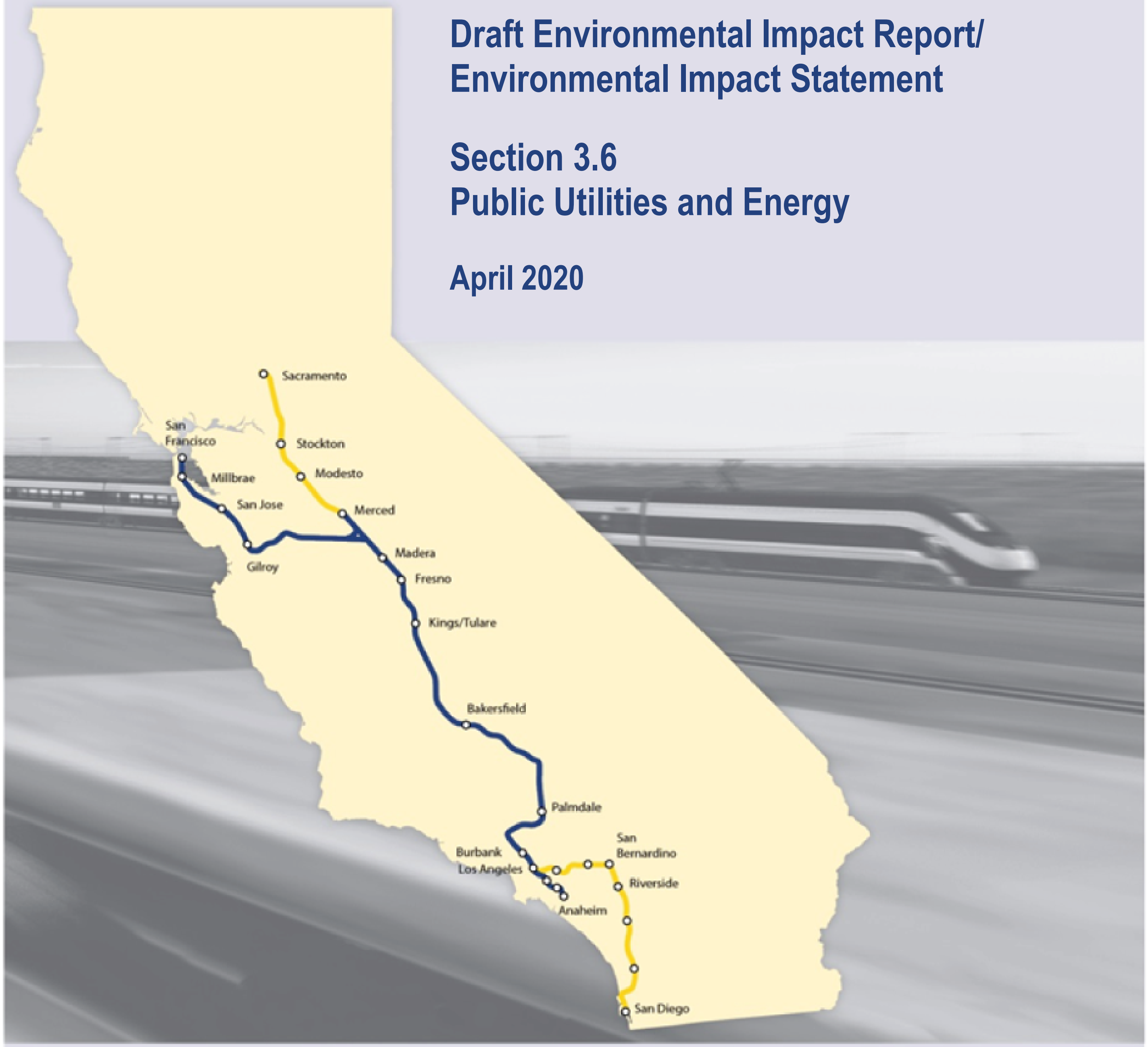
California High-Speed Rail Authority

San Jose to Merced Project Section

Draft Environmental Impact Report/ Environmental Impact Statement

Section 3.6 Public Utilities and Energy

April 2020



CALIFORNIA
High-Speed Rail Authority

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
AC	alternating current
ACE	Altamont Corridor Express
Authority	California High-Speed Rail Authority
BART	San Francisco Bay Area Rapid Transit District
Bay Area	San Francisco Bay Area
Bcf	billion cubic feet
BMP	best management practice
Btu	British thermal units
C&D	construction and demolition
CAFE	Corporate Average Fuel Economy
Cal-ISO	California Independent System Operator
CARB	California Air Resources Board
CCE	Community Choice Energy
CCID	Central California Irrigation District
CEC	California Energy Commission
CED	California Energy Demand
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
C.F.R.	Code of Federal Regulations
CGP	Construction General Permit
CO_2	carbon dioxide
CPCN	public convenience and necessity
CPUC	California Public Utilities Commission
CSE	countywide siting element
CVP	Central Valley Project
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EIR	environmental impact report
EIS	environmental impact statement
Fed. Reg.	*Federal Register*
FERC	Federal Energy Regulatory Commission
FRA	Federal Railroad Administration
GHG	greenhouse gas
gpd	gallons per day

GWD	Grasslands Water District
GWh	gigawatt hours
HMRD	Henry Miller Reclamation District
HSR	high-speed rail
HUA	Hollister Urban Area
I-	Interstate
IAMF	impact avoidance and minimization feature
kV	kilovolt
mgd	million gallons per day
MMBtu	million British thermal units
MMcf	million cubic feet
MOWS	maintenance of way siding
MOWF	maintenance of way facility
MS4	Municipal Separate Storm Sewer System
MW	megawatt
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NPDES	National Pollutant Discharge Elimination System
PG&E	Pacific Gas and Electric Company
PPD	pounds per day
project, project extent	San Jose to Central Valley Wye Project Extent
RCRA	Resource Conservation and Recovery Act
RPS	Renewables Portfolio Standard
RSA	resource study area
RTP	regional transportation plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SBCWD	San Benito County Water District
SBWR	South Bay Water Recycling
SCRWA	South County Regional Wastewater Authority
SCVWD	Santa Clara Valley Water District
SFPUC	San Francisco Public Utilities Commission
SJCE	San Jose Clean Energy
SJMWS	San Jose Municipal Water System
SJWC	San Jose Water Company
SLCC	San Luis Canal Company

SLDMWA	San Luis and Delta-Mendota Water Authority
SLWD	San Luis Water District
SVAWPC	Silicon Valley Advanced Water Purification Center
SVP	Silicon Valley Power
SWP	State Water Project
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TBM	tunnel boring machine
TPSS	traction power substation
USBR	U.S. Bureau of Reclamation
USDOT	U.S. Department of Transportation
USEO	U.S. Presidential Executive Order
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VMT	vehicle miles traveled
VTA	(Santa Clara) Valley Transportation Authority
WWTP	wastewater treatment plant

3.6 Public Utilities and Energy

3.6.1 Introduction

This section describes the public utilities and energy resources in the San Jose to Central Valley Wye Project Extent (project) resource study area (RSA) where public utilities and energy are most susceptible to change as a result of construction and operation of the project. This analysis evaluates potential project impacts on utility services, access to the right-of-way, water use, waste generation, storm drain facilities, and energy consumption.

Public Utilities

Public utilities impacts include major utility lines (electricity, natural gas, petroleum, water, communications) in the right-of-way of the project alternatives that would need to be relocated, removed, protected in place, abandoned in place, extended, or realigned during construction. Alternative 1 would result in 211 major utility conflicts; Alternative 2 would result in 301 major utility conflicts; Alternative 3 would result in 201 major utility conflicts; and Alternative 4 would result in 380 major utility conflicts.

Public utility impacts also include water consumption; construction of the project would consume between 3,905 and 4,251 acre-feet of water, depending on the alternative.

Energy

Energy resource impacts include energy consumption for construction and operation; Alternative 1 would consume 22,760 billion British thermal units (Btus) of energy for construction; Alternative 2 would consume 28,750 billion Btus; Alternative 3 would consume 24,010 billion Btus; and Alternative 4 would consume 29,290 billion Btus. Operations would result in a net decrease in energy consumption of 6,781,860 MMBtu per year for medium ridership scenario and a net decrease of 7,209,560 million Btu per year for the high ridership scenario in 2040. Network upgrades and electric utility infrastructure would be constructed to supply electricity to the HSR system, including traction power switching stations, paralleling stations, and reconductoring of overhead electrical lines.

The following appendices in Volume 2 of this Draft environmental impact report (EIR)/environmental impact statement (EIS) provide additional details on public utilities and energy:

- Appendix 2-C, Operations and Service Plan Summary, provides background information on the intended service and operations of the high-speed rail (HSR) system.
- Appendix 2-D, Applicable Design Standards, describes the relevant design standards for the project.
- Appendix 2-E, Project Impact Avoidance and Minimization Features, provides a list of all impact avoidance and minimization features (IAMF) incorporated into this project.
- Appendix 2-J, Regional and Local Plans and Policies, provides a list by resource of all applicable regional and local plans and policies.
- Appendix 3.6-A, Public Utilities and Energy Facilities, provides a list of existing utilities and energy facilities in the public utilities RSA and a determination of whether relocation or protection in place would be required.
- Appendix 3.6-B, Existing Plus Project Conditions Energy Analysis, compares existing physical conditions for the energy analysis to the existing plus project conditions to estimate statewide energy use with and without the HSR project.
- Appendix 3.6-C, Water Use Assessment, provides an analysis and evaluation of anticipated water use requirements for construction and operation of the project.
- Appendix 3.6-D, Energy Analysis Memorandum, describes the calculation of statewide energy consumption as well as criteria pollutant and greenhouse gas (GHG) emission levels associated with future operation of the HSR system, which were used in this analysis.

Public utilities and energy resources are important factors for construction and operation of the project. Construction of the project would require the relocation of public utilities, potentially resulting in impacts on the utilities and utility services. HSR operations would also require network upgrades for electricity supply, potentially affecting public utilities beyond the project footprint. Construction and operation of the project would also consume energy, including electricity, natural gas, and petroleum products, potentially affecting energy supply. This section also considers energy demand when viewed on a system-wide basis, because HSR operation would affect energy consumption for other modes of transportation. The following six EIR/EIS resource sections provide additional information related to public utilities and energy:

- Section 3.2, Transportation, evaluates impacts on traffic, including road closures and roadway access as a result of utility relocations during project construction.
- Section 3.3, Air Quality and Greenhouse Gases, evaluates impacts on air quality and GHG emissions from construction and operation of the project.
- Section 3.5, Electromagnetic Fields and Electromagnetic Interference, evaluates impacts of the project on sensitive land uses that are susceptible to potential impacts from electromagnetic fields and electromagnetic interference.
- Section 3.8, Hydrology and Water Resources, evaluates impacts of the project on drainage and stormwater management infrastructure and utility systems along the alignment during construction.
- Section 3.11, Safety and Security, evaluates impacts of high-risk facilities including natural gas and crude oil liquid pipelines, electric transmission lines, and water lines.
- Section 3.14, Agricultural Farmland, evaluates impacts of the project on agricultural farmland and the disruption of utilities and irrigation infrastructure and power systems.

Key Definitions

The following are definitions for public utilities and energy resources analyzed in this Draft EIR/EIS.

- **Public utilities**—Public utilities are defined as any subsurface, aboveground, or overhead facility used for transmission, regardless of size, shape, or method of conveyance. This impact evaluation focuses on major public utilities, which include the following types of facilities:
  - Electrical substations
  - High-voltage electrical lines (50 kilovolts [kV] or greater)
  - High-pressure natural gas pipelines of ≥ 20-inch outside diameter
  - Petroleum (crude oil) and petroleum product fuel pipelines of ≥ 20-inch outside diameter
  - Water lines (including potable and irrigation water lines) of outside diameter ≥ 20 inches
  - Wastewater lines of outside diameter ≥ 20 inches
  - Stormwater canals, conduits, and pipes of outside diameter ≥ 42 inches
  - Fiber optic lines and telecommunication cables
- **Energy**—Energy is commonly measured in terms of British thermal units (Btu). A Btu is defined as the amount of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit. For transportation projects, energy usage is predominantly influenced by the amount of fuel used for construction and operation. The average Btu content of fuels is the heat value (or energy content) per quantity of fuel as determined from tests of fuel samples. For example, a gallon of gasoline produces approximately 120,000 Btu (U.S. Energy Information Administration [EIA] 2017a); however, the Btu value of gasoline varies from season to season and from batch to batch. The Btu is the unit of measure used to quantify the overall energy impacts expected to result from construction and operations of the HSR.

- **Transportation energy**—Transportation energy is generally defined in terms of direct and indirect energy.
  - Direct energy involves all energy consumed by vehicle propulsion (e.g., automobiles, trains, airplanes). This energy is a function of traffic characteristics such as volume, speed, distance traveled, vehicle mix, and thermal value of the fuel being used. Direct energy also includes the electrical power requirements of the HSR system, including recoverable energy during HSR train braking.
  - Indirect energy consumption involves the nonrecoverable, one-time energy expenditure involved in constructing the physical track and systems associated with the project, typically through the irreversible burning of hydrocarbons for operating equipment and vehicles in which energy is lost to the environment and consumption of electricity for lighting, operation of equipment, and other purposes.

3.6.2 Laws, Regulations, and Orders

This section presents federal and state laws, regulations, and orders applicable to public utilities and energy. The California High-Speed Rail Authority (Authority) would implement the HSR system, including the project, in compliance with all federal and state regulations. Volume 2, Appendix 2-J, provides regional and local plans and policies relevant to public utilities and energy considered in the preparation of this analysis.

