit, and stormwater control systems for these improvements would be designed and constructed in accordance with the PPDG.

The **Merced Layover Facility** would alter existing drainage through construction of new layover tracks and support areas. Improvements associated with the **Merced Layover Facility** would create new impervious pavement surfaces. Improvements within the UPRR ROW for the **Merced Layover Facility** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit, and stormwater control systems for these improvements would be designed and constructed in accordance with the PPDG. Improvements located outside the UPRR ROW for the **Merced Layover Facility** would be regulated as a Priority Development Project under the Small MS4 Permit or Central Valley Permit based on the construction of more than 5,000 square feet of new impervious surface for a parking lot or industrial/commercial facility, and would be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan.

Because the **Merced Layover Facility** would include train fueling/cleaning operations, these improvements would be required to comply with the Industrial General Permit which requires the use of BMPs, BAT, and BCT to reduce and prevent discharges of pollutants to meet applicable water quality standards. Both the Small MS4 Permit and Central Valley Permit require source control measures to be developed for pollutant-generating activities including fueling areas and vehicle/equipment wash areas. The **Merced Layover Facility** would therefore be required to incorporate appropriate stormwater mitigation measures, including LID source control, site design, stormwater treatment, and hydromodification management, into the design plan. The Small MS4 Permit requires that the source control measures for these pollutant-generating activities be designed in accordance with the recommendations of the CASQA Stormwater BMP Handbook for New Development and Redevelopment (California Stormwater Quality Association 2003) or equivalent manual. Impact HYD-2 presented the recommendations regarding fueling areas and vehicle/equipment washing areas included in the CASQA Stormwater BMP Handbook for New Development and Redevelopment.

In summary, the **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** would include construction of new paved surfaces for parking lots, driveways, and pedestrian paths. The **Merced Layover Facility** would involve the construction of new paved surfaces and buildings for layover facility support areas including an administrative office, crew facilities, small parts storage, fueling facilities, wayside power, and train cleaning function areas. These improvements would alter drainage patterns (e.g., increase runoff from new impervious surfaces and create new stormwater drainage systems) and provide new sources of polluted runoff associated with motor vehicle traffic and train fueling/cleaning. Increasing runoff can cause erosion of unlined drainage courses (e.g.,

natural creeks and earthen canals and ditches) that would receive runoff from these Phase II improvements, which can increase the turbidity of surface waters and cause sedimentation downstream. Pollutants that may be transported in runoff from parking lots, roadways, and layover facility support facilities include sediment; metals; organic compounds including diesel, gasoline, oil, and grease; and trash and debris. **Merced Layover Facility** support areas that would include train fueling/cleaning operations would be required to comply with the Industrial General Permit which requires the use of BMPs, BAT, and BCT to reduce and prevent discharges of pollutants to meet applicable water quality standards. For Phase II improvements that meet the criteria of regulated projects under local MS4 Permits, design and construction of stormwater controls and treatment systems would be performed in accordance with local MS4 Permit requirements, including hydromodification requirements. As discussed under *National Pollutant Discharge Elimination System Municipal Stormwater Permits* in Section 4.10.2.1, the criteria for determining regulated projects under local MS4 Permits includes the amount of new impervious surface area that would be created and proposed land uses (e.g., parking lots). Design and construction of stormwater controls and treatment systems in accordance with local MS4 Permit requirements (e.g., use of source controls, infiltration features, vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to manage stormwater to maintain predevelopment runoff rates, volumes, and quality) would ensure that stormwater runoff would not contain significant levels of pollutants or cause erosion and sedimentation in receiving waters.

New station platforms at the **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** and improvements that would alter existing drainage within the UPRR ROW (**Merced Extension Alignment** and portions of the **Merced Layover Facility**) would not be regulated under local MS4 Permits. Stormwater runoff from station platforms would not contain significant levels of pollutants because the station platforms would have only foot traffic. Compliance with the post-construction stormwater performance standards of the Construction General Permit would be required for new station platforms and other improvements within the UPRR ROW (e.g., new or improved tracks and drainage systems), and would ensure that stormwater runoff from station platforms and tracks would not cause erosion and sedimentation in receiving waters.

Use of Pesticides

Pesticides would be used (similar to current operations) to maintain and clear vegetation from tracks. The future use of pesticides for vegetation removal near the tracks would be required to comply with DPR regulations that are intended to protect human health and the environment (see discussion under *California Department of Pesticide Regulation* in Section 4.10.2.2). DPR puts special controls on pesticides that can be especially dangerous to human health or the environment if not used correctly, limiting their use to trained individuals and only at times and places approved by a permit from the County Agricultural Commissioners (California Department of Pesticide Regulation 2017). Use of pesticides for vegetation removal near the tracks would therefore result in a less-than-significant impact on water quality.

Train Operations and Accident Conditions

Trains can be sources of pollutants such as petroleum products (e.g., oil, grease, and diesel) and metals. Under normal operating conditions, the amount of these pollutants released by modern trains is minimal (i.e., only minor drips) because trains undergo regular inspections and maintenance to prevent and fix leaks. Impacts from minor drips would be limited to the area immediately below the railroad tracks, and the track ballast material would minimize stormwater

runoff from the area of localized impacts and prevent significant impacts on water quality. Therefore, Phase II operations within UPRR ROW would not contribute new significant sources of pollutants to stormwater runoff unless an accidental release of hazardous materials occurs along the tracks.

As described in Impact SAF-8 in Section 4.16, the potential increases in accident conditions resulting from Phase II operations of passenger trains include the accidental release of hazardous materials. However, based on historic FRA accident/incident data, these occurrences are rare and travel by rail remains one of the safest modes of transportation. Phase II operations would comply with stringent federal and state protocols and regulations intended to reduce the likelihood of accident conditions. Accident conditions, including the accidental release of hazardous materials, are not expected to increase with Phase II operations.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Compliance with existing regulations (such as the Construction General Permit; requirements for Priority Development Projects under the Central Valley Permit or Small MS4 Permit; and Industrial General Permit) and the design and construction of stormwater control systems in the UPRR ROW in accordance with the PPDG would ensure that stormwater runoff from Phase II improvements would not cause erosion and sedimentation in receiving waters and that runoff from impervious surface areas is managed and treated to remove contaminants. Use of pesticides for vegetation removal near tracks would be required to comply with DPR regulations which would ensure runoff would not affect water quality of receiving waters. Phase II operations would comply with stringent federal and state protocols and regulations intended to reduce the likelihood of accident conditions, and similarly not affect water quality of receiving waters for accident conditions. Compliance with existing regulations would ensure that these potential sources of polluted runoff would result in less-than-significant impacts on the water quality of receiving waters.

However, all Phase II improvements would require earthwork. If contaminants are present in reused existing soil or imported fill materials that are exposed to stormwater, contaminants could leach into stormwater runoff from the reused existing soil or imported fill and result in pollution of stormwater runoff and surface water, potentially reducing the quality of the receiving water. This is a potentially significant impact.

Significance with Application of Mitigation

Implementation of Mitigation Measure HAZ-2.3 requires preparation of a RMP. The RMP would include guidelines for testing and reuse of existing soil to ensure that potentially contaminated existing soil would not be reused in a manner that could pollute stormwater runoff, surface waters, or groundwater. The RMP would include guidelines for testing and use of imported fill material to ensure that contaminated fill materials are not used in a manner that could pollute stormwater runoff, surface waters, or groundwater. Implementation of Mitigation Measure HAZ-2.3, design and construction of stormwater controls and treatment systems in accordance with the PPDG, compliance with the post-construction requirements of the Construction General Permit, and compliance with requirements of applicable MS4/NPDES permits for stormwater control and treatment would ensure that operation of the Phase II improvements would have a less-than-significant impact on water quality.

Mitigation Measures

Mitigation Measure HAZ-2.3 would apply to the operation and maintenance of all Phase II improvements that could result in impacts on water quality a result using contaminated soils or fill. The description of Mitigation Measure HAZ-2.3 is presented in Section 4.9, *Hazardous Materials*.

Mitigation Measure HAZ-2.3: Implement construction risk management plan

Impact HYD-11	Construction of the Phase II improvements could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
Level of Impact	Less than significant

Impact Characterization and Significance Conclusion

As discussed under Impact HYD-9, when temporary and limited groundwater dewatering would be required for construction activities, dewatering effluent would be treated and discharged (in accordance with provisions of the Construction General Permit, RMP, and Mitigation Measure HYD-1.1) back to the nearby surface water, if possible, providing an opportunity for groundwater recharge.