3.6.2.1 Federal

FRA, Procedures for Considering Environmental Impacts (64 Federal Register [Fed. Reg.] 28545)

The Federal Railroad Administration (FRA) Procedures for Considering Environmental Impacts state that an EIS should consider possible impacts on energy production and consumption, especially those alternatives likely to reduce the use of petroleum or natural gas consistent with the policy outlined in U.S. Presidential Executive Order (USEO) 12185.

Section 403(b) of the Power Plant and Industrial Fuel Use Act (USEO 12185; 44 Fed. Reg. 75093; Public Law 95-620)

Section 403(b) of the Power Plant and Industrial Fuel Use Act and of USEO 12185 encourages additional conservation of petroleum and natural gas by recipients of federal financial assistance.

Norman Y. Mineta and Special Programs Improvement Act (Public Law 108-426)

The Norman Y. Mineta and Special Programs Improvement Act, established by the U.S. Department of Transportation's (USDOT) Pipeline and Hazardous Materials Safety Administration, regulates safe movement of hazardous materials to industry and consumers by all modes of transportation, including pipelines. The regulations require pipeline owners and operators to meet specific standards and qualifications, including participating in public safety programs that notify an operator of proposed demolition, excavation, tunneling, or construction near or affecting a pipeline. This includes identifying pipelines that may be affected by such activities and identifying any hazards that may affect a pipeline. In California, the Office of the Fire Marshal administers pipeline safety.

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity. FERC also regulates natural gas and hydropower projects. As part of that responsibility, FERC regulates the transmission and sale of natural gas for resale in interstate commerce, the transmission of oil by pipeline in interstate commerce, and the transmission and wholesale sales of electricity in interstate commerce. FERC also licenses and inspects private, municipal, and state hydroelectric projects; approves the siting and abandonment of interstate natural gas facilities, including pipelines, storage, and liquefied natural gas; oversees environmental matters related to natural gas and hydroelectricity projects and major electricity policy initiatives; and administers accounting and financial reporting regulations and conduct of regulated companies.

Corporate Average Fuel Economy

Corporate Average Fuel Economy (CAFE) standards are federal regulations to reduce energy consumed by on-road motor vehicles. The USDOT's National Highway Traffic Safety Administration (NHTSA) regulates the standards, and the U.S. Environmental Protection Agency (USEPA) measures vehicle fuel efficiency. The standards specify minimum fuel consumption efficiency standards for new automobiles sold in the United States.

On May 19, 2009, President Obama issued a Presidential Memorandum proposing a new national fuel economy program that adopted uniform federal standards to regulate both fuel economy and GHG emissions for model years 2012 through 2016. The program was extended to cover model year 2017 through 2025 light-duty vehicles and ultimately requires an average fuel economy standard of 40 miles per gallon in 2025 (45 miles per gallon for cars and 32 miles per gallon for trucks).

The USEPA Administrator announced in a Notice signed March 13, 2017, and published in the *Federal Register* (Fed. Reg.) March 23, 2017, the agency's intention to reconsider the Final Determination of the Mid-Term Evaluation of GHG standards for model year 2022–2025 light-duty vehicles and to coordinate its reconsideration with the parallel process to be undertaken by the USDOT's NHTSA regarding CAFE standards for cars and light trucks for the same model years. On August 24, 2018, the USEPA and NHTSA proposed the Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks. The Safer Affordable Fuel-Efficient Vehicles Rule, if finalized, would amend certain existing CAFE and tailpipe carbon dioxide (CO_2) emissions standards for passenger cars and light trucks and establish new standards, all covering model years 2021 through 2026. More specifically, the NHTSA is proposing new CAFE standards for model years 2022 through 2026 and amending its 2021 model year CAFE standards, and the USEPA is proposing to amend its CO_2 emissions standards for model years 2021 through 2025 in addition to establishing new standards for model year 2026. The agencies proposed to retain the model year 2020 standards for both programs through model year 2026, but also requested comment on a range of other alternatives.

Resource Conservation and Recovery Act (42 United States Code § 6901 et seq.)

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976 to oversee proper management of solid and hazardous wastes, from their generation to ultimate disposal or destruction. Implementation of the RCRA has largely been delegated to federally approved state waste management programs and, under Subtitle D, further promulgated to local governments for management of planning, regulation, and implementation of nonhazardous solid waste disposal. The USEPA retains oversight of state actions under 40 Code of Federal Regulations (C.F.R.) Parts 239–259. Where facilities are found to be inadequate, 40 C.F.R. Section 256.42 requires that necessary facilities and practices be developed by the responsible state and local agencies or by the private sector. In California, that responsibility was created under the California Integrated Waste Management Act of 1989 and Assembly Bill (AB) 939.

3.6.2.2 State

Public Utilities Code Sections 1001–1013 and California Public Utilities Commission General Order 131-D

The California Public Utilities Commission (CPUC) regulates public electric utilities in California. Sections 1001–1013 of the Public Utilities Code require railroad companies operating railroads primarily powered by electric energy or electric companies operating power lines not to begin construction of electric railroads or power lines without first obtaining a certificate from the CPUC specifying that the construction is required for the public's convenience and necessity. General Order 131-D establishes CPUC rules for implementing Public Utilities Code Sections 1001–1013 relating to the planning and construction of electric generation, transmission/power/distribution line facilities, and substations in California. A permit to construct must be obtained from CPUC for facilities between 50 kV and 200 kV. A certificate of public convenience and necessity (CPCN) must be obtained from the CPUC for facilities 200 kV and above. Both the permit to construct and CPCN are discretionary decisions by CPUC that are subject to the California Environmental Quality Act (CEQA).

Rules for Overhead 25 kV Railroad Electrification Systems for a High-Speed Rail System (California Public Utilities Commission General Order 176)

The Rules for Overhead 25 kV Railroad Electrification Systems for a High-Speed Rail System became effective March 26, 2015. The rules establish uniform safety requirements governing the design, construction, operation, and maintenance of 25-kV alternating current (AC) railroad electrification overhead contact systems. The CPUC General Order would apply to the HSR system.

General Order 176 applies to 25-kV AC electrification systems constructed in California and serving an HSR passenger system capable of operating at speeds of 150 miles per hour or higher, in dedicated rights-of-way with no public highway-rail at-grade crossings and in which freight operations do not occur. General Order 176 promotes the safety and security of the general public and of persons engaged in the construction, maintenance, and operation of a 25-kV electrified HSR system.

The base standards for design, construction, installation, operation, and maintenance established by General Order 176 require coordination and cooperation of the Authority (the entity that owns the HSR system) and other facility owners (e.g., Pacific Gas and Electric Company [PG&E]) so that the facilities of both parties are not prevented from performing as required or intended. General Order 176 does not prevent the Authority from entering into agreements with other facility owners that establish stricter standards than or additional requirements to those specified in these rules.

Designation of Transmission Corridor Zones (California Code of Regulations, Title 20, §§ 2320–2340)

The regulation on Designation of Transmission Corridor Zones specifies the scope and process required for identification, evaluation, and designation of new transmission corridor zones.

Energy Efficiency Standards (California Code of Regulations, Title 24, Part 6)

The Energy Efficiency Standards promote efficient energy use in new buildings constructed in California. The standards regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The standards are enforced through the local building permit process.

Renewables Portfolio Standard Program (SB 1078)

Senate Bill (SB) 1078 established the Renewables Portfolio Standard (RPS) Program, requiring retail sellers of electricity to increase their purchases of electricity generated by renewable sources and establishing a goal of having 20 percent of California's electricity generated by renewable sources by 2017. In 2010, the California Air Resources Board (CARB) extended this target for renewable energy resource use to 33 percent of total use by 2020 (CPUC 2017). In October 2015, Governor Edmund G. Brown, Jr. signed SB 350, which requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030. Increasing California's renewable supplies will diminish the state's heavy dependence on natural gas as a fuel for electric power generation.

100 Percent Clean Energy Act (SB 100)

SB 100, the 100 Percent Clean Energy Act of 2018, makes it a policy of the state that eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045.

Integrated Waste Management Act (AB 939)

The California Integrated Waste Management Act of 1989 was enacted by AB 939 in response to the RCRA. It requires cities and counties to prepare an integrated waste management plan, including a countywide siting element (CSE), for each jurisdiction. Per California Public Resources Code Sections 41700–41721.5, the CSE provides an estimate of the total permitted disposal capacity needed for a 15-year period, or whenever additional capacity is necessary. CSEs in California must be updated by each operator and permitted by Department of Resources Recycling and Recovery, which is within the Natural Resources Agency, every 5 years. AB 939 mandated that local jurisdictions meet solid waste diversion goals of 50 percent by 2000.

Sustainable Communities and Climate Protection Act of 2008 (SB 375, Chapter 728, Statutes of 2008)

Adopted in September 2008, SB 375 provides a new planning process to coordinate community development and land use planning with regional transportation plans (RTP) in an effort to reduce sprawling land use patterns and dependence on private vehicles and thereby reduce vehicle miles traveled (VMT) and GHG emissions associated with VMT. SB 375 is one major tool to meet the goals in the Global Warming Solutions Acts (AB 32). Under SB 375, CARB sets GHG emission reduction targets for 2020 and 2035 for the metropolitan planning organizations in the state. Each metropolitan planning organization must then prepare a sustainable communities strategy that meets the GHG emission reduction targets set by CARB. The sustainable communities strategy has been incorporated into the region's RTP.

Local Government Construction and Demolition Guide (SB 1374)

SB 1374 seeks to assist jurisdictions with diverting construction and demolition (C&D) material, with a primary focus on CalRecycle, by developing and adopting a model C&D diversion ordinance for voluntary use by California jurisdictions.

Protection of Underground Infrastructure (California Government Code § 4216)

Protection of Underground Infrastructure regulation requires an excavator to contact a regional notification center (i.e., underground service alert) at least 2 days before excavation of any subsurface installations. The underground service alert then notifies utilities that may have buried lines within 1,000 feet of the excavation. Representatives of the utilities must mark the specific location of their facilities within the work area prior to the start of excavation. The construction contractor must probe and expose the underground facilities by hand prior to using power equipment.

California Public Utilities Commission General Order 95

The CPUC General Order, Rule for Overhead Electric Line Construction, formulates uniform requirements for overhead electrical line construction, including overhead catenary construction, the application of which helps provide adequate service and safety for persons engaged in the construction, maintenance, operation, or use of overhead electrical lines and for the public in general.

Water Conservation Act of 2009 (SB X7-7)

The Water Conservation Act of 2009 (SB X7-7, Chapter 4, Statutes of 2009 Seventh Extraordinary Session) requires urban and agricultural water suppliers to increase water use efficiency. The urban water use goal within the state is to achieve a 20 percent reduction in per capita water use by December 31, 2020. Agricultural water suppliers should have prepared and adopted agricultural water management plans by December 31, 2012, were required to update those plans by December 31, 2015, and are required to update those plans every 5 years thereafter. Effective 2013, agricultural water suppliers who do not meet the water management planning requirements established by this bill are not eligible for state water grants or loans.

Clean Energy and Pollution Reduction Act of 2015

The Clean Energy and Pollution Reduction Act of 2015 establishes targets to increase the RPS to 50 percent by 2030 from the retail sales of renewable electricity. The California Energy Commission (CEC) is involved in many efforts to promote and support renewable energy development. These efforts include requiring the state's utilities to disclose their electricity supply portfolio to consumers, funding solar photovoltaic installations on new single-family and multifamily homes, distributing renewable energy conservation planning grants to local governments, providing incentives for the development of geothermal resources, addressing barriers to bioenergy development, and tracking the state's progress toward its renewable goals.

Urban Water Management Planning Act (California Water Code, §§ 10610–10656)

The Urban Water Management Planning Act (California Water Code, Division 6, Part 2.6, §§ 10610–10656) requires the preparation of an urban water management plan every 5 years by water suppliers that provide over 3,000 acre-feet of water annually or serve water for municipal purposes either directly or indirectly to 3,000 or more customers. The Santa Clara Valley Water District (SCVWD) and water suppliers in urban areas in Santa Clara, San Benito, and Merced Counties including San Jose, Morgan Hill, Gilroy, Hollister, and City of Merced are required to prepare water management plans under the Urban Water Management Planning Act.

Sustainable Groundwater Management Act

California depends on groundwater for a major portion of its annual water supply, and sustainable groundwater management is essential to a reliable and resilient water system. In September 2014, Governor Jerry Brown enacted the Sustainable Groundwater Management Act, which empowers local agencies to adopt groundwater management plans that are tailored to the resources and needs of their communities. The intent of good groundwater management is to provide a buffer against drought and climate change and to contribute to reliable water supplies regardless of weather patterns.

Waste Management for State Agencies (Assembly Bill 75)

This California state law, adopted in 1999, requires each state agency and each large state facility, as defined, to divert at least 50 percent of the waste it generates. Agencies must also designate at least one solid waste reduction and recycling coordinator to oversee the implementation of waste management plans and recycling/reuse programs and submit an annual report, for the prior calendar year, including disposal amounts and explanation of diversion activities. Reports are due by May 1 of each year. The business services manager at the Authority is the designated coordinator.