Construction of the **Livingston Station, Atwater Station**, and **Merced Station** would not involve groundwater dewatering. The **Merced Extension Alignment** would entail construction of new bridges over the Merced River, Canal Creek, Weber Canal, Bear Creek, irrigation canals, and a drainage ditch and new culverts over various canals, which would involve the discharge of groundwater or dewatering effluent. Construction of the pedestrian bridge at the **Turlock Station** may also involve handling and management of groundwater/dewatering effluent. Construction of the **Merced Layover Facility,** would involve construction of a new bridge crossing an irrigation canal, which would involve the discharge of groundwater or dewatering effluent.

Dewatering effluent generated during construction of the Phase II improvements would be treated and discharged (in accordance with provisions of the Construction General Permit, RMP, and Mitigation Measure HYD-1.1) back to the nearby surface water, if possible, providing an opportunity for groundwater recharge. Since dewatering activities for construction of bridges and culverts would be short term and limited to bridge and culvert locations, and the discharged effluent would have the opportunity to recharge the aquifer, the dewatering activities associated with construction of Phase II improvements would have a less-than-significant impact on groundwater resources and groundwater recharge.

Impact HYD-12	Phase II operations could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
Level of Impact after Mitigation	Less than significant

Impact Characterization and Significance Conclusion

Phase II operations would not involve dewatering or other use of groundwater that could deplete groundwater resources. Phase II improvements associated with new stations would create new impervious surfaces, which can impede groundwater recharge as stormwater would runoff of the impervious surfaces rather than infiltrating the ground surface and recharging aquifers. As discussed under Impact HYD-10, Phase II improvements associated with new station platforms creating new impervious surfaces within the UPRR ROW would be required to comply with the post-construction requirements of the Construction General Permit, which requires post-construction runoff to match preconstruction runoff for the 85th-percentile storm event. Other Phase II improvements that would create new impervious surfaces, such as the construction of parking areas, driveways, pedestrian paths, and layover facility support areas at new stations and facilities would be required to comply with requirements of the applicable MS4/NPDES permits for stormwater control and treatment, which include LID source control, site design, stormwater treatment, and hydromodification management. Stormwater control and treatment systems may include vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to maintain predevelopment runoff rates, volumes, and quality and enhance infiltration and groundwater recharge.

The **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** would involve creation of new impervious pavement surfaces as part of establishing new stations. Improvements within the UPRR ROW for these stations would be required to comply with the post-construction stormwater performance standards of the Construction General Permit and improvements outside the UPRR ROW would be regulated as a Priority Development Project under the Small MS4 Permit or Central Valley Permit.

Improvements associated with the **Merced Layover Facility** would involve creation of new impervious pavement surfaces as part of establishing new layover facility support areas. Improvements within the UPRR ROW for the layover facility would be required to comply with the post-construction stormwater performance standards of the Construction General Permit and improvements outside the UPRR ROW would be regulated as Priority Development Projects under the Small MS4 Permit or Central Valley Permit. The **Merced Extension Alignment** would not involve creation of new impervious pavement surfaces.

Design and construction of stormwater controls and treatment systems for the Phase II improvements, in accordance with the PPDG, and in compliance with the post-construction requirements of the Construction General Permit and with requirements of the applicable MS4/NPDES permits for stormwater control and treatment, would ensure that operation of the Phase II improvements that include the creation of new impervious surfaces would have a less-than-significant impact on groundwater recharge

Impact HYD-13	Construction of the Phase II improvements could expose people or structures or property to significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam; placing structures within 100-year flood hazard areas that could impede or redirect flood flows; or substantially altering the existing drainage courses of the site or area.
Level of Impact	Potentially significant
Mitigation Measures	HYD-5.1: Prevent construction workers, materials, and equipment from being exposed to storm flooding hazards
Level of Impact after Mitigation	Less than significant

Impact Characterization

Potential flooding hazards were identified for areas intersected by the Phase II improvements including storm-related flooding (100-year flood zones and 200-year flood zones), areas protected from flooding by levees, and dam failure inundation areas. The Phase II improvements are not located near the coast and are therefore not susceptible to coastal flooding hazards, such as tsunamis, extreme high tides, or SLR.

The **Turlock Station** and **Atwater Station** would not intersect any flood hazard zones or drainage courses. The **Livingston Station** would be located in a dam failure inundation area and the **Merced Station** would be located in a 100-year flood zone.

The **Merced Extension Alignment** would intersect flood hazard zones including dam failure inundation areas and 100-year flood zones around the Merced River, Canal Creek, and Bear Creek. Construction of the **Merced Extension Alignment** would also entail construction of new bridges over the Merced River, Canal Creek, Weber Canal, Bear Creek, irrigation canals, and a drainage ditch, and new culverts over various canals to support the new main track. The **Merced Layover Facility** would intersect a 100-year flood zone and involve the construction of a new bridge crossing an irrigation canal.

Construction of the Phase II improvements may be located within drainage courses during construction of bridges and culverts, which could also alter drainage courses and cause flooding during construction because the placement of construction materials, equipment, and new structures (e.g., culverts, bridge supports, fill material, and temporary bridges for equipment access) within drainage courses and potential diversion of surface water around work areas within drainage courses could obstruct flood flows. The Phase II improvements would also require construction within 100-year floodplains. If flooding of construction areas occurs, construction workers could be exposed to risk of injury. Construction materials and equipment could also be inundated, which could result in pollution of surface waters. Construction materials and equipment could be carried downstream by flood flows, creating a greater risk of damage to property and injury to people.

As discussed under *Dam and Levee Failure* in Section 4.10.3.1, levee systems accredited by FEMA to provide protection from a 100-year flood require regular maintenance to maintain the stability, height, and overall integrity of the levee and its associated structures and systems. The potential for inundation of Phase II improvements from failure of a FEMA-accredited levee is therefore considered low. The Phase II improvements would not involve construction activities on or adjacent to FEMA-accredited levees and therefore construction of the Phase II improvements would not affect the integrity of levees or increase the risk of flooding related to levee failure.

In potential dam failure inundation areas that are intersected by the Phase II improvements, existing dams under state and federal jurisdiction are periodically inspected to ensure that they are adequately maintained and that identified deficiencies are corrected. The regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure, and the Phase II improvements would not increase the likelihood of dam failure.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Catastrophic dam failure is considered a low-likelihood event because regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure. Therefore, potential flooding impacts associated with dam failure during construction of the Phase II improvements would be less than significant.

Construction of the **Turlock Station, Livingston Station,** and **Atwater Station** would not entail activities within drainage courses or flood zones, and therefore would result in less-than-significant impacts related to flooding hazards during construction. However, construction of the **Merced Extension Alignment, Merced Layover Facility,** and the **Merced Station** would include activities within drainage courses or flood zones. If storm-related flooding of construction areas occurs, construction workers could be exposed to risk of injury, and construction materials and equipment within drainage courses could impede flood flows. Construction materials and equipment could also be inundated, which could result in pollution of surface waters. Construction materials and equipment could be carried downstream by flood flows, creating a greater risk of damage to property and injury to people. This is a potentially significant impact.

Significance with Application of Mitigation

Mitigation Measure HYD-5.1 would prevent construction workers, materials, and equipment from being exposed to storm flooding hazards. This measure would mitigate potential construction impacts related to flooding hazards to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-5.1 would apply to the **Merced Extension Alignment, Merced Layover Facility,** and the **Merced Station** for construction flooding hazard impacts related to improvements within drainage courses and flood zones. The description of Mitigation Measure HYD-5.1 is presented in Impact HYD-5.

Mitigation Measure HYD-5.1: Prevent construction workers, materials, and equipment from being exposed to storm flooding hazards

Impact HYD-14	Phase II operations could expose people or structures or property to significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam; placing structures within 100-year flood hazard areas that could impede or redirect flood flows; or substantially altering the existing drainage courses of the site or area.
Level of Impact	Potentially significant
Mitigation Measures	HYD-6.1: Perform detailed hydraulic evaluations and modify designs for improvements within drainage courses and flood zones if required to reduce potential flooding impacts
Level of Impact after Mitigation	Less than significant

Impact Characterization

As discussed under Impact HYD-13, Phase II improvements intersect various flooding hazard areas including storm-related flooding (100-year flood zones) and dam failure inundation areas. The Phase II improvements are not located near the coast and are therefore not susceptible to coastal flooding hazards, such as tsunamis, extreme high tides, or SLR. The potential for the Phase II improvements to be subject to flooding impacts related to dam or levee failure during operation is very low as regular inspection and maintenance of dams and levees substantially reduces the potential for their failure. Therefore potential impacts of flooding related to dam or levee failure during operation of the Phase II improvements are not discussed further.

For Phase II improvements located within drainage courses and/or flood zones, if the improvements are not appropriately designed, they could potentially impede or redirect flood flows during operation, and railroad tracks could be inundated. Under existing standard procedures, trains would not operate on railroad tracks that are inundated due to the increased risk of derailment. Railroad tracks could be damaged by inundation and increase the risk of future derailment, which can result in serious injuries or deaths and spills of pollutants that can impact surface water and/or groundwater. However, under existing standard procedures, if tracks were to be inundated by flooding, the line would be shut down, the tracks would be inspected, repairs and removal of debris would be performed if needed, and operation would begin again once the water has receded and the tracks are determined to be safe and free of debris. Therefore damage to tracks from flooding inundation would not expose people or structures or property to significant risk of loss, injury, or death.

Table 4.10-10 as presented in Impact HYD-6 summarizes the required design storm interval for new stormwater drainage systems and improvements over drainage courses which would depend on the location (rural or urban) and type of drainage systems. In the Central Valley Region, encroachment permits would be required from the CVFPB to construct bridges, and the CVFPB requires new bridges to be designed for 200-year flood events. If a bridge design cannot meet the 200-year flood criteria, the bridge would have to go through a CVFPB hearing process for approval. The review and approval of bridge designs by CVFPB would ensure that operation of new bridges in the Central Valley Region would not impede or redirect flood flows.

The **Turlock Station, Livingston Station,** and **Atwater Station** would not intersect any flood zones or drainage courses. The **Merced Station** would be located in a 100-year flood zone.

The **Merced Extension Alignment** would intersect 100-year flood zones around the Merced River and Bear Creek. Construction of the **Merced Extension Alignment** would also entail construction of new bridges over the Merced River, Canal Creek, Weber Canal, Bear Creek, irrigation canals, and a drainage ditch, and new culverts over various canals to support the new main track. The **Merced Layover Facility** would intersect a 100-year flood zone and involve the construction of a new bridge crossing an irrigation canal.

Phase II improvements within drainage courses and flood zones could impede or redirect flood flows if not appropriately designed, which could result in flooding of offsite areas. This is a potentially significant impact.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

The **Turlock Station, Livingston Station,** and **Atwater Station** are not located within drainage courses or flood zones, and therefore would result in less-than-significant impacts related to flooding hazards during operation.

The **Merced Extension Alignment, Merced Layover Facility,** and the **Merced Station** would include improvements within drainage courses and/or flood zones that could potentially impede or redirect flood flows during operation if the improvements are not appropriately designed. This is a potentially significant impact.

Significance with Application of Mitigation

Implementation of Mitigation Measure HYD-6.1 would require detailed hydraulic evaluations and modifications of project designs if required to reduce potential flooding hazards. This measure would reduce potential operation flooding impacts within drainage courses and flood zones to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-6.1 would apply to **Merced Extension Alignment, Merced Layover Facility,** and the **Merced Station** for operational flooding hazard impacts related to improvements within drainage courses and flood zones. The description of Mitigation Measure HYD-6.1 is presented in Impact HYD-6.

Mitigation Measure HYD-6.1: Perform detailed hydraulic evaluations and modify designs for improvements within drainage courses and flood zones if required to reduce potential flooding impacts

Impact HYD-15	Construction of the Phase II improvements could alter drainage patterns and/or create or contribute runoff water that could exceed the capacity of existing or planned stormwater drainage systems and result in flooding.
Level of Impact	Potentially significant
Mitigation Measures	HYD-7.1: Limit groundwater or dewatering discharge flow rates
Level of Impact after Mitigation	Less than significant

Impact Characterization

The potential for exceedance of stormwater drainage system capacity and flooding associated with alteration of drainage patterns and creation of new impervious surfaces is discussed under Impact HYD-16 because these potential impacts would occur during operations.

Construction of several Phase II improvements could require the discharge of groundwater or dewatering effluent. Groundwater or dewatering effluent discharged into stormwater drainage systems could potentially exceed the capacity of the stormwater drainage systems if the discharge is not performed at an appropriate flow rate. Construction of the **Livingston Station, Atwater Station**, and **Merced Station** would not involve dewatering discharges.

The **Merced Extension Alignment** would entail construction of a new bridge within, adjacent to, and over the Merced River, Canal Creek, Weber Canal, Bear Creek, irrigation canals, and drainage and new culverts over various canals and which would involve the discharge of groundwater or dewatering effluent. Construction of the pedestrian bridge at the **Turlock Station** may also involve handling and management of groundwater/dewatering effluent. Construction of the **Merced Layover Facility** would involve construction of a new bridge crossing an irrigation canal, which would involve the discharge of groundwater or dewatering effluent. Groundwater or dewatering effluent discharged into stormwater drainage systems could potentially exceed the capacity of the stormwater drainage systems if the discharge is not performed at an appropriate flow rate.

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Construction of the **Livingston Station, Atwater Station**, and **Merced Station** would result in less-than-significant impacts on storm drainage system capacity because these improvements would not involve the discharge of groundwater or dewatering effluent to storm drainage systems.

Construction activities associated with the **Merced Extension Alignment, Merced Layover Facility**, and **Turlock Station** for a new pedestrian bridge and new culvert crossing and railroad bridges over waterways would require the discharge of groundwater or dewatering effluent. The discharge of groundwater or dewatering effluent could exceed the capacity of storm drainage systems and cause flooding. This is a potentially significant impact.

Significance with Application of Mitigation

Mitigation Measure HYD-7.1 would limit flow rates for groundwater or dewatering discharges. This measure would reduce potential construction impacts on storm drainage system capacity to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-7.1 would apply to the **Merced Extension Alignment, Merced Layover Facility**, and **Turlock Station** for construction impacts on storm drainage system capacity and associated flooding. The description of Mitigation Measure HYD-7.1 is presented in Impact HYD-7.

Mitigation Measure HYD-7.1: Limit groundwater or dewatering discharge flow rates

Impact HYD-16	Phase II operations could alter drainage patterns or create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems and result in flooding.
Level of Impact	Potentially significant
Mitigation Measures	HYD-8.1: Perform detailed hydraulic evaluations and modify designs for stormwater controls if required to prevent storm drainage system capacity exceedance and/or reduce potential flooding impacts
Level of Impact after Mitigation	Less than significant

Impact Characterization

Phase II improvements within the UPRR ROW would include altering drainage patterns by modifying or creating trackside ditches and drainage systems. Phase II improvements would also create new impervious surfaces and stormwater drainage systems at stations and the layover facility, which would alter drainage patterns and create new sources of runoff. If stormwater control systems are not appropriately designed for these improvements, stormwater runoff could exceed the capacity of stormwater drainage systems and result in flooding.

According to the Preliminary Stormwater Management Plan (AECOM 2016a) and Preliminary Hydrology and Drainage Report (AECOM 2016b), at many places along the extension alignment, trackside drainage ditches are not connected to downstream drainage systems and act as retention and infiltration basins, and excess runoff from these ditches may flow overland into adjacent properties during extreme storm events. In developed urban areas, Phase II improvements crosses several major arterial roads with existing storm drain systems, and new drainage systems may be connected to the existing local roadway drainage system. In rural areas, drainage systems may be connected to adjacent canal ditches, creeks, or rivers after implementing appropriate stormwater management systems. In general, the drainage design concepts would include the following features.

- Construct trackside swales or ditches to collect runoff from the tracks within the UPRR ROW.
- Allow infiltration, and detention onsite and offsite, if feasible.
- Evaluate or improve the capacity of the existing drainage system to carry runoff from Phase II improvements, if required.
- Construct catch basins as required to convey excess flows from Phase II improvements to the local drainage system.
- Construct cross-culverts under the existing or new tracks to carry runoff across the trackway system to maintain the flow pattern.

The design storm interval for new ditches and stormwater drainage systems adjacent to tracks would be a 25-year flood for rural areas and a 50-year flood for urban areas (AECOM 2016b). Stormwater controls would be designed and constructed for Phase II improvements within the UPRR ROW in accordance with the PPDG, and may include biofiltration swales, biofiltration strips, infiltration devices, detention devices, media filters, wet basins, and dry weather diversion (AECOM 2016a). Compliance with the post-construction stormwater performance standards of the Construction General Permit would ensure that the stormwater controls are designed so that runoff from tracks would match existing runoff conditions (up to the 85th-percentile storm event).

The **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** would alter existing drainage through the construction of station platforms, driveways, and parking areas. Improvements associated with these stations would create new impervious pavement surfaces. The **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** improvements within the UPRR ROW would be required to comply with the post-construction stormwater performance standards of the Construction General Permit and improvements outside the UPRR ROW would be regulated as a Priority Development Project under the Small MS4 Permit or Central Valley Permit.