California Regional Water Quality Management Plans

Division Seven (Water Quality) of the State Water Code establishes the responsibilities and authorities of the nine Regional Water Quality Control Boards (RWQCB) and the State Water Resources Control Board (SWRCB). The Porter-Cologne Act names these Boards "… the principal State agencies with primary responsibility for the coordination and control of water quality" (Section 13001). Each Regional Board is directed to "… formulate and adopt water quality control plans for all areas within the region." The Regional Boards implement the basin plans by issuing and enforcing waste discharge requirements to individuals, communities, or businesses whose waste discharges can affect water quality. These requirements can be either State Waste Discharge Requirements for discharges to land, or federally delegated National Pollutant Discharge Elimination System (NPDES) permits for discharges to surface water. Methods of treatment are not specified. When such discharges occur, they are managed so that (1) they meet these requirements; (2) water quality objectives are met; and (3) beneficial uses are protected, and water quality is controlled (San Francisco RWQCB 2017; Central Valley RWQCB 2018; Central Coast RWQCB 2019).

3.6.2.3 Regional and Local

Appendix 2-J in Volume 2 provides a list of the regional and local policies relevant to public utilities and energy. These policies include sustainable communities strategies that accompany RTPs, county and city general plans, urban water management plans, and countywide integrated waste management plans. In addition to these plans, a local coalition of the Clean Cities Program has been established within the region.

Clean Cities Program

The U.S. Department of Energy's Clean Cities program was established to advance the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum use in transportation. The Silicon Valley Clean Cities Coalition, in Santa Clara County, builds partnerships with local and statewide organizations in the public and private sectors to advance the use of alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and new transportation technologies (Silicon Valley Clean Cities 2018; U.S. Department of Energy n.d.). In 2017, the City of San Jose established the San Jose Community Energy Department which operates San Jose Clean Energy (SJCE), the City of San Jose's Community Choice Energy (CCE) program. CCEs allow governments to buy electricity for their businesses and residents. The SJCE is expected to launch in September 2018 for City Accounts and in March 2019 for residents and businesses (City of San Jose 2018a).

3.6.3 Consistency with Plans and Laws

As indicated in Section 3.1.5.3, Consistency with Plans and Laws, CEQA and Council on Environmental Quality (CEQ) regulations require a discussion of inconsistencies or conflicts between a proposed undertaking and federal, state, regional, or local plans and laws. As such, this Draft EIR/EIS describes any inconsistency of the project alternatives with federal, state, regional, and local plans and laws to provide planning context.

There are a number of federal and state laws and implementing regulations listed in Section 3.6.2.1, Federal, and Section 3.6.2.2, State, that direct the use of public utilities and energy. A summary of the federal and state requirements considered in this analysis follows:

- Acts and orders applicable to the conservation of petroleum, natural gas, and water include the Power Plan and Industrial Fuel Use Act of 1978; USEO 12185; and the Conservation of Petroleum and Natural Gas, and the Water Conservation Act of 2009.
- Acts and orders applicable to the safe transmission of hazardous material, natural gas, oil, and electricity include Norman Y. Mineta and Special Programs Improvement Act and the FERC. The RCRA provides for the proper management of solid and hazardous wastes, from their generation to ultimate disposal or destruction.
- Federal and state initiatives to reduce energy consumed and GHG emissions from motor vehicles include CAFE, Pavley Rule, and Sustainable Communities and Climate Protection Act of 2008.
- The Public Utilities Code regulates public electric utilities in California. California Code of Regulations (California Code of Regulations), Title 24, Part 6, & Part 11, Energy Efficiency Standards promotes efficient energy use in new buildings constructed in California.
- The Integrated Waste Management Act regulates generation and disposal of waste in California and mandates a reduction of waste being disposed. The Local Government Construction and Demolition Guide assists jurisdictions with diverting their C&D material, with a primary focus on CalRecycle.
- The RPS Program requires retail sellers of electricity in California to increase their purchases of electricity generated by renewable sources.
- Prior to excavation of any subsurface installation in California, the excavator must contact a regional notification center per the Protection of Underground Infrastructure.
- CPUC General Order 176 and General Order 95 regulate overhead electric line construction in California.

The Authority, as the lead agency proposing to construct and operate the HSR system, must comply with all federal and state laws and regulations, and secure all applicable federal and state permits prior to initiating construction on the selected alternative. Therefore, there would be no inconsistencies between the project alternatives and these federal and state laws and regulations.

The Authority is a state agency and therefore is not required to comply with local land use and zoning regulations; however, the Authority has endeavored to design and construct the HSR project so that it is consistent with land use regulations. For example, the project alternatives would incorporate IAMFs to minimize impacts on public utilities and energy. Analysts reviewed a total of 21 regional and local plans including 69 goals, policies, and objectives (listed in Volume 2, Appendix 2-J), and determined, based on comparison of the project to the policies, goals, and objectives reviewed, that there would be no inconsistencies.

3.6.4 Methods for Evaluating Impacts

The National Environmental Policy Act (NEPA) and CEQA require evaluation of impacts on public utilities and energy. The following sections define the RSAs and summarize the methods used to analyze impacts on public utilities and energy. As summarized in Section 3.6.1, Introduction, six other resource sections in this Draft EIR/EIS also provide additional information related to public utilities and energy.

3.6.4.1 Definition of Resource Study Area

As defined in Section 3.1, Introduction, RSAs are the geographic boundaries in which analysts conducted the environmental investigations specific to each resource topic. There are two RSAs for public utilities and energy, one for public utilities and one for energy resources. The RSA for impacts on public utilities and the RSA for impacts on energy resources encompass the infrastructure and service areas of public utilities and energy sources, respectively, that construction and operation of the project could directly and indirectly affect. The RSA for direct impacts includes the entire project footprint on or across public utilities and energy infrastructure, including surface, subsurface, and overhead utilities. The RSA for indirect impacts includes the area that would extend beyond the project footprint, including areas where utility relocations, use of non-HSR utility and energy resources and facilities necessary for project construction and operation, and construction of electrical interconnections with local utilities would occur. Table 3.6-1 describes specific RSA boundaries for public utilities and energy resources.

Table 3.6-1 Definition of Public Utilities and Energy Resource Study Areas

Type	Boundary Definition
Public Utilities	
Utility-owned properties and facilities including major public utility infrastructure and facilities required for connecting to the HSR system. Facilities include substations; easements; overhead utility lines (e.g., electricity, telephone, cable television); and buried utility lines (e.g., electricity, water, wastewater, stormwater, natural gas lines, petroleum product lines).	The RSA for direct impacts includes the entire project footprint on or across public utilities and energy infrastructure, including surface, subsurface, and overhead utilities, which include stormwater and water supply lines, electricity transmission facilities, natural gas and petroleum product pipelines, fiber optics, and communication facilities. The RSA for indirect impacts includes the area that would extend beyond the project footprint, including impacts of utility relocations or use of non-HSR resources and facilities necessary for project construction and operation, and construction of electrical interconnections with local utilities required for connecting to the HSR system.
Wastewater Treatment Facilities	Santa Clara County, Merced County, City of Santa Clara, City of San Jose, City of Morgan Hill, City of Gilroy, City of Los Banos, Santa Nella
Stormwater Management Facilities	Santa Clara County, Merced County, City of Santa Clara, City of San Jose, City of Morgan Hill, City of Gilroy, City of Los Banos, Santa Nella
Solid Waste Management Facilities	Santa Clara County, San Benito County, Merced County, City of Santa Clara, City of San Jose
Hazardous Waste Management Facilities[1]	Kings County, Kern County, Imperial County

Type	Boundary Definition
Energy Resources	
Electricity generation and transmission systems required for connecting to the HSR system, as well as changes in petroleum consumption for vehicle and plane travel and electrical, natural gas, and petroleum consumption demands from construction and operation of the HSR and its associated facilities.	Infrastructure and service areas of energy resource providers. Includes the project footprint and areas within and beyond the project footprint, including the electricity grid in the entire state of California and other western states that produce energy exported to California.[2]

RSA = resource study area
HSR = high-speed rail
[1] There are no licensed hazardous waste disposal facilities in Santa Clara, San Benito, or Merced Counties. There are three licensed hazardous waste disposal facilities in California, one in Kern County, one in Kings County, and one in Imperial County.
[2] The HSR system would obtain electricity from the statewide grid. Therefore, this analysis cannot apportion to a particular regional study area the use of any particular generation facilities.

3.6.4.2 Impact Avoidance and Minimization Features

IAMFs are project features that are considered to be part of the project and are included as applicable in each of the alternatives for purposes of the environmental impact analysis. The full text of the IAMFs that are applicable to the project is provided in Appendix 2-E. The following IAMFs are applicable to the public utilities and energy analysis:

- PUE-IAMF#1: Design Measures
- PUE-IAMF#2: Irrigation Facility Relocation
- PUE-IAMF#3: Public Notifications
- PUE-IAMF#4: Utilities and Energy
- SS-IAMF#2: Safety and Security Management Plan
- HYD-IAMF#1: Stormwater Management
- HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan
- GEO-IAMF#1: Geologic Hazards
- BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors
- HMW-IAMF#5: Demolition Plans
- GEO-IAMF#10: Geology and Soils
- HMW-IAMF#7: Transport of Materials
- HMW-IAMF#8: Permit Conditions
- HMW-IAMF#10: Hazardous Materials Plans
- HYD-IAMF#2: Flood Protection
- HYD-IAMF#4: Prepare and Implement an Industrial Stormwater Pollution Prevention Plan

This environmental impact analysis considers these IAMFs as part of the project design. Within Section 3.6.6, Environmental Consequences, each impact narrative describes how these project features are applicable and, where appropriate, effective at avoiding or minimizing impact to less than significant under CEQA.

3.6.4.3 Methods for Impact Analysis

Overview of Impact Analysis

This section describes the sources and methods used to analyze potential project impacts on public utilities and energy. These methods apply to both NEPA and CEQA analyses unless otherwise indicated. Refer to Section 3.1.5.4, Methods for Evaluating Impacts, for a description of the general framework for evaluating impacts under NEPA and CEQA. Sections 3.6.4.4, Method for Evaluating Impacts under NEPA, and 3.6.4.5, Method for Determining Significance under CEQA, describe the NEPA and CEQA impact methodologies used to evaluate project impacts on public utilities and energy.

Public Utilities

The public utilities section assesses the impact that construction of the project would have on public utilities in the RSA and the ability of public utility providers and facilities to meet new demand for utility services, such as electricity, water, wastewater, and solid waste disposal, resulting from construction and operation of the project.

Public Utilities Analysis Evaluates:

- Planned and accidental utility service interruptions during construction
- Temporary and permanent conflicts with existing utility lines within the RSA
- Demand for utility services for construction and operation, including water, wastewater, stormwater, and solid waste

Construction Impacts

The Authority has engaged at the local level with public utility operators and local agencies since 2009 to identify public utilities in the RSA and to conduct early coordination to minimize potential utility conflicts. Analysts reviewed utility corridor maps, as-built drawings, and encroachment requirements provided by utility providers to determine the type, size, and location of existing utility infrastructure within the public utilities RSA. Specialists mapped the locations of public utilities, including natural gas, petroleum and fuel pipelines, electric transmission lines, water lines, wastewater and stormwater management lines, and communications facilities in the public utility RSA, using geographic information systems. Analysts then quantified impacts on major utilities (defined in Section 3.6.1, Introduction) by counting each time the utility would cross the project alternatives and determined whether the conflicting utilities would require relocation or could be protected in place. Volume 2, Appendix 3.6-A, provides information on the individual utility conflicts in the public utilities RSA.

Analysts estimated construction water use for the project based on the amount of water that would be used during construction for operation of concrete batch plants for production of concrete, placement of concrete, earthwork, dust control, landscaping, and operation of tunnel boring machines (TBM). Analysts developed estimates for construction water use based on assumptions for the amount of required concrete and number of water trucks included in the on-site vehicle construction schedule for each alternative (Tung 2017; Authority 2018a). Estimates of existing water use in the RSA used region-specific water use rates for the known land uses in the RSA. Volume 2, Appendix 3.6-C provides additional discussion of the methodology and analysis prepared as part of the water use assessment. Section 3.8, Hydrology and Water Resources, provides additional detail regarding surface and groundwater supplies and quality, stormwater management, and hydrology.

The Authority's engineers provided estimates of the amount of vegetation clearing, removal of existing asphalt and gravel, and demolition of existing structures to calculate the amount of solid waste generated by C&D activities. These estimates took into consideration the existing characteristics of the public utilities RSA including the approximate square footage of structures that would be demolished for construction of the project, the amount of cut-and-fill profile, and the materials generated by the operation of TBMs.

Operations Impacts

Analysts estimated operational potable and nonpotable water consumption and solid waste generation based on the new station facilities and the operations and maintenance activities at the maintenance of way siding (MOWS) and maintenance of way facility (MOWF) based on typical rates. Analysts assumed wastewater generation for operation of the HSR stations and maintenance facilities to be 100 percent of total water demand during operation. The amount of wastewater to be generated by operation of the project would actually be lower than the water demand because not all operational uses of water would generate wastewater (e.g., irrigation). At this time, the amount of wastewater that would be generated by operation is not known, so to be conservative this analysis uses the assumption that wastewater would equal 100 percent of the total water demand.

To evaluate the potential need for construction of new water supply or wastewater or waste management infrastructure, analysts compared the water consumption, wastewater generation, and solid and hazardous waste generation estimates to the anticipated water supply and wastewater and solid and hazardous waste disposal capacity.

Energy

As described in Section 3.6.1, Introduction, transportation energy is generally discussed in terms of direct and indirect energy. Energy impacts caused by the project would comprise the additional consumption of electricity to power the HSR system (direct use) and consumption of resources to construct the proposed HSR facilities (indirect use).