The **Merced Extension Alignment** would alter existing drainage through replacement of existing tracks, modification of at-grade crossings and undercrossings, and construction of a new main track and supporting bridges/culverts and associated ditches/drainage systems. The creation of new impervious pavement surfaces is not anticipated with the **Merced Extension Alignment**. Improvements within UPRR ROW for the **Merced Extension Alignment** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit.

The **Merced Layover Facility** would alter existing drainage through construction of new layover tracks and support areas. Improvements associated with the **Merced Layover Facility** would create new impervious pavement surfaces and stormwater drainage systems. Improvements within the UPRR ROW for the **Merced Layover Facility** would be required to comply with the post-construction stormwater performance standards of the Construction General Permit and improvements located outside the UPRR ROW would be regulated as a Priority Development Project under the Small MS4 Permit or Central Valley Permit.

In summary, the Phase II improvements establishing new stations (**Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station**) would involve construction of new paved surfaces for station platforms, driveways, parking areas, and pedestrian paths; and construction of the **Merced Layover Facility** would involve new paved surfaces for layover facility support areas and driveways. These Phase II improvements would alter drainage patterns (e.g., increase runoff from new impervious surfaces and create new stormwater drainage systems). For the Phase II improvements that meet the criteria of regulated projects under applicable MS4 permits, design and construction of stormwater controls would be performed in accordance with applicable MS4 permit requirements, including hydromodification requirements, which may include the use of vegetated swales, retention basins, biofiltration, and minimizing impermeable surfaces to manage stormwater to maintain predevelopment runoff rates and volumes.

New station platforms at the **Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station** would be located in the UPRR ROW, and would therefore not be regulated under local MS4 permits. Stormwater controls within the UPRR ROW (which would be designed and constructed in accordance with the PPDG) would handle runoff from station platforms, and compliance with the

post-construction stormwater performance standards of the Construction General Permit would ensure that the stormwater controls are designed so that runoff from station platforms would match existing runoff conditions (up to the 85th-percentile storm event).

Significance Conclusion and Mitigation Measures

Significance Prior to Mitigation

Phase II improvements establishing new stations (**Turlock Station**, **Livingston Station**, **Atwater Station**, and **Merced Station**) would create new paved surfaces for station platforms, driveways, parking areas, and pedestrian paths; and construction of the **Merced Layover Facility** would create new paved surfaces for layover facility support areas and driveways. The **Merced Extension Alignment** would alter existing drainage patterns through construction of a new tracks, culverts, and bridges. Construction of these Phase II improvements would alter drainage patterns (e.g., increase runoff from new impervious surfaces and/or alter/create new stormwater drainage systems). Compliance with the applicable MS4/NPDES Permit requirements, including post-construction requirements of the Construction General Permit, would ensure that operation of these Phase II improvements would minimize increases in stormwater runoff compared to the existing condition; however, increases in stormwater runoff could still result from the Phase II improvements from creation of new impervious surfaces and new connections of trackside drainage ditches to existing storm drainage systems. The new impervious surfaces and connections to existing storm drainage systems could contribute toward exceeding the capacity of existing storm drainage systems and result in flooding. This is a potentially significant impact.

Significance with Application of Mitigation

Mitigation Measure HYD-8.1 would require detailed hydraulic evaluations and modification of stormwater controls. This mitigation measure would reduce potential impacts related to alteration of drainage patterns and creation of runoff that could result in exceeding storm drainage system capacity and flooding during operation to a less-than-significant level.

Mitigation Measures

Mitigation Measure HYD-8.1 would apply to the **Turlock Station**, **Livingston Station**, **Atwater Station**, **Merced Extension Alignment, Merced Layover Facility**, and **Merced Station** for operational impacts on storm drainage system capacity and associated flooding. The description of Mitigation Measure HYD-8.1 is presented in Impact HYD-8.

Mitigation Measure HYD-8.1: Perform detailed hydraulic evaluations and modify designs for stormwater controls if required to prevent storm drainage system capacity exceedance and/or reduce potential flooding impacts

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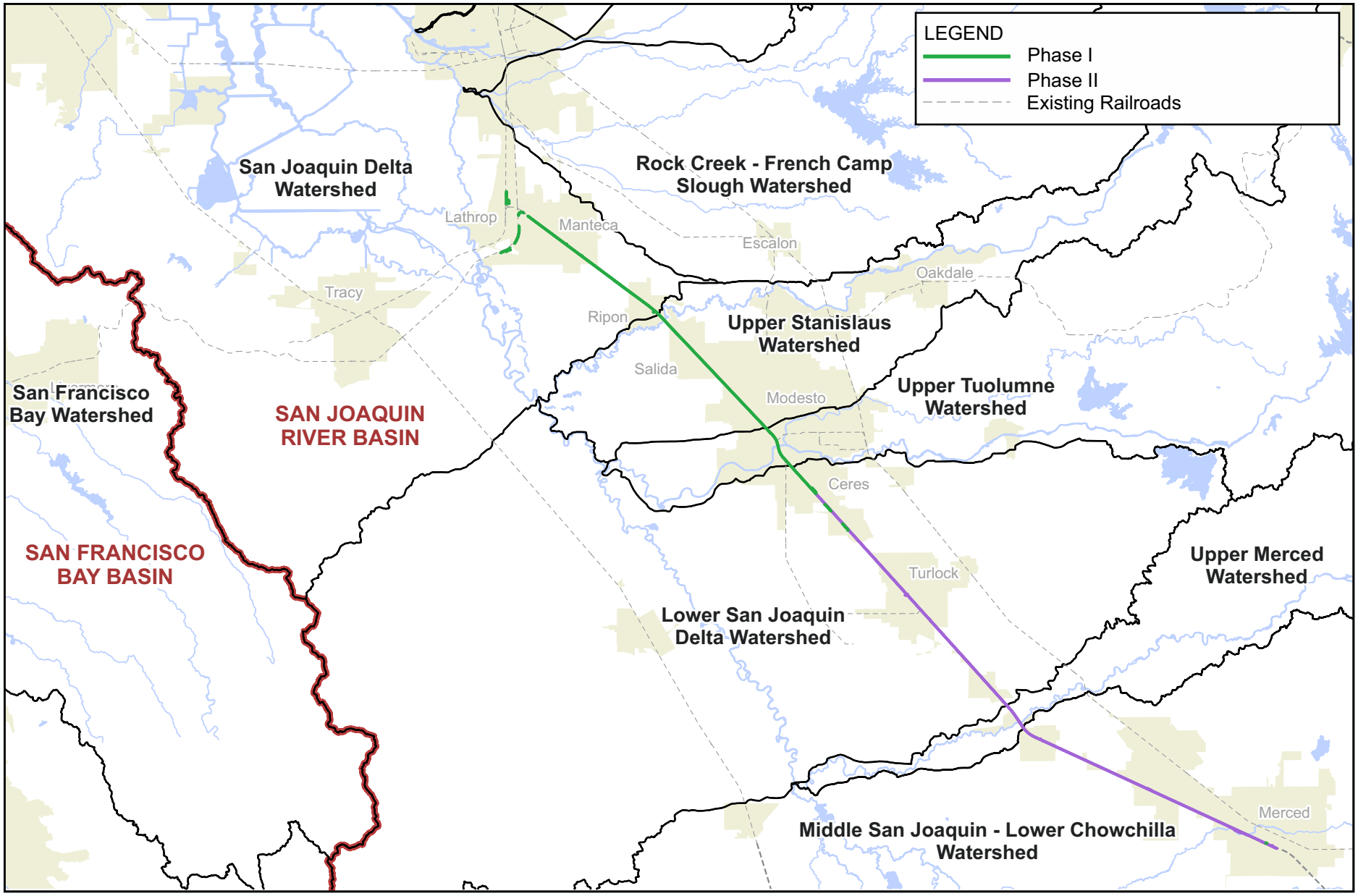

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Figure 4.10-1
Hydrologic Basins and Large Watersheds of the Study Area
ACE Extension Lathrop to Ceres/Merced

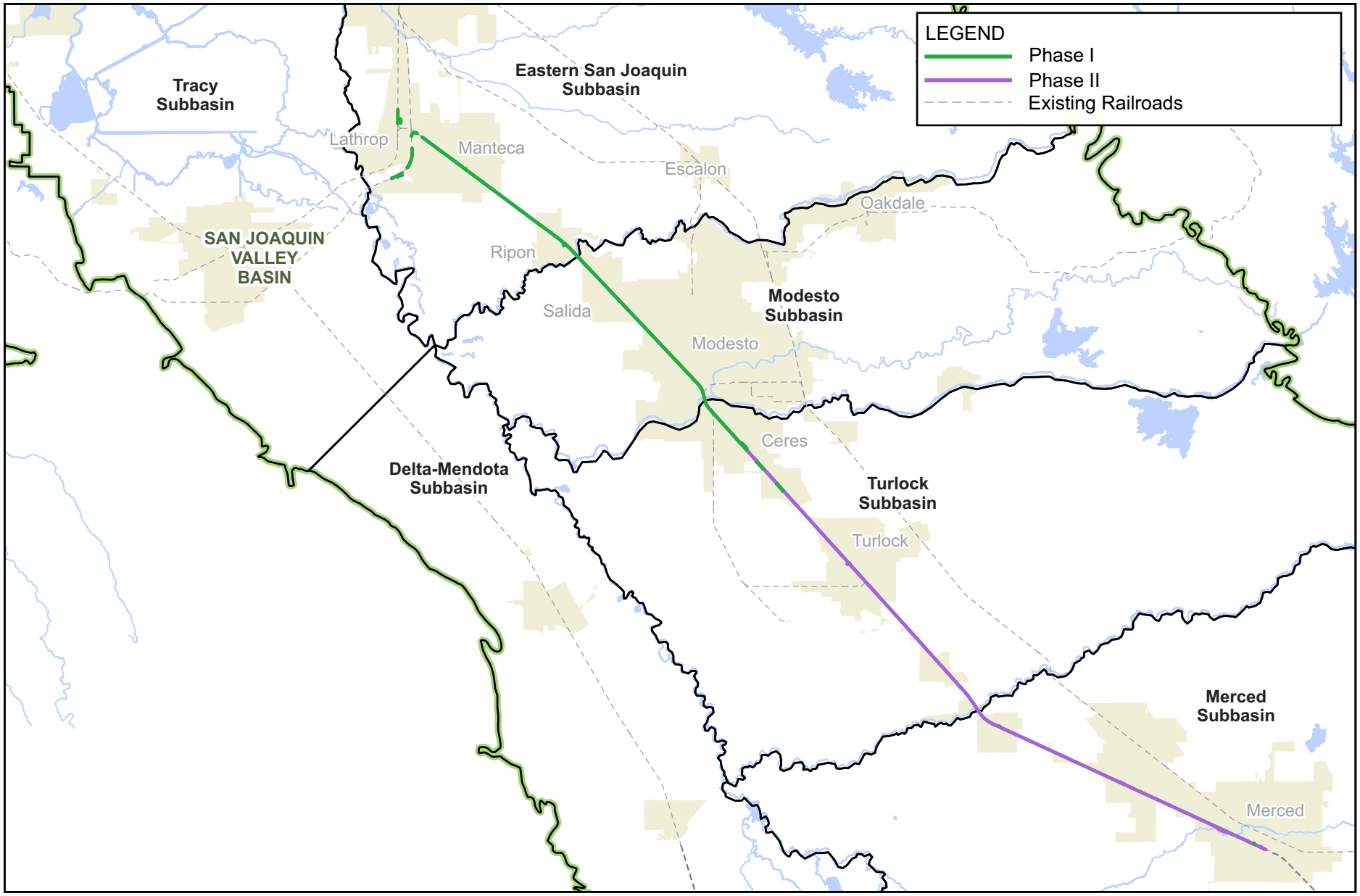

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Figure 4.10-2
Groundwater Basins and Subbasins of the Study Area
ACE Extension Lathrop to Ceres/Merced

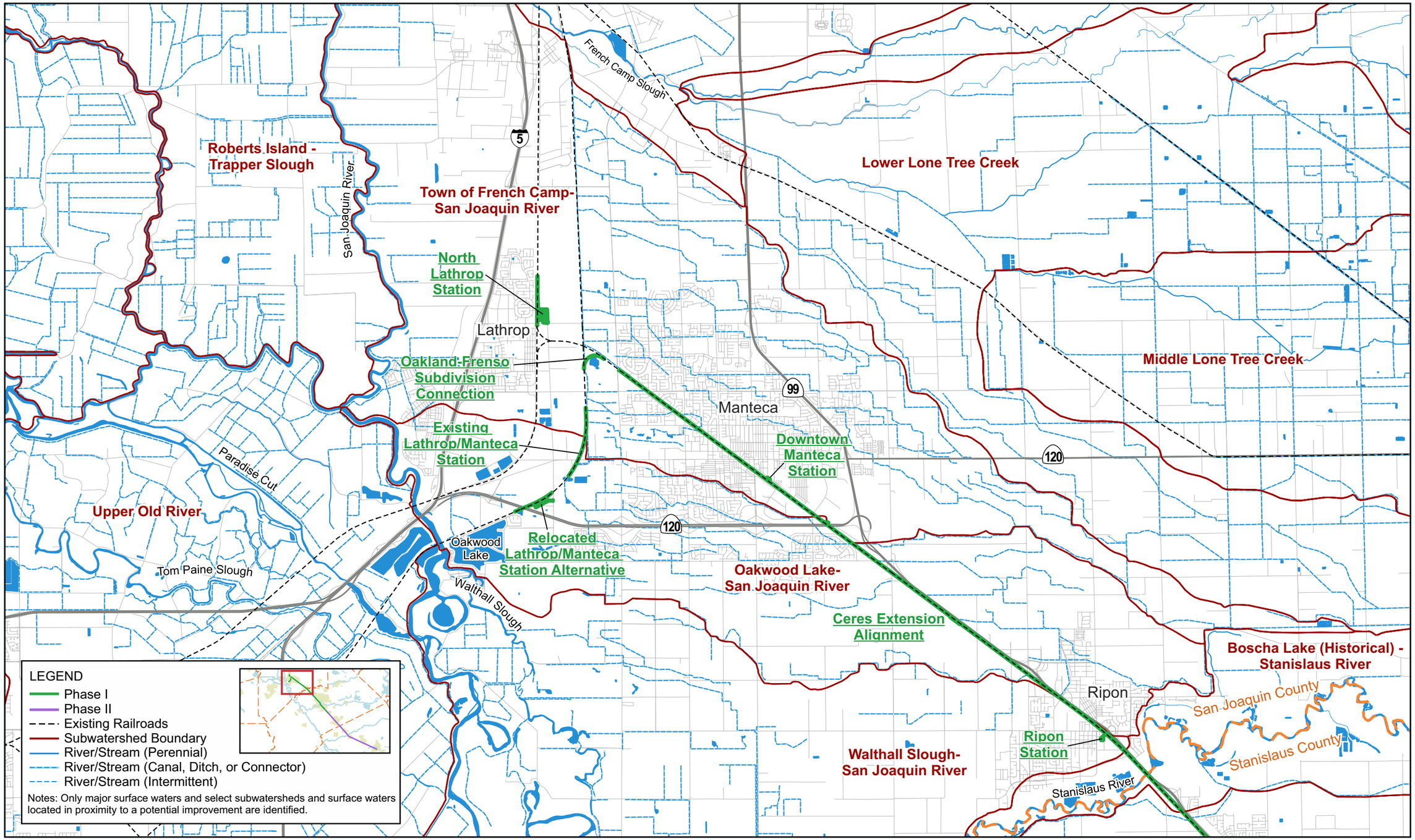

Figure 4.10-3
Lathrop to Ceres
Subwatersheds and Surface Waters, Sheet 1
ACE Extension Lathrop to Ceres/Merced