Energy Resources Analysis Evaluates:

- Construction energy demand
- Peak electricity demand during construction
- Operation energy demand
- Peak electricity demand during operation
- Regional and statewide energy consumption for transportation modes
- Ancillary energy consumption for operations

Construction Impacts

Indirect energy consumption involves the nonrecoverable, one-time energy expenditure required to construct the physical infrastructure associated with the project alternatives. Analysts estimated construction energy use for the project based on the amount of fuel used for construction vehicles and helicopters and the amount of electricity used at construction sites. Energy would be used during construction for lighting and communications, operation of construction vehicles and equipment for structural work, placement of concrete, earthwork, dust control, landscaping, and operation of TBMs. Energy would also be used during construction for operation of helicopters for reconductoring electric transmission lines to provide electric power to the project alternatives.

This analysis uses construction energy data from other sources or existing HSR systems, because construction energy consumption information for comparable HSR systems is not readily available. Therefore, construction-related energy consumption factors identified for the HSR system include applicable construction data gathered for typical heavy-rail systems and the San Francisco Bay Area Rapid Transit District (BART) heavy-rail commuter system. Analysts used these data to estimate construction-related energy consumption for the project alternatives. Analysts then compared the electricity demand for construction (calculated in terms of megawatt hours and Btus) to current estimates of peak demand and supply capacity within the electricity distribution grid controlled by the California Independent System Operator (Cal-ISO).

Operations Impacts

The project and the proposed HSR system would obtain electricity from the statewide electricity grid. To identify the projected energy demand of the project, the estimated electrical requirements of the HSR system were prorated based on the proportion of the length of HSR guideway in the project extent. Phase 1 of the HSR system would be approximately 520 miles long. The length of the project is approximately 90 miles, or approximately 17 percent of the full HSR system, and consequently would consume approximately 17 percent of the electrical requirements of the HSR system.

In calculating estimated energy savings for operations of the project alternatives, two ridership probability scenarios were used: medium and high. These scenarios are based on probabilistic estimates for Phase I of the HSR system to achieve its ridership projections by 2040. In the case of HSR, *probabilistic* is defined as numerous possible ridership outcomes, each having varying degrees of certainty or uncertainty of occurring. More detailed discussions of travel demand and ridership forecasts are presented in Sections 2.7.1, Travel Demand and Ridership Forecasts, and 3.1.5.6, Environmental Consequences.

Energy used for vehicle propulsion is a function of traffic characteristics and the thermal value of the fuel used. Analysts derived petroleum consumption rates for vehicle travel from the travel demand forecast for the HSR and growth projections performed by the CEC. These consumption rates were used to determine the amount of petroleum used for transportation under the No Project Alternative and the project alternatives. Analysts then compared current electricity consumption rates from the CEC with the projected energy consumption of the HSR system. Refer to Volume 2, Appendix 3.6-D, for additional information regarding the methodology for determining projected energy consumption of the HSR system.

The construction energy payback period measures the number of years required to pay back the energy used in construction with operational energy consumption savings of the project alternatives. Analysts calculated the payback period by dividing the estimated HSR system construction energy by the amount of energy that the HSR system would later save (based on the prorated statewide value). The calculations assume that the amount of energy saved in the study years (2015 and 2040) would remain constant throughout the payback period.

3.6.4.4 Method for Evaluating Impacts under NEPA

CEQ NEPA regulations (40 C.F.R. Parts 1500–1508) provide the basis for evaluating project effects (as described in Section 3.1.5.4). As described in Section 1508.27 of these regulations, the criteria of context and intensity are considered together when determining the severity of the change introduced by the project.

- **Context—**For this analysis, the context for the proposed project's effect on public utilities and energy would include the following:
  - The regulatory setting pertaining to public utilities and, including CAFE standards, regulations set by the FERC and the CPUC, local utility and energy-related ordinances and standards, and integrated waste management plans
  - The regional and local regulatory setting pertaining to energy, including regional, county, and municipal general plans, transportation plans, renewable energy standards, and local GHG emissions management plans and policies
  - The statewide electricity generation and distribution system that would provide electricity for construction and operation of the HSR system
  - The number of users and importance of various modes of the transportation system, including vehicle (automobile and bus) and airplane transportation
  - The utility system, the relationship to project alternatives, and the number of potential disruptions by the HSR
- **Intensity—**This analysis determines intensity by assessing the following:
  - The project's effect on demand for public utility services and energy
  - Any potential violation by the project of federal, state, or local law or requirements imposed for the protection of the environment
  - The degree to which possible effects related to public utilities and energy are uncertain or involve unknown risks, which could occur if the project would result in an exceedance of existing and planned capacity of public utilities and energy providers

3.6.4.5 Method for Determining Significance under CEQA

CEQA requires an EIR to identify the significant environmental impacts of a project (CEQA Guidelines § 15126). One of the primary differences between NEPA and CEQA is that CEQA requires a threshold-based impact analysis. Significant impacts are determined by evaluating whether project impacts would exceed the significance threshold established for the resource (as presented in Section 3.1.5.4). By contrast, under NEPA, significance is used to determine whether an EIS will be required; NEPA requires a federal lead agency to prepare an EIS when the proposed federal action (project) as a whole has the potential to “significantly affect the quality of the human environment.” Accordingly, Section 3.6.9, CEQA Significance Conclusions, summarizes the significance of the environmental impacts on public utilities and energy for each project alternative.

The Authority is using the following thresholds to determine if a significant impact on public utilities and energy would occur as a result of the project alternatives. For the CEQA analysis, the project would result in a significant impact on public utilities if it would:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects
- Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years
- Result in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project’s projected demand in addition to the provider’s existing commitments
- Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals
- Fail to comply with federal, state, and local management and reduction statutes and regulations related to solid waste

Low-impact conflicts would occur if the project would cross or conflict with distribution pipelines or electrical power lines, which are easier to avoid, relocate, or protect in place. Low-impact conflicts involving utilities are considered less than significant impacts on utilities and service systems because these types of utilities and service systems would be temporarily affected, typically only during a brief relocation period. Construction work that could result in temporary interruption of utility services would be conducted in coordination with the utility provider and with prior public notification, and utility service levels would remain unchanged after construction work is completed. Environmental consequences related to utility relocations are described in detail in Section 3.6.6, Environmental Consequences.

For purposes of analysis for this Draft EIR/EIS, the Authority is using the following additional criteria as thresholds of significance. For this analysis, the project would result in a significant impact on public utilities and energy if it would:

- Require or result in the construction of new electrical facilities or expansion and upgrade of existing facilities, the construction of which could cause significant environmental effects
- Conflict with a major nonlinear fixed facility, such as an electrical substation or wastewater treatment plant (WWTP), the relocation of which could cause a lengthy and harmful interruption of service
- Conflict with a major linear non-fixed facility, such as major stormwater transmission main or gas/electricity transmission facility, the reconstruction or relocation of which could cause a lengthy and harmful interruption of service

According to Appendix F of the CEQA Guidelines, EIRs must discuss the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. Wise and efficient use of energy may include decreasing overall per capita energy consumption; decreasing reliance on fossil fuels such as coal, natural gas, and oil; and increasing reliance on renewable energy sources. The significance criteria discussed herein are used to determine whether the project would have a potentially significant effect on energy use, including energy conservation:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency
- Place a substantial demand on regional energy supply or require substantial additional capacity or substantially increase peak and base period electricity demand

By contrast, if the proposed project results in energy savings, alleviates demand on energy resources, or encourages the use of efficient transportation alternatives, it would have a beneficial effect.

3.6.5 Affected Environment

This section describes the affected environment for public utilities and energy in their RSAs, including the existing public utilities and energy providers and infrastructure, and energy sources, supply, demand, and transmission. This information provides the context for the environmental analysis and evaluation of impacts.

Table 3.6-2 provides a summary of the utility and energy providers within the public utilities RSA. Table 3.6-2 includes public utilities and energy providers that are categorized as major utilities and identified in Appendix 3.6-A and also includes public utilities and energy providers within the RSA that are not categorized as major utilities but that provide utility and energy services within the RSA. The subsequent text and figures focus on the major public utilities within the RSA, including facilities for electricity, natural gas, petroleum, telecommunications, potable water, stormwater, wastewater, and solid waste.

Table 3.6-2 Summary of Utility and Energy Providers within the Resource Study Areas[1]

Utility Type	County/City Location	Provider
Electrical	Santa Clara, San Benito, and Merced Counties	PG&E
	City of Santa Clara	Silicon Valley Power
	Cities of San Jose and Gilroy	Calpine
Natural Gas	Santa Clara, San Benito, and Merced Counties	PG&E
	Santa Clara County	CPN Pipeline Co.
		Silicon Valley Power
Petroleum and Fuel Pipelines	Merced County[2]	Shell
		Phillips 66
		Chevron

Utility Type		County/City Location	Provider
Communications	Telephone	Santa Clara, San Benito, and Merced Counties	AT&T
			Verizon
		Santa Clara County	T-Mobile
			Sprint
			Century Link/Level 3 Communications
			Century Link/QWEST
		San Benito County	T-Mobile
			Charter Spectrum
		Merced County	T-Mobile
			Comcast
	Cable/Internet	Santa Clara, San Benito, and Merced Counties	AT&T
			Verizon
			Comcast/Xfinity
		Santa Clara County	CenturyLink/Level 3 Communications
		San Benito County	Charter Spectrum
		Merced County	Comcast/Xfinity
			CenturyLink/Level 3 Communications
Water Supply	Potable	Santa Clara County	Santa Clara Valley Water District
		City of Santa Clara	City of Santa Clara Water Utility
		City of San Jose	San Jose Water Company
			Great Oaks Water Company
			San Jose Municipal Water System
		City of Morgan Hill	City of Morgan Hill Water Division
		City of Gilroy	City of Gilroy Public Works
		San Benito County	San Benito County Water District
		Merced County	U.S. Bureau of Reclamation[3]
			San Luis and Delta-Mendota Water Authority[3]
			California Department of Water Resources[4]
			Henry Miller Reclamation District/San Luis Canal Company
			San Luis Water District
			Central California Irrigation District
		Santa Nella	Santa Nella County Water District
		Volta	Volta Community Services District
		City of Los Banos	City of Los Banos Public Works

Utility Type		County/City Location	Provider
	Recycled	Cities of Santa Clara and San Jose	South Bay Water Recycling System
		City of Gilroy	South County Regional Water Authority
	Agricultural[5]	Santa Clara County	Santa Clara Valley Water District
		San Benito County	San Benito County Water District
		Merced County	U.S. Bureau of Reclamation
			San Luis and Delta-Mendota Water Authority
			California Department of Water Resources
			Henry Miller Reclamation District/San Luis Canal Company
			Grassland Water District
			Central California Irrigation District
			San Luis Water District
			Del Puerto Water District
			Centinella Water District [6]
Wastewater Collection and Treatment		Santa Clara County	Municipal service providers; on-site wastewater treatment systems in unincorporated areas
		City of Santa Clara	City of Santa Clara Sewer Utility
			San Jose/Santa Clara Regional Wastewater Facility
		City of San Jose	City of San Jose Environmental Services Department
			San Jose/Santa Clara Regional Wastewater Facility
		City of Morgan Hill	City of Morgan Hill Department of Public Works
		City of Gilroy	City of Gilroy Water Department
		City of Gilroy	South County Regional Wastewater Authority
		San Benito County	San Benito County Resource Management Agency; municipal service providers; on-site treatment systems in unincorporated areas
		Merced County	Merced County Public Works; municipal service providers; on-site treatment systems in unincorporated areas
		Santa Nella	Santa Nella County Water District
		City of Los Banos	City of Los Banos Public Works

Utility Type	County/City Location	Provider
Stormwater Management	Santa Clara County	Santa Clara County Roads and Airports Department (unincorporated areas); municipal service providers
	Santa Clara County	Santa Clara County Clean Water Program
	City of Santa Clara	City of Santa Clara Public Works
	City of San Jose	City of San Jose Department of Transportation
	City of Morgan Hill	City of Morgan Hill Utilities
	City of Gilroy	City of Gilroy Public Works
	San Benito County	San Benito County Resource Management Agency; municipal service providers
	Merced County	Merced County Department of Public Works
	Santa Nella	Santa Nella County Water District
	City of Los Banos	City of Los Banos Public Works
Solid Waste Disposal	Santa Clara County	Kirby Canyon Recycling and Disposal Facility
		Guadalupe Community Facility
		Newby Island Sanitary Landfill
	San Benito County	John Smith Road Class III Landfill
	Merced County	Billy Wright Landfill
		Highway 59 Landfill

Sources: AT&T 2018; USBR and DWR 2003; USBR 2013, 2014. ; USBR and SLDMWA 2014; CalRecycle 2019a, 2019b, 2019c, 2019d, 2019e; 2019f; Calpine 2017a, 2017b, 2017c, 2017d, 2017e; Charter Spectrum 2017; City of Gilroy 2016a; City of Morgan Hill 2016a, 2017a; City of Los Banos 2010; City of Santa Clara 2018a, 2018b; City of San Jose 2018b; CCID 2014a, 2017; Del Puerto Water District 2011; Nolte 2009; County of San Benito 2010, 2018; County of Santa Clara 2018a; Santa Nella County Water District 2017a; SLWD 2012; SLDMWA 2018; SVP 2017.

[1] Table 3.6-2 includes public utilities and energy providers that are categorized as major utilities and identified in Appendix 3.6-A and also includes public utilities and energy providers within the RSA that are not categorized as major utilities; non-major utilities are not identified in Appendix 3.6-A.

[2] No major utility petroleum or fuel pipelines have been identified in the Union Pacific Railroad right-of-way in Santa Clara County or San Benito County.

[3] The U.S. Bureau of Reclamation and San Luis and Delta-Mendota Water Authority are the joint operators of the Delta-Mendota Canal, which is part of the Central Valley Project.

[4] The California Department of Water Resources is the operator of the California Aqueduct, which is part of the State Water Project.

[5] Includes local maintaining agencies within the public utilities and energy resource study area.

[6] The Centinella Water District sold its entire allocation of water from the Bureau of Reclamation and currently has no water allocation for distribution. The Centinella Water District Manager is investigating procedures for dissolving the Water District.

PG&E = Pacific Gas and Electric Company

3.6.5.1 Public Utilities

Major public utilities within the public utility RSA include facilities for electricity, natural gas and petroleum distribution, telecommunications, water supply infrastructure (potable, recycled, and agricultural water), stormwater management structures including storm drains and canals, and sanitary sewer lines. Table 3.6-3 provides a summary by alternative and subsection of the major utilities within the public utility RSA for each project alternative.

Electrical Transmission

PG&E provides electricity to much of Northern California, from approximately Bakersfield to the California-Oregon border. The company's generation portfolio includes hydroelectric facilities, a nuclear power plant, and a natural gas-fired power plant. PG&E provides electric service to most of the RSA. It generates electricity in facilities within several hundred miles of the points of use (PG&E 2014; CEC 2017a). Silicon Valley Power (SVP), a municipal-owner utility, operates electrical generating equipment and provides electricity service to the City of Santa Clara (SVP 2017). Calpine operates electric generation equipment in San Jose and Gilroy (Calpine 2017a, 2017b, 2017c, 2017d, 2017e).

Table 3.6-3 Major Utility Lines within the Public Utility Resource Study Area

Alternative/Subsection	Electrical Lines	Transmission Tower	Natural Gas	Petroleum Pipelines	Communication Lines	Storm/Wastewater Pump Station	Storm Drains and Canals	Sanitary Sewers	Potable//Recycled Water
Alternative 1									
San Jose Diridon Station Approach	1	2	0	0	10	0	0	1	0
Monterey Corridor	3	0	2	0	15	0	4	5	2
Morgan Hill and Gilroy	59	1	8	0	36	0	2	1	16
Pacheco Pass	17	0	0	1	1	0	2	0	1
San Joaquin Valley	23	0	0	1	10	2	70	0	0
Alternative 1 Totals	**103**	**3**	**10**	**2**	**72**	**2**	**78**	**7**	**19**
Alternative 2									
San Jose Diridon Station Approach	1	2	0	0	10	0	0	1	0
Monterey Corridor	5	0	3	0	23	6	5	9	2
Morgan Hill and Gilroy	60	4	6	0	96	25	4	5	5
Pacheco Pass	17	0	0	1	1	0	2	0	1
San Joaquin Valley	23	0	0	1	10	2	70	0	0
Alternative 2 Totals	**106**	**6**	**9**	**2**	**140**	**33**	**81**	**15**	**8**
Alternative 3									
San Jose Diridon Station Approach	1	2	0	0	10	0	0	1	0
Monterey Corridor	3	0	2	0	15	0	4	5	2
Morgan Hill and Gilroy	53	0	10	0	28	0	0	0	7
Pacheco Pass	17	0	0	1	1	0	2	0	1
San Joaquin Valley	23	0	0	1	10	2	70	0	0
Alternative 3 Totals	**97**	**2**	**12**	**2**	**64**	**2**	**76**	**6**	**10**

Alternative/Subsection	Electrical Lines	Transmission Tower	Natural Gas	Petroleum Pipelines	Communication Lines	Storm/Wastewater Pump Station	Storm Drains and Canals	Sanitary Sewers	Potable/Recycled Water
Alternative 4									
San Jose Diridon Station Approach	31	1	5	2	29	4	19	13	14
Monterey Corridor	7	0	1	0	4	2	6	5	2
Morgan Hill and Gilroy	60	0	5	0	45	1	9	4	15
Pacheco Pass	17	0	0	1	1	0	2	0	1
San Joaquin Valley	23	0	0	1	10	2	70	0	0
Alternative 4 Totals	**138**	**1**	**11**	**4**	**89**	**9**	**106**	**22**	**32**

Facilities that were identified as both electrical and telecommunication facilities were included in counts for each type.

Figure 3.6-1 illustrates the locations of major utility electrical transmission and power lines (≥ 50 kV) within the public utilities RSA (identified by alternative and by subsection in Table 3.6-3). Most major electrical transmission lines within the public utilities RSA are PG&E transmission lines, which occur in all subsections of the public utilities RSA, with most in the Morgan Hill and Gilroy Subsection. SVP owns and operates a 6-mile 230-kV electric transmission line and a 0.25-mile 115-kV electric transmission line within the public utilities RSA that provide electric power to the City of Santa Clara (NERC 2012). Calpine operates five facilities in Santa Clara County: the Los Esteros Critical Energy Facility, Metcalf Energy Center, and Agnews Power Plant in San Jose, and the Gilroy Energy Center and Gilroy Cogeneration Facility in Gilroy. The Calpine Esteros Facility is a 243-megawatt (MW) natural gas combined cycle electric generation facility. The Metcalf Energy Center is a 564-MW natural gas combined cycle electric generation facility. The Agnews Power Plant is a 28-MW natural combined cycle electric generation facility. The Esteros, Metcalf, and Agnews facilities use recycled water provided by the City of San Jose (Calpine 2017a, 2017b, 2017c). The Gilroy Energy Center is a 141-MW natural gas turbine electric generation facility. The Gilroy Cogeneration Facility is a 130-MW natural gas steam-electric generation facility that generates both steam and electricity. The steam generated is sold to an adjacent food processing facility. The two Gilroy facilities use recycled water provided by the South County Regional Wastewater Authority (SCRWA) (Calpine 2017d, 2017e).

Major electrical facilities in the public utilities RSA also include PG&E electric transmission towers and PG&E electrical substations. Two electric transmission towers are within the San Jose Diridon Station Approach Subsection of the public utilities RSA for all alternatives, while a third electric transmission tower is within the RSA for Alternatives 1 and 2 in the Morgan Hill and Gilroy Subsection. There are three existing electrical substations within the RSA—the Metcalf Substation (150 Metcalf Road, San Jose, CA 95138), the Morgan Hill Substation (330 West Main Avenue, Morgan Hill, CA 95037), and the Llagas Substation (601 Renz Lane, Gilroy, CA 95020). Electrical transmission lines parallel to the proposed HSR alignments extend between these electrical substations. Quinto Solar photovoltaic facility in Los Banos (Merced County) is a 108-MW solar generating facility owned and operated by 8 Point 3 Energy Partners that commenced operation in 2015. The facility sells electric power to Southern California Edison (SunPower 2014; Westside Connect 2015).

High-Pressure Natural Gas Pipelines

PG&E is the primary natural gas service provider for the region and is responsible for maintaining the infrastructure for natural gas distribution in Santa Clara, San Benito, and Merced Counties (CEC 2017a). Other high-pressure natural gas pipeline operators in Santa Clara County include the CPN Pipeline Company, which operates a 16-inch natural gas pipeline to supply natural gas to Calpine electric generating equipment in San Jose, and SVP, which operates a 16-inch natural gas pipeline to supply natural gas to SVP generating facilities in Santa Clara. High-pressure natural gas distribution lines generally follow existing transportation corridors (e.g., roads and railroad tracks).

Figure 3.6-2 illustrates major utility natural gas pipelines within the public utilities RSA. Table 3.6-3 provides a summary of major utility natural gas pipelines that cross or run parallel to the project alternatives. Three major utility high-pressure 34-inch diameter natural gas pipelines owned by PG&E cross or run parallel to and within the alignment for Alternatives 1, 3, and 4 in the Morgan Hill and Gilroy Subsection and two 34-inch diameter major utility natural gas pipelines cross the alignment for Alternative 2. These pipelines cross the alignments at more than one location; each location at which the pipelines cross or run parallel to and within the alignment are identified as separate and distinct major utility conflicts in the utility conflicts summary. No major utility natural gas pipelines cross the alignment for any alternative in the San Jose Diridon Station Approach, Pacheco Pass, or San Joaquin Valley Subsections.

Petroleum and Fuel Pipelines

Petroleum and fuel pipelines transport a variety of products including crude oil, gasoline, jet fuel, home heating oil, and diesel fuel. Although there are three petroleum and fuel pipeline providers in the public utilities RSA—Shell, Phillips 66, and Chevron—only one major utility crude oil pipeline (20-inch outside diameter) operated by Shell oil company crosses the alignment for all project alternatives. This pipeline is approximately parallel to Interstate (I-) 5 in the Pacheco Pass Subsection (approximately 0.5 mile west of the California Aqueduct) and is illustrated on Figure 3.6-3.

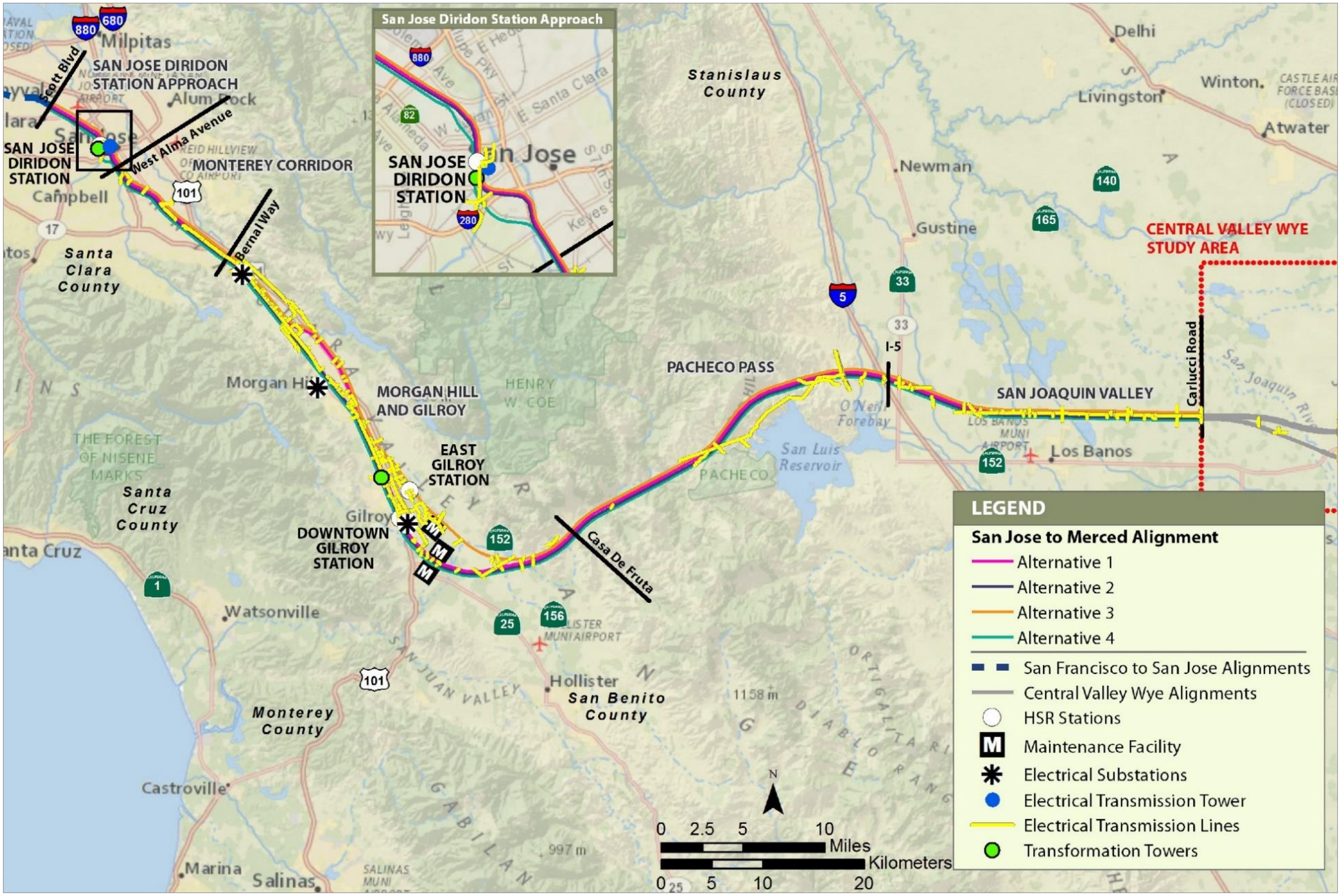
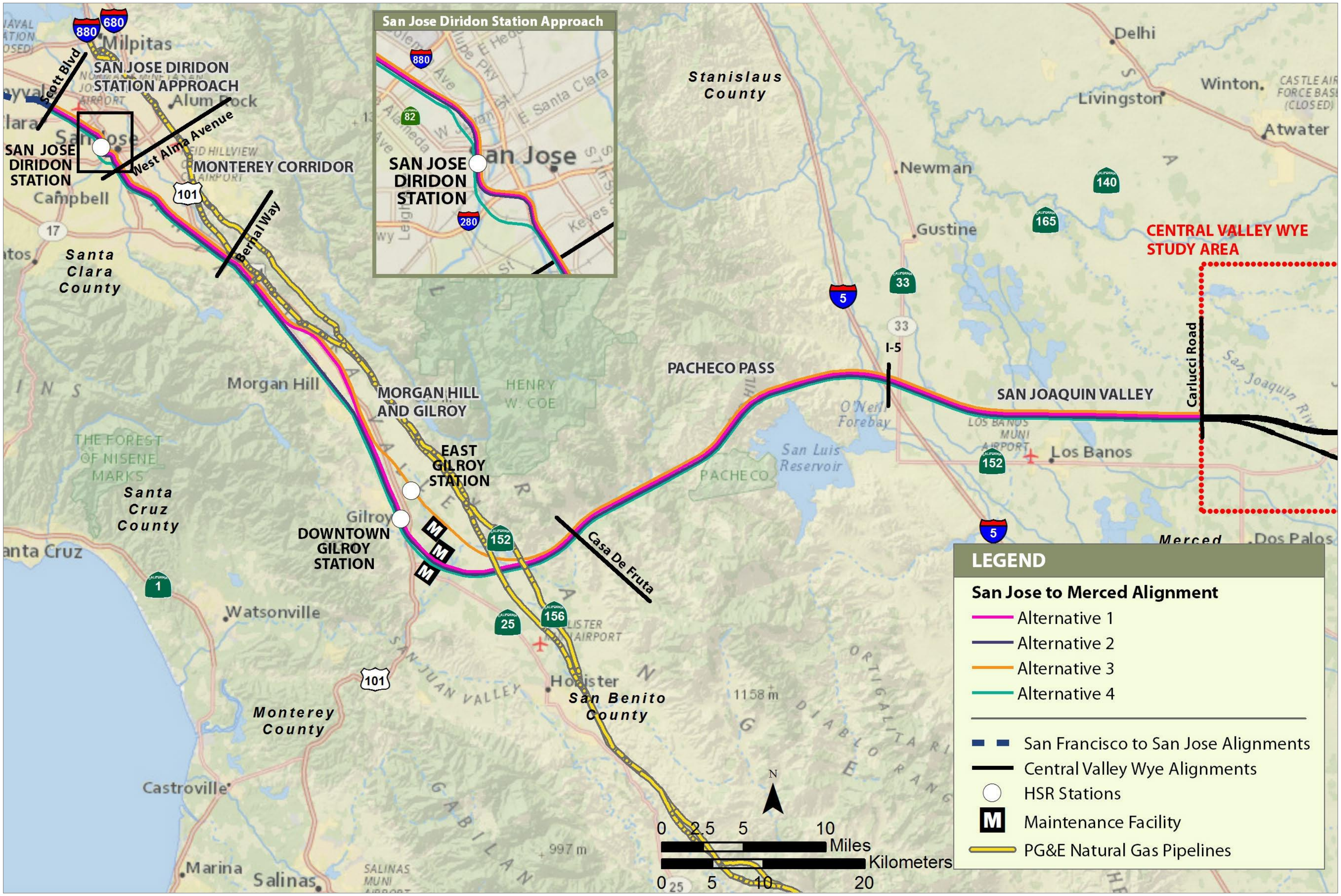