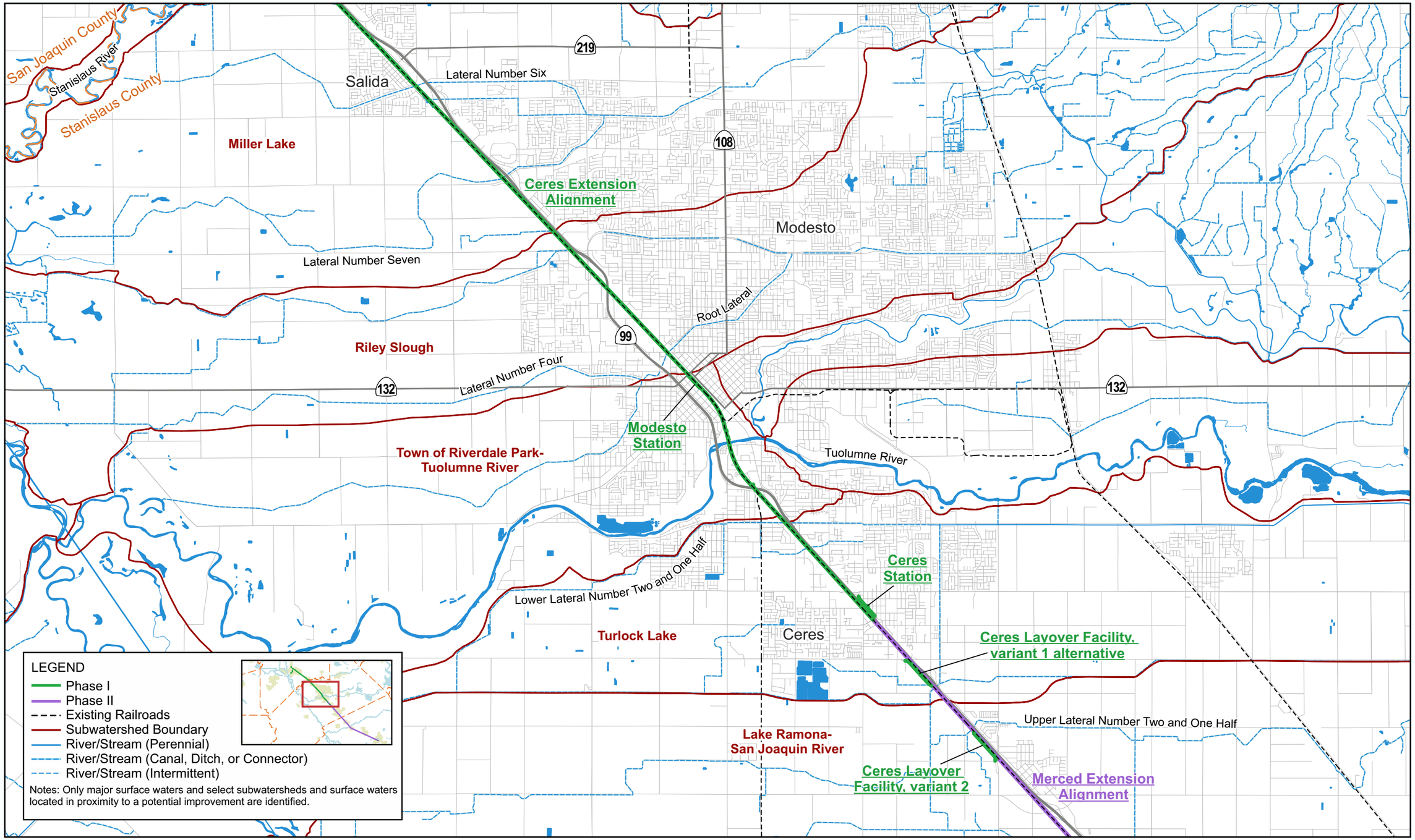

Figure 4.10-4
Lathrop to Ceres
Subwatersheds and Surface Waters, Sheet 2
ACE Extension Lathrop to Ceres/Merced

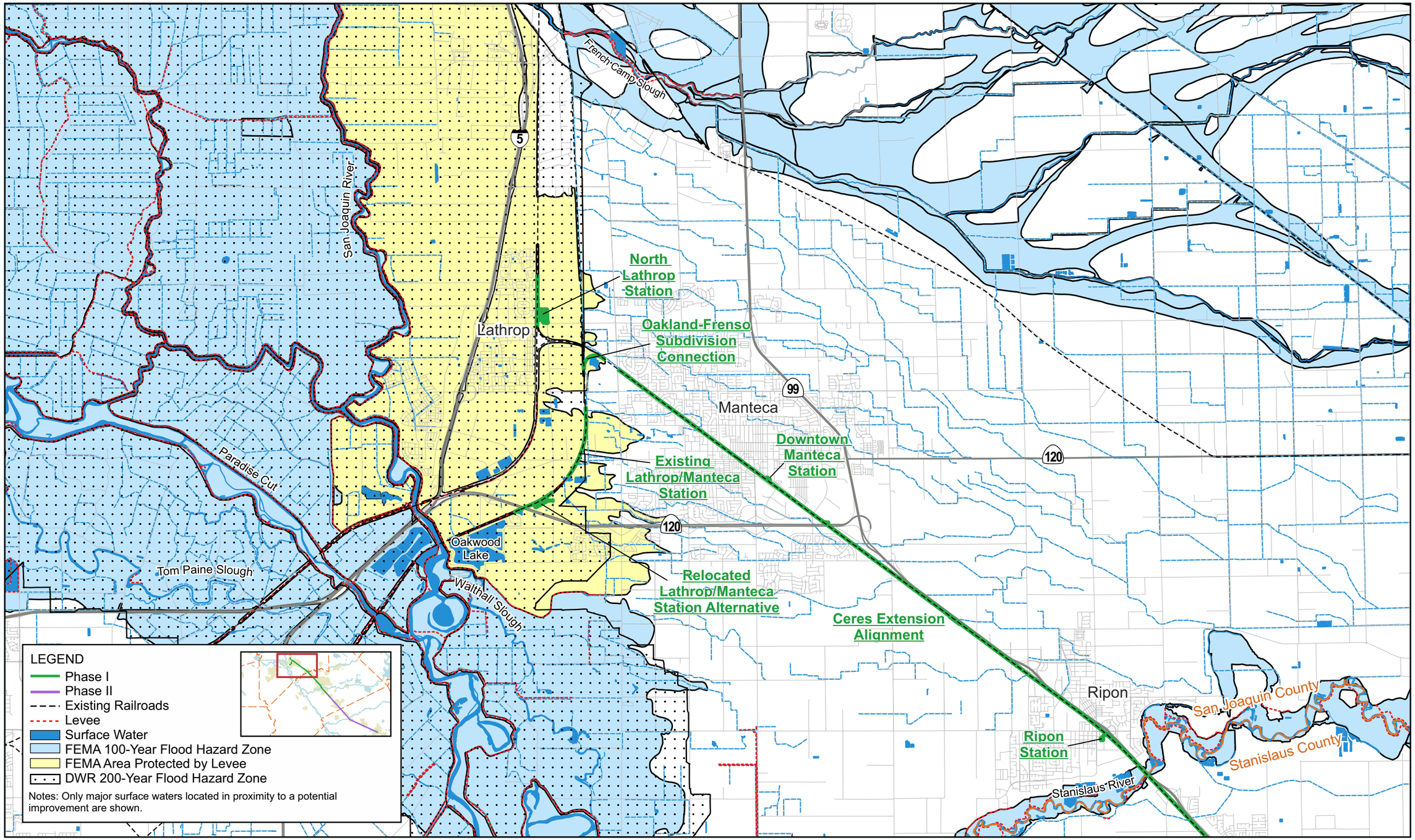

Figure 4.10-5
Lathrop to Ceres
Flooding Hazard Zones, Sheet 1
ACE Extension Lathrop to Ceres/Merced