Figure 3.6-1 Electric Transmission Lines, Power Lines, and Substations in the Resource Study Area



Source: USDOT 2017

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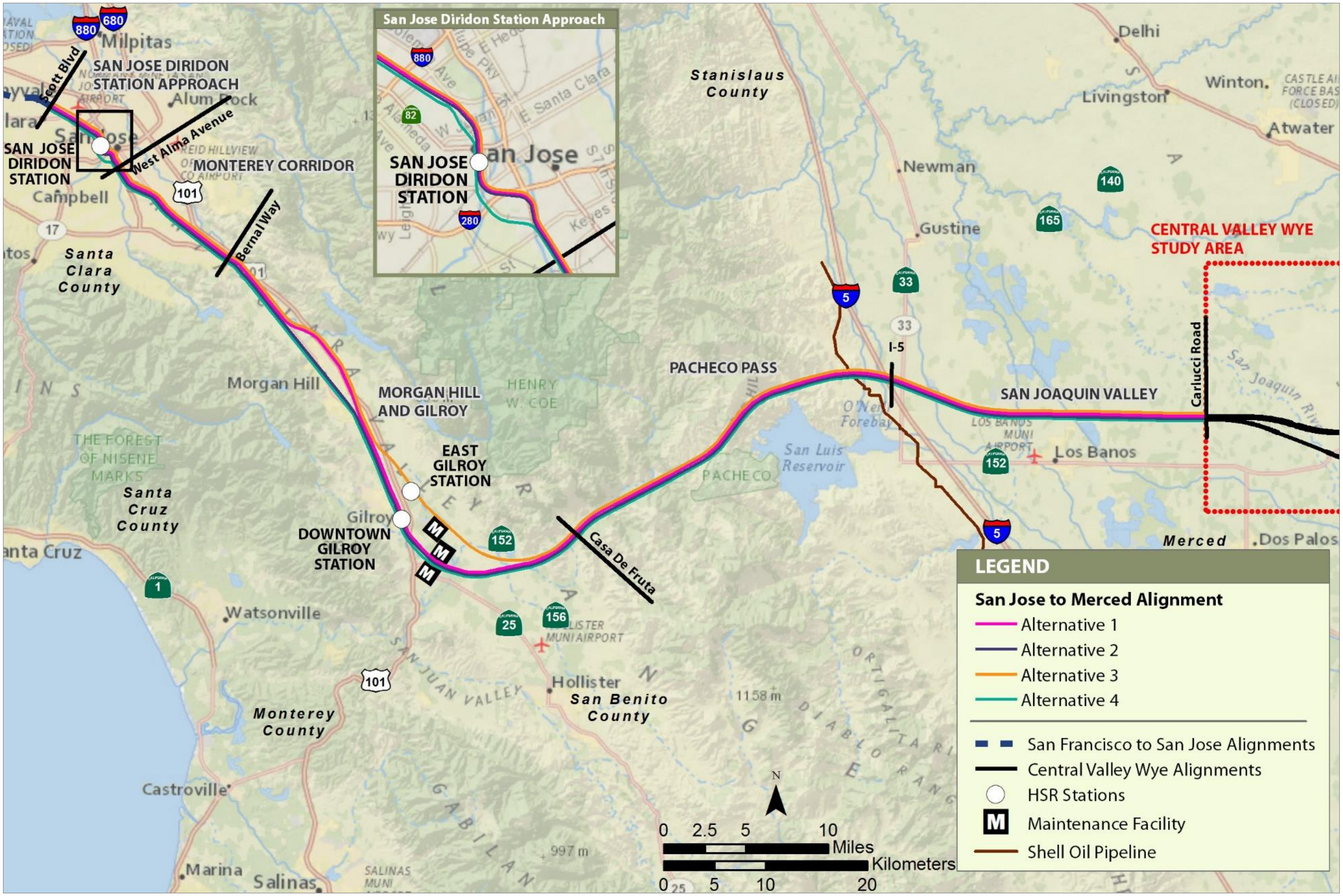
Figure 3.6-2 Major Natural Gas Pipelines in the Resource Study Area



Source: USDOT 2017

AUGUST 2019

Figure 3.6-3 Major Petroleum Pipelines in the Resource Study Area

Communication Facilities

Communications service providers in Santa Clara, San Benito, and Merced Counties are shown in Table 3.6-2. Appendix 3.6-A in Volume 2 includes a summary of major communications lines that either run parallel to or cross the proposed HSR alignments.

Santa Clara County

AT&T and Verizon are the primary telecommunications service providers in the public utilities RSA in Santa Clara County. Other utility providers in Santa Clara County (e.g., Sprint, Century Link/QWEST, Century Link/Level 3 Communications, T-Mobile, Comcast) operating in Santa Clara County own or lease cell towers and telecommunications lines (cable and telephone). Components of the infrastructure are aboveground and below-ground and are generally within the Union Pacific Railroad, Monterey Road, and U.S. Highway (US) 101 rights-of-way and in urban areas between San Jose and Gilroy.

San Benito County

AT&T and Verizon are the primary telecommunications service providers in the public utilities RSA in San Benito County. Charter Communications/Spectrum also provides telephone and internet services in the public utilities RSA in San Benito County (Charter Spectrum 2017).

Merced County

AT&T and Verizon are the primary telecommunications service providers in the public utilities RSA in Merced County. Comcast and CenturyLink also provide communications services in the RSA in Merced County.

Water Supply Infrastructure

This section summarizes water suppliers and infrastructure by community from north to south, west to east along the project alternatives. The discussion is organized by type of water supplies, focusing on potable water, recycled water, and nonpotable agricultural water. This section also summarizes water demand within the public utilities RSA. For additional discussion of groundwater, including a map of groundwater basins and information about applicable basin plans, refer to Section 3.8, Hydrology and Water Resources. Appendix 3.6-A in Volume 2 includes detailed information on major utilities, including water conveyance infrastructure, that cross or run parallel to the project alternatives.

Types of Water Supplies:

- Potable Water—Water that is safe to drink or for use in food preparation.
- Recycled Water—Treated wastewater that can be used for landscape irrigation, industrial uses, etc.
- Nonpotable Agricultural Water—Untreated water that is not of drinking water quality but is typically used for agricultural irrigation

Potable Water Suppliers

Municipalities and counties provide most of the potable water within the public utilities RSA. Potable water suppliers within the public utilities RSA are listed in Table 3.6-2 and their service area boundaries are illustrated on Figure 3.6-4 for Santa Clara and San Benito Counties and on Figure 3.6-5 for Merced County.

Santa Clara Valley Water District

The SCVWD supplies water to approximately 1.9 million people in Santa Clara County, primarily for residential use. The SCVWD water resource planning includes the Santa Clara Valley Water District 2015 Urban Water Management Plan. The plan provides demand and supply projections and current and projected sources of water for the SCVWD. The plan forms the basis of the SCVWD Water Supply and Infrastructure Master Plan (SCVWD 2016). In 2015, the SCVWD obtained about half of their water supply from local sources and half from imported water sources. The SCVWD imported water from outside the public utilities RSA from sources including the California Department of Water Resources (DWR) State Water Project (SWP), the U.S. Bureau of Reclamation’s (USBR) Central Valley Project (CVP), and San Francisco Public Utilities Commission (SFPUC). Local potable water sources include natural groundwater recharge and surface water supplies, including surface water rights held by SCVWD and the San Jose Water Company (SJWC) (SCVWD 2016). In addition to natural drainage features, the SCVWD’s water supply infrastructure is comprised of storage, conveyance facilities, recharge facilities, diversion facilities, dams and reservoirs, groundwater subbasins, groundwater recharge systems, water treatment plants, treatment and distribution facilities, pump stations, and raw water conveyance systems (SCVWD 2016). Many residents in rural and unincorporated areas of Santa Clara County rely on private groundwater wells for potable water.

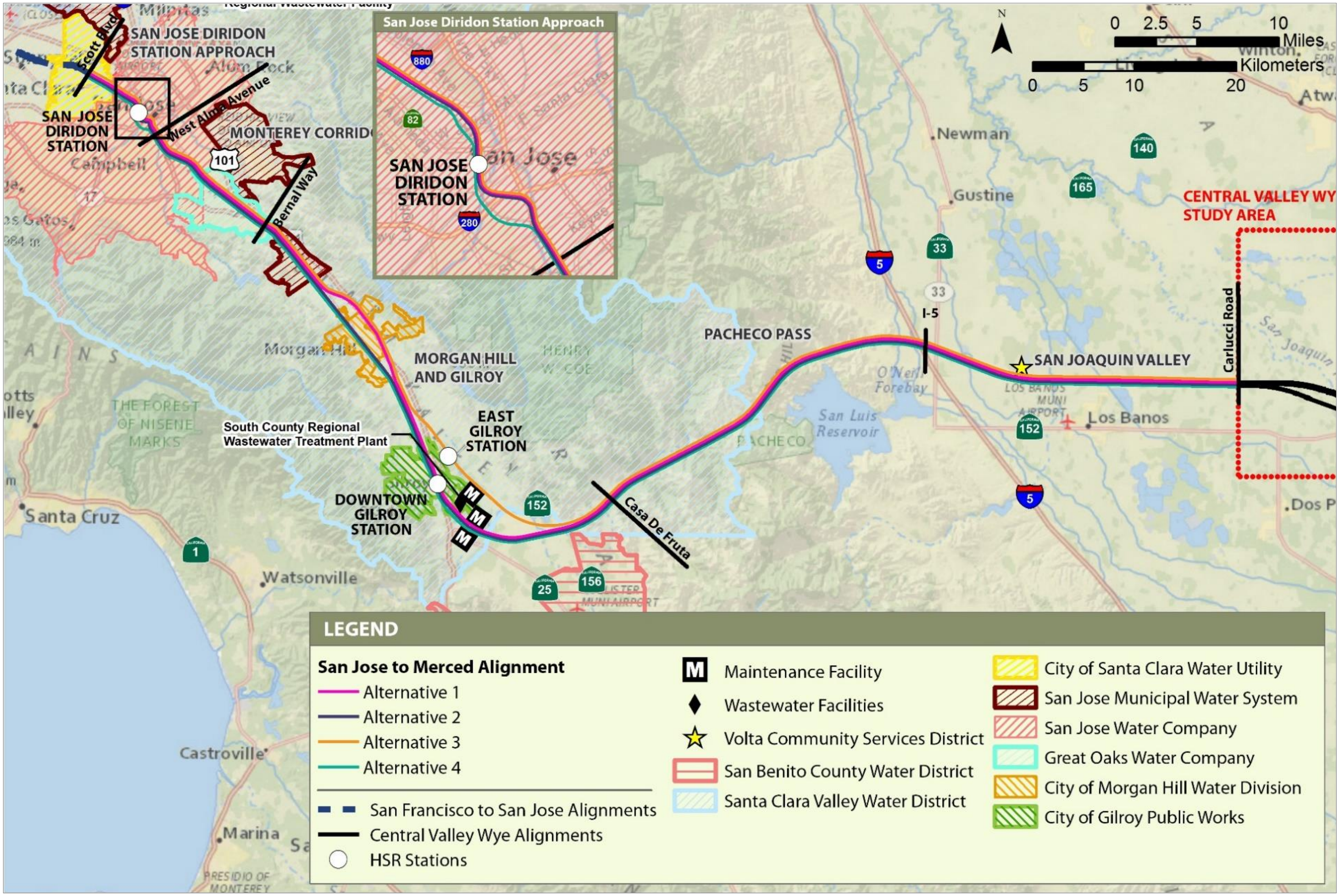


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Figure 3.6-4 Potable Water Distribution System Boundaries