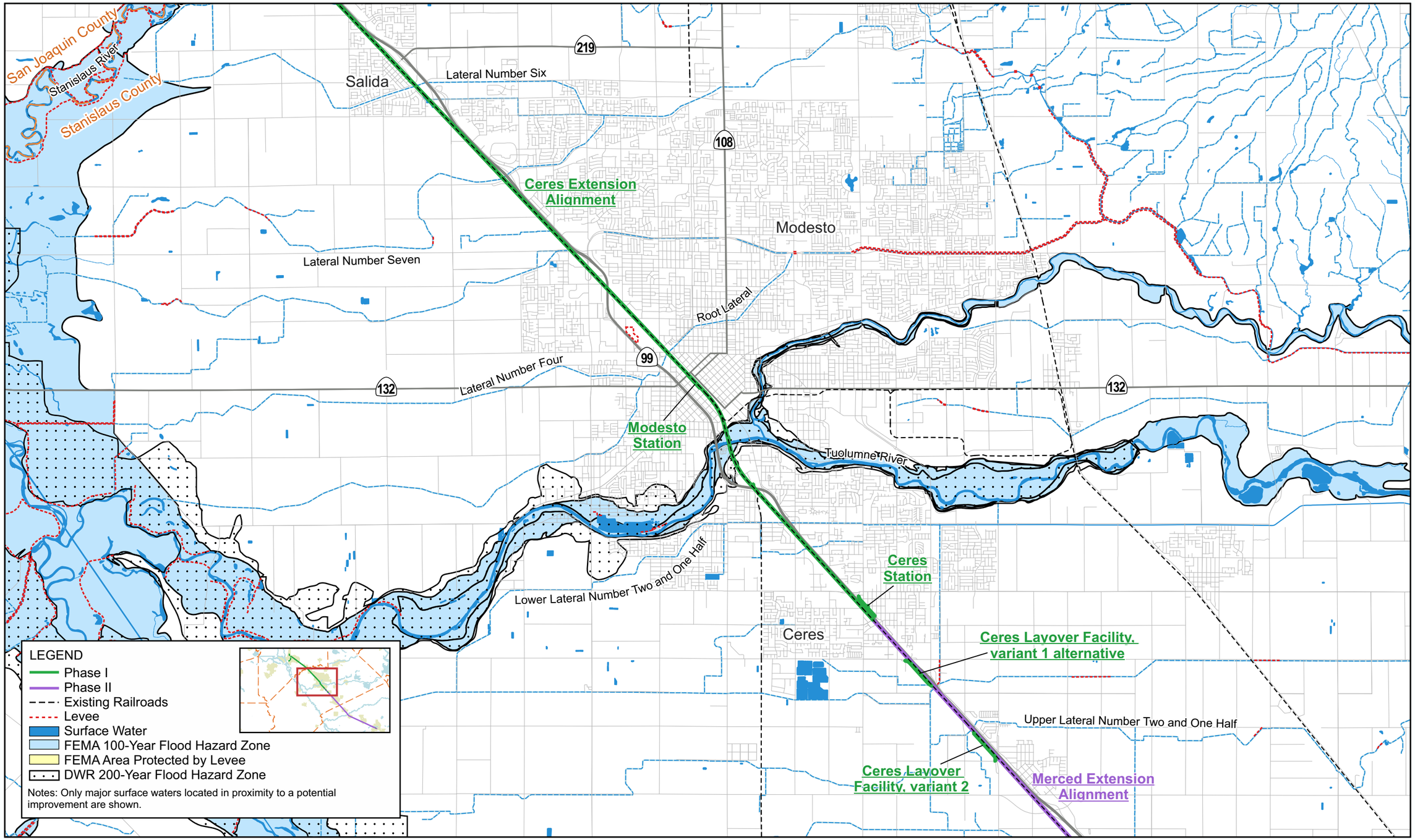

Figure 4.10-6
Lathrop to Ceres
Flooding Hazard Zones, Sheet 2
ACE Extension Lathrop to Ceres/Merced

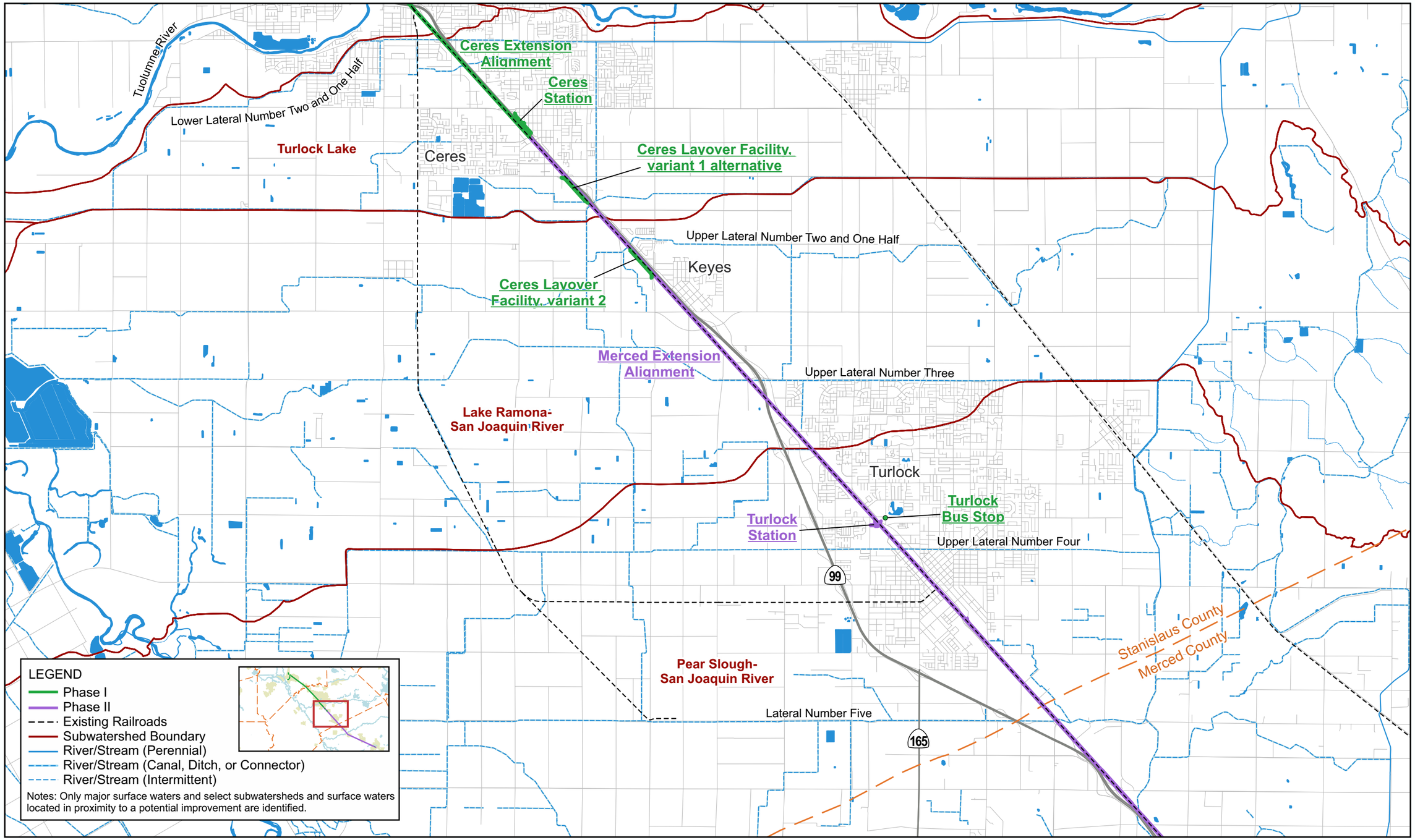

Figure 4.10-7
Ceres to Merced
Subwatersheds and Surface Waters, Sheet 1
ACE Extension Lathrop to Ceres/Merced

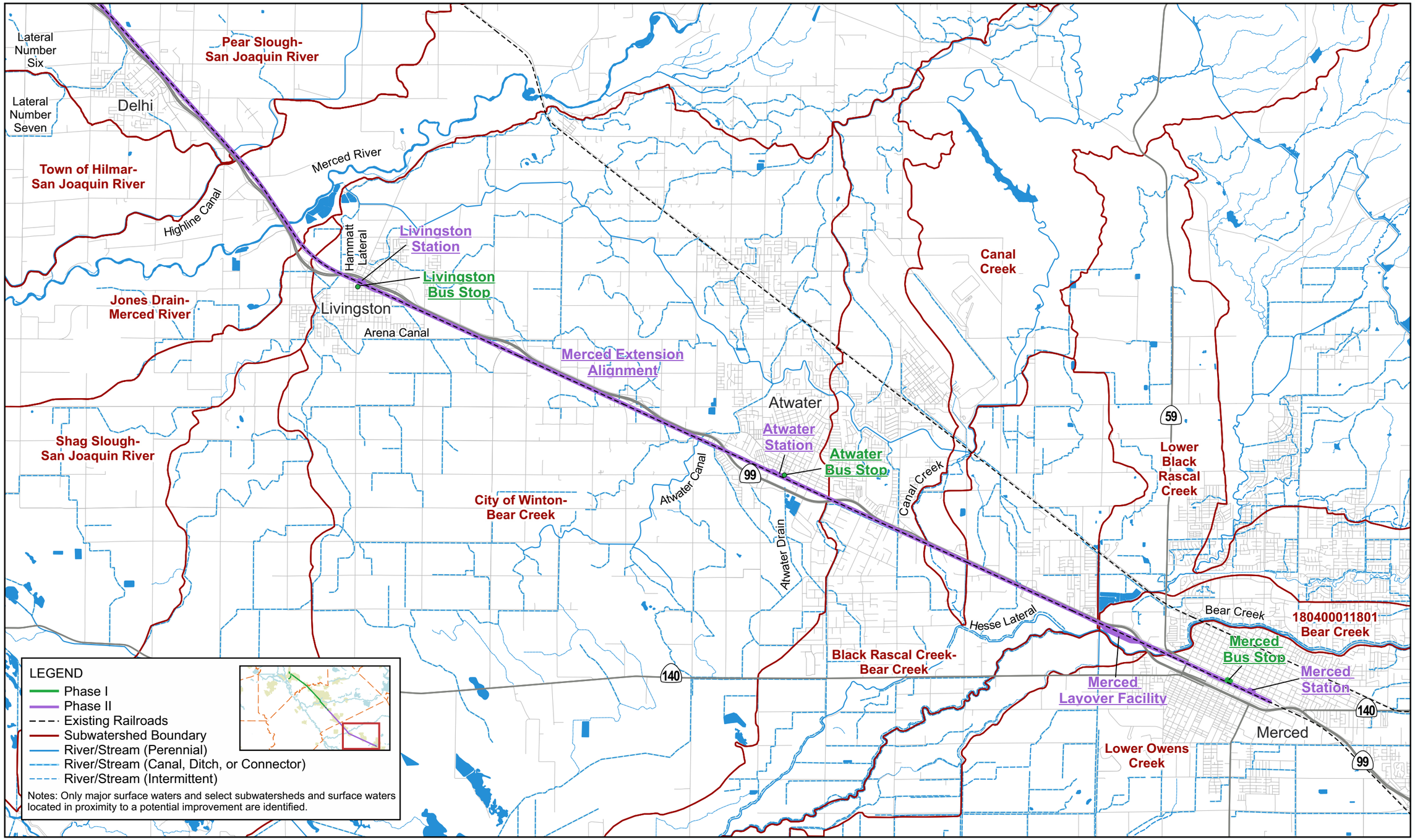

Figure 4.10-8
Ceres to Merced
Subwatersheds and Surface Waters, Sheet 2
ACE Extension Lathrop to Ceres/Merced

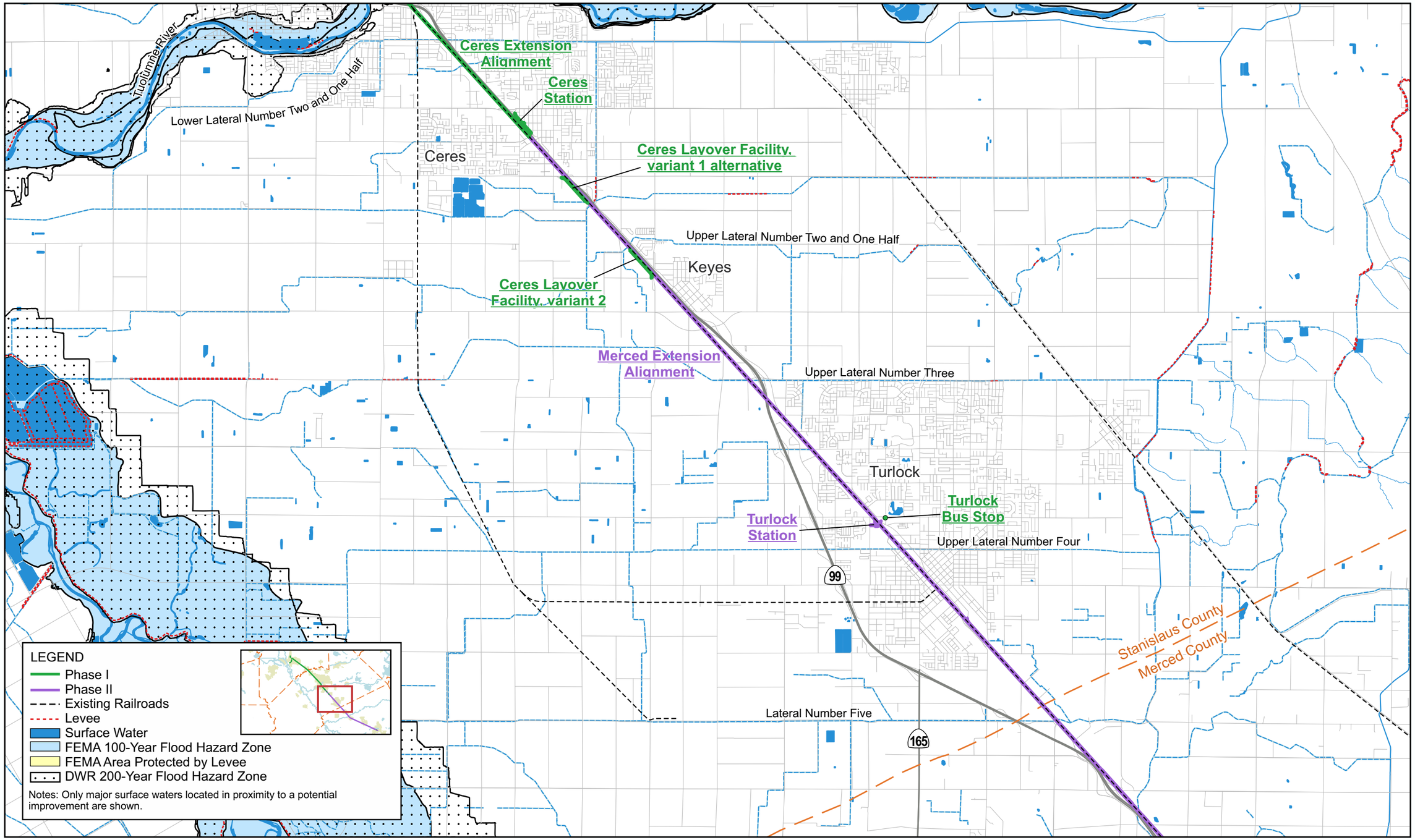

Figure 4.10-9
Ceres to Merced
Flooding Hazard Zones, Sheet 1
ACE Extension Lathrop to Ceres/Merced

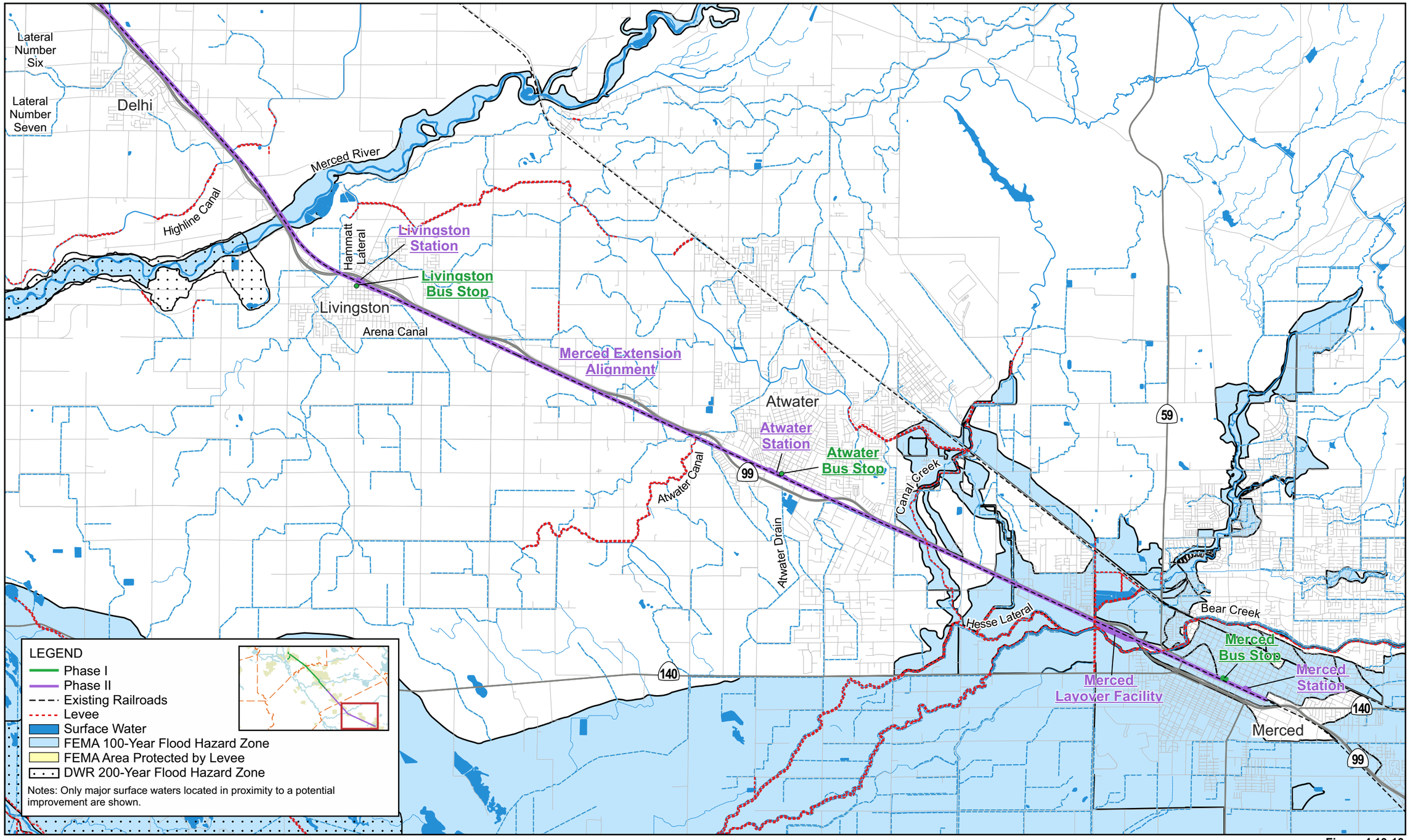

Figure 4.10-10
Ceres to Merced
Flooding Hazard Zones, Sheet 2
ACE Extension Lathrop to Ceres/Merced