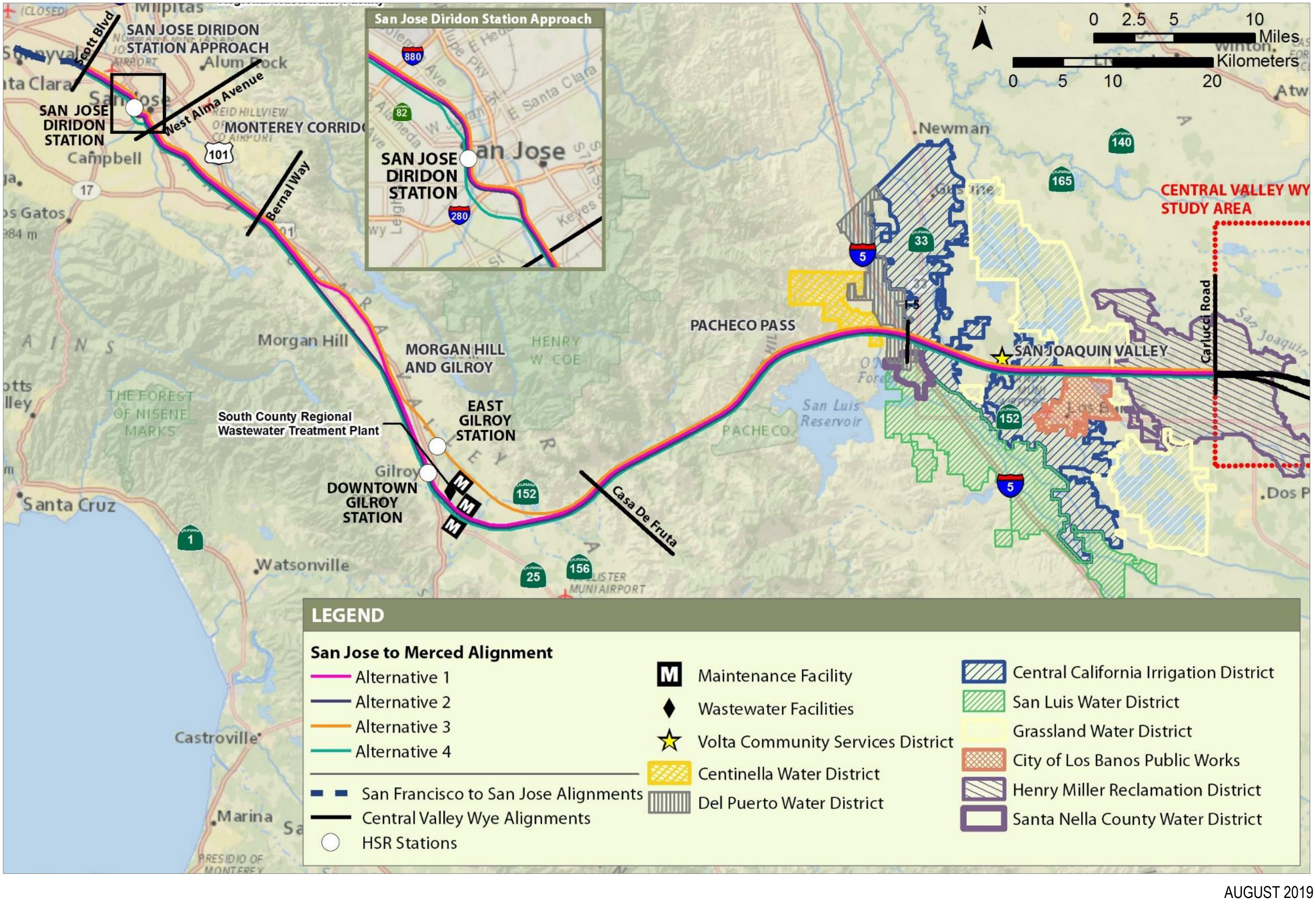


Figure 3.6-5 Agricultural Irrigation District Water System Boundaries

San Jose Municipal Water System

The San Jose Municipal Water System (SJMWS) provides potable water to approximately 113,650 residents in the San Jose neighborhoods of North San Jose/Alviso, Evergreen, Edenvale, and Coyote Valley. The SJMWS relies on four water sources: surface water from SFPUC, local and imported surface water from SCVWD, groundwater from the Santa Clara Subbasin, and recycled water from the South Bay Water Recycling (SBWR) system. The North San Jose/Alviso neighborhood's potable water supply is primarily surface water from SFPUC, most of which originates from the Hetch Hetchy Reservoir in the Sierra Nevada, and is supplemented by groundwater wells owned and operated by SJMWS (SFPUC 2016). In the neighborhoods of Evergreen, Edenvale, and Coyote Valley, groundwater from the Santa Clara Subbasin provides for most of the potable water use. The SJMWS also purchases treated surface water from SCVWD under a treated water contract.

City of Santa Clara Water Utility

The City of Santa Clara Water Utility supplies potable water to approximately 26,000 residents in Santa Clara. Water sources available to the City of Santa Clara Water Utility include a local underground aquifer, which provides about 62 percent of the City's potable water through 26 wells, and imported water supplies delivered by the SCVWD and the SFPUC (City of Santa Clara 2018).

San Jose Water Company

The SJWC is the primary source of potable water for the metropolitan area of San Jose. The SJWC sources potable water supplies from groundwater, local surface water, and imported treated surface water (SJWC 2016). Typically, groundwater comprises approximately one-third of SJWC's potable water supply, surface water from the local watersheds of the Santa Cruz Mountains comprises about 7 percent, and imported treated surface water originating from local reservoirs, the SWP, and the CVP comprise more than 50 percent of its potable water (SJWC 2016). SJWC's distribution system has interties with City of Santa Clara, City of San Jose Municipal Water, City of Milpitas, and Great Oaks Water Company.

Great Oaks Water Company

The Great Oaks Water Company provides potable water to approximately 20,000 residents in the San Jose neighborhoods of Blossom Valley, Santa Teresa, Edenvale, Coyote Valley-Almaden Valley. The Great Oaks Water Company sources their potable water from underground water supplies in the Santa Clara Valley Groundwater Basin (Great Oaks Water Company 2015, 2018).

City of Morgan Hill Water Division

The City of Morgan Hill Water Division provides potable water services in Morgan Hill through the use of 17 municipal groundwater wells that tap into the Llagas Subbasin of the Gilroy-Hollister Groundwater Basin and the Santa Clara Subbasin of the Santa Clara Valley Groundwater Basin (City of Morgan Hill 2015a, 2015b, 2016b, 2017b). Residential and commercial water users in the Morgan Hill area also rely on groundwater withdrawn from the Llagas Subbasin and the Coyote Valley subarea of the Santa Clara Subbasin. The SCVWD monitors these subbasins and provides transfers of surface water and raw water for the purposes of recharge of the Llagas Subbasin and the Coyote Valley subarea of the Santa Clara Subbasin. The SCVWD noted in the January 2016 Groundwater Condition Report that groundwater levels were below the 5-year average for both subbasins. Based on demand projections presented in the South County Water Supply Planning Project dated July 2010, the Llagas Subbasin is expected to experience a water supply shortfall in 2030. As the city continues to grow, planning efforts have recommended increasing groundwater recharge and use of recycled water to meet additional water needs, and if necessary, treatment and use of local surface waters (SCVWD 2010b).

City of Gilroy Public Works Department

The City of Gilroy's Public Works Department provides potable water services to approximately 56,000 residents in Gilroy through nine groundwater wells that connect to the Llagas Subbasin of the Gilroy-Hollister Groundwater Basin (City of Gilroy 2016b). As described for the City of Morgan Hill, the Llagas Subbasin is expected to experience a water supply shortfall in the future, which could be offset by increasing groundwater recharge, use of recycled water, or treatment of local surface waters (SCVWD 2010b).

San Benito County Water District

The San Benito County Water District (SBCWD) provides water to municipal and rural land uses in San Benito County through four major sources of water supplies: local groundwater, imported water, recycled water, and local surface water. The SBCWD, Sunnyslope County Water District, and the City of Hollister jointly prepared the 2015 Hollister Urban Area (HUA) Urban Water Management Plan. The plan describes the current and projected water demand for the HUA and identifies sources of water supply and plans for future water supply facilities (County of San Benito 2016b). Local groundwater, which provides approximately 83 percent of the total supply, is withdrawn from the basin by private irrigation, domestic wells, and public water supply retailers. Imported water, from the USBR's CVP, is approximately 16 percent of the total supply. The SBCWD has a 40-year contract (extending to 2027) to purchase CVP water from the USBR for a maximum of 8,250 acre-feet per year of municipal and industrial water. Local surface water is not used directly for potable use in the basin, but creek percolation is a significant source of groundwater recharge (SBCWD 2015).

Merced County Reclamation Districts

The USBR's CVP and the DWR's SWP provide potable water to municipal and special water districts in Merced County through the Delta-Mendota Canal and the California Aqueduct. The Delta-Mendota Canal, jointly operated by USBR and the San Luis and Delta-Mendota Water Authority (SLDMWA), delivers water to the San Luis Reservoir; this water is then pumped to a facility in the Pacheco Pass near Casa de Fruta, where the water is diverted to the SCVWD and SBCWD (SBCWD 2018).

Special water districts generally provide potable water to unincorporated areas of Merced County. Special water districts within the public utilities RSA include the SLDMWA, the Henry Miller Reclamation District (HMRD)/San Luis Canal Company (SLCC), the San Luis Water District (SLWD), and the Central California Irrigation District (CCID). Municipal areas including Santa Nella, Volta, and Los Banos operate municipal water systems for residents that are typically supplied by groundwater wells.

Santa Nella County Water District

The Santa Nella County Water District provides potable water to approximately 500 customers in the unincorporated community of Santa Nella. The Santa Nella water system is supplied from groundwater wells; Santa Nella is also supplied with treated surface water from the San Luis Canal (Nolte 2009; Santa Nella County Water District 2017a).

Volta Community Services District

The Volta Community Services District provides potable water to approximately 30 customers in the unincorporated community of Volta. The Volta water system is supplied from groundwater wells (Nolte 2009; Santa Nella County Water District 2017a).

City of Los Banos Public Works Department

The City of Los Banos obtains its water supply from the Delta-Mendota Subbasin groundwater aquifer via a series of wells. The City's water system includes 13 active wells, a distribution system with line sizes ranging from 4 to 30 inches in diameter, an elevated storage tank, and a surface-mounted storage tank with pumps. The City of Los Banos does not currently use surface water, but may use treated surface water purchased through the SWP in the future (City of Los Banos 2010).

City of Merced Public Works Department

The City of Merced Public Works Department is the only municipal water purveyor in the City of Merced and provides service to approximately 83,962 residents (as of 2015) with the city limits and in areas adjacent to the City including University of California-Merced, comprising a total of 44.7 square miles of service area. The City of Merced obtains water from the Merced Subbasin of the San Joaquin Valley Groundwater Basin and operates 20 active and standby groundwater wells. The City of Merced does not receive and does not anticipate receiving wholesale water (City of Merced 2017).

Recycled Water Suppliers

Cities of Santa Clara and San Jose

SBWR is a recycled water wholesaler to water retailers including the City of Santa Clara and two San Jose water suppliers (SJWC and SJMWS). The SBWR delivers approximately 6 billion gallons per year (approximately 11 million gallons per day [mgd]) of recycled water to more than 850 commercial customers (City of San Jose 2018b). Recycled water from the SBWR makes up about 16 percent of the water sales of the City of Santa Clara Water Utility (City of Santa Clara 2018). The SBWR obtains recycled water from the San Jose-Santa Clara Regional Wastewater Facility (jointly owned by the Cities of Santa Clara and San Jose and operated by the City of San Jose's Environmental Services Department). This wastewater treatment facility treats and distributes water to customers in San Jose, Santa Clara, and other jurisdictions in northern Santa Clara County for nonpotable agricultural and industrial uses (City of San Jose 2018b). The Silicon Valley Advanced Water Purification Center (SVAWPC) adjacent to the regional wastewater facility further purifies the recycled water and blends it with tertiary treated water to produce high-quality recycled water. The SVAWPC is conducting a project to demonstrate the effectiveness of advanced treatment technologies to produce potable water for a potable water reuse program (SCVWD 2016).

City of Gilroy

The SCRWA WWTP in Gilroy produces recycled water for nonpotable uses such as irrigation, agriculture, and industrial uses. The SCVWD partners with SCRWA, City of Gilroy, and City of Morgan Hill to operate the recycled water program—the SCRWA is the recycled water producer, the SCVWD is the wholesaler, and Gilroy and Morgan Hill are the retailers (SCRWA 2017). In 2014–2015, 1,995 acre-feet per year of recycled water was used by 11 customers in Gilroy. As of May 2016, recycled water was not yet being delivered to customers in Morgan Hill; however the SCRWA Recycled Water Management Plan identifies an additional 80 potential customers in Gilroy and 79 potential customers in Morgan Hill (SCVWD 2016).

City of Merced

The City of Merced Public Works Department supplies recycled water for agricultural use on City-owned land, storm drain flushing, and for wetlands and wildlife habitat. The City of Merced used 4,886 acre-feet of recycled water for these purposes in 2015, approximately 45 percent for wetlands and habitat and approximately 55 percent for municipal and agricultural uses (City of Merced 2017).

Nonpotable Agricultural Water Suppliers

Santa Clara County

The SCVWD provides water to agricultural users in Santa Clara County and actively manages aquifers that are used to supply water to agricultural users. Agricultural users in the southern part of Santa Clara County rely primarily on groundwater withdrawn from groundwater wells in the Coyote and Llagas Subbasins for their water supply. The SCVWD actively manages these subbasins through groundwater recharge to augment the water supply. Sources of water for recharge include water captured and stored in local reservoirs and water imported from the SWP and the CVP through SLDMWA (SCVWD 2010a, 2016). Current (2015) and projected (2040) agricultural water consumption in Santa Clara County is 27,700 acre-feet per year including 26,000 acre-feet per year of agricultural groundwater consumption and 1,700 acre-feet per year of independent groundwater consumption used for irrigation or landscaping (SCVWD 2016).

San Benito County

The SBCWD has four major sources of water supply for agricultural uses: local groundwater, imported water, recycled water, and local surface water. The SBCWD has a 40-year contract to purchase CVP water from the USBR for a maximum 35,550 acre-feet per year of agricultural water (SBCWD 2016, 2017).

Merced County

The public utilities RSA extends through unincorporated Merced County in an area that is primarily agricultural and open space; water is typically supplied by individual groundwater wells or federal and state water projects (County of Merced 2012). The primary water infrastructure within the public utilities RSA are irrigation canals owned or regulated by the following agencies and departments (illustrated on Figure 3.6-5):

- **USBR**—USBR operates the CVP including the Delta-Mendota Canal and San Luis dam and reservoir in Merced County (USBR 2018). The CVP provides agricultural water to numerous water districts in Merced County (SLWD 2012).
- **SLDMWA**—The SLDMWA consists of water agencies representing approximately 2,100,000 acres within the western San Joaquin Valley including portions of Santa Clara, San Benito, and Merced Counties. The SLDMWA operates the Delta-Mendota Canal jointly with the USBR, a canal which delivers approximately 3,000,000 acre-feet per year of water within the SLDMWA service area. Approximately 83 percent of this water supply is used for agriculture, 7 percent for municipal and industrial uses, and 9 percent for habitat enhancement and restoration at wildlife refuges. The SLDMWA also operates the O'Neill Pumping/Generating Plant at San Luis/O'Neill Forebay Reservoir, the San Luis Drain and other water infrastructure facilities under a cooperative agreement with USBR (SLDMWA 2018, 2019).

  The Westside-San Joaquin Region of the SLDMWA includes water agencies in western Merced County. Water supplies within the Westside-San Joaquin Region of the SLDMWA include CVP water, groundwater, local surface water including recycled water, and water transferred from outside the Westside-San Joaquin Region (SLDMWA 2019). Municipal water suppliers in this region, including the City of Los Banos, have prepared UWMPs, and 11 agricultural water suppliers within the region have prepared agricultural water management plans. The region primarily overlies the southern portion of the Tracy Groundwater Subbasin, the Delta-Mendota Groundwater Subbasin, and the Westside Groundwater Subbasin of the San Joaquin Valley Groundwater Basin. Groundwater sustainability plans are being prepared for each subbasin, with the objective of achieving basin sustainability by the year 2040.
- **California DWR**—The California DWR operates and maintains the San Luis Joint-Use Complex, which includes O'Neill Dam and Forebay, Sisk Dam, San Luis Reservoir, Gianelli Pumping-Generating Plant, Dos Amigos Pumping Plant, and a 103-mile portion of the California Aqueduct in Merced County. This complex serves the SWP and the CVP (DWR 2018).
- **HMRD/SLCC**—The HMRD operates and maintains canals and drains for the SLCC within Merced County, including areas east of Los Banos. The HMRD in conjunction with the SLCC deliver irrigation water and provide drainage services to SLCC customers. The SLCC services an area of approximately 47,285 acres in Merced and Fresno Counties. The SLCC has an annual contractual entitlement of 163,000 acre-feet provided by the CVP (SLCC 2014; USBR 2014).
- **Grassland Water District**—The Grasslands Water District (GWD) is approximately 51,540 acres in size with most of the land within the district being wetland habitat to the northwest and southeast of Los Banos. The GWD's primary operation is the delivery of water to landowners within its boundaries using a 110-mile canal system. The GWD receives an annual allotment of water for distribution from the CVP (GWD 2017).
- **CCID**—The CCID provides water to approximately 1,600 farms in the vicinity of Gustine, Santa Nella, Los Banos, and other areas in Merced County. The CCID also provides municipal and industrial water to customers in their service area. The CCID obtains water from USBR. The CCID services approximately 142,000 acres of irrigated agricultural land and approximately 5,000 metered water connections east of I-5 and west of the San Joaquin River. In 2011, the CCID received 510,000 acre-feet of water from USBR and also obtained 45,300 acre-feet of drainage water (CCID 2014b, 2017).

- **SLWD**—SLWD is on the western side of the San Joaquin Valley near Santa Nella and Los Banos and extends from Merced County into Fresno County. The SLWD covers 64,500 acres and includes 30,954 irrigated acres and approximately 700 metered water connections. The SLWD does not operate groundwater wells and receives all of its water from the USBR Delta-Mendota Canal and has an allocation of 125,080 acre-feet. The SLWD typically only receives a portion of this contract water allocation each year due to restrictions on pumping from the Delta (SLWD 2012, 2016).
- **Del Puerto Water District**—The Del Puerto Water District runs parallel to the Delta-Mendota Canal in Merced County northwest of Santa Nella and extends 50 miles into Stanislaus County. The Del Puerto Water District's service area encompasses 45,000 acres of farmland along the Delta-Mendota Canal, and receives water from the CVP (Nolte 2009; Del Puerto Water District 2011).
- **Centinella Water District**—The Centinella Water District comprises 840 irrigable acres. In 2004, the Centinella Water District sold its contract with USBR, and the Centinella Water District currently has no allocation of water for distribution. The land in the District is designated as habitat for mitigation purposes. The Centinella Water District Manager has begun exploring the steps required to dissolve the District (LAFCO 2017).

Potable Water Demand

Acre-foot of water

An acre-foot of water is the volume equal to a sheet of water 1 acre in area and 1 foot in depth.

The demand for potable water in urban areas of the public utilities RSA was approximately 165,724 acre-feet per year in 2015, with the highest demand in San Jose (139,907 acre-feet per year). The SCVWD supplies wholesale potable water to municipal water service providers in Santa Clara County including the Cities of Santa Clara, San Jose, Morgan Hill, and Gilroy. In Merced County, the City of Los Banos, Santa Nella, and Volta operate municipal water supply systems in the RSA. Water demand for the Cities of Santa Clara, San Jose, Morgan Hill, and Gilroy in Santa Clara County and the City of Los Banos, Santa Nella, and Volta in Merced County is projected to increase by approximately 70 percent to 280,490 acre-feet per year by 2040. Table 3.6-4 shows potable water supplies for urban areas of the RSA.

Water Supply

Santa Clara Valley Water District

Sources of water supply for the SCVWD include natural groundwater recharge, local surface water, imported surface water from the SWP and CVP, recycled water, and transfers. The SFPUC delivers water to retailers in northern Santa Clara County, and the SJWC has local surface water rights (SCVWD 2016). The SCVWD 2015 Urban Water Management Plan includes projections of average annual water supply to 2040 and includes water supply reliability analysis for water supplies in single and multiple dry years (SCVWD 2016).

The SCVWD countywide water supply in 2015 was 260,000 acre-feet. The SCVWD projected water supply is 438,100 acre-feet in 2025 and 441,900 acre-feet in 2040. Water supplies are anticipated to increase from 2015 levels with the completion and implementation of future water supply projects including dam improvements, potable water reuse and recycled water programs, and water pipeline construction and restoration (SCVWD 2016).

The SCVWD projected countywide water demand in 2025 is 391,400 acre-feet; the projected 2025 water supply exceeds the projected 2025 water demand by 36,800 acre-feet. The SCVWD projected water demand in 2040 is 435,100 acre-feet; the projected 2040 water supply exceeds the projected 2040 water demand by 6,800 acre-feet. Projected demand and projected supply are anticipated to be equal for normal dry years, including access to reserves, except for 2040, for which reserves are projected to be insufficient, resulting in a projected shortfall of 25,800 acre-feet for 2040. Shortfalls are predicted for multiple dry years from 2020 to 2040; the SCVWD has updated its Master Water Plan (2017) and is conducting interagency planning to identify and develop additional water supplies to account for multiple dry years (SCVWD 2016).

Table 3.6-4 Existing and Projected Urban Potable Water Demand in the Resource Study Area

Water Utility/Water District	Demand (acre-feet/year)[1]	
	Current (2015)	Future Projected (2040)
City of Santa Clara Water Utility (City of Santa Clara)	17,620	27,040
San Jose Water Company (City of San Jose)	106,580	161,070
San Jose Municipal Water System (City of San Jose)	15,710	35,200
Great Oaks Water Company (City of San Jose)	2,760	4,070
City of Morgan Hill Water Division[2]	5,380	10,970
City of Gilroy Public Works[3]	8,140	17,870
Santa Nella County Water District[4]	2,500	4,750
Volta Community Services District[4]	375	710
City of Los Banos Public Works	6,660	18,820

Sources: SCVWD 2016; City of Santa Clara 2016; SJWC 2016; San Jose Municipal Water System 2016; City of Morgan Hill 2016a; City of Gilroy 2016b; City of Los Banos 2016; Nolte 2009.
[1] 1 acre-foot of water is equivalent to 325,851 gallons.
[2] Includes water consumption for landscaping use; does not include estimated demand associated with other water users in the Morgan Hill area that rely on groundwater withdrawals from the Llagas Subbasin and Coyote Valley subarea of the Santa Clara Subbasin.
[3] Includes recycled water consumption.
[4] 2015 values for Santa Nella and Volta, are estimated based on Nolte 2009.

San Benito County Water District

The SBCWD receives water from the CVP under a 40-year contract (extending to 2027) for a maximum of 8,250 acre-feet per year for municipal and industrial water and 35,550 acre-feet per year of water for agricultural use. The SBCWD manages the San Justo Reservoir to store imported CVP water, with a planned reserve of 3,000 acre-feet. Groundwater wells in the HUA operated by water retailers also provide water to Hollister and Sunnyslope; the City of Hollister and the Sunnyslope County Water District are municipal water purveyors. The HUA water supply increased from 2015 levels with completion of the Hollister-West Hills Treatment Plant in 2017. The West Hills plant provides additional treatment capacity for CVP water; the treated water is blended with groundwater for distribution to customers (Hollister Free Lance 2017).

The HUA water demand in 2015 was 4,880 acre-feet. The projected demand in 2020 is 6,936 acre-feet and the projected demand in 2025 is 7,740 acre-feet. The projected normal year water supply in both 2020 and 2025 is 11,539 acre-feet including 7,245 acre-feet of purchased or imported water, 3,999 acre-feet of groundwater, and 116 acre-feet of recycled water. The difference between projected supply and demand in 2020 is 4,603 acre-feet and in 2025 is 3,799 acre-feet. Supply and demand are anticipated to be equal in dry and multiple dry years after application of water conservation measures (SBCWD 2016).

City of Merced Public Works Department

Sources of water supply to the City of Merced include groundwater and recycled water. The projected water supply in 2025 is 33,287 acre-feet including 5,821 acre-feet of recycled water, and the projected water supply in 2035 is 37,829 acre-feet including 5,869 acre-feet of recycled water. Water demand in 2025 and water demand in 2035 are projected to be equal to projected water supply; water conservation measures are anticipated to reduce water demand in dry and multiple dry years to equal the available supply and groundwater pumping will compensate for reduced surface water allocations (City of Merced 2017).

Agricultural Water Demand

Santa Clara County

Agricultural water use for irrigation in Santa Clara County was 37,500 acre-feet per year in 2010. Most of this agricultural water use was from groundwater (91.6 percent or 34,350 acre-feet per year), while the remaining was from surface waters (8.4 percent or 3,150 acre-feet per year) (USGS 2017).

San Benito County

Agricultural water use for irrigation in San Benito County was more than twice that of Santa Clara County in 2010, at 80,900 acre-feet per year. Of this agricultural water use, 72 percent or 58,250 acre-feet per year was from groundwater sources, and 28 percent or 22,650 acre-feet per year was from surface water (USGS 2017).

Merced County

Agricultural water use for irrigation in Merced County was 1.54 million acre-feet per year in 2010. Unlike Santa Clara and San Benito Counties, most of this agricultural water use for irrigation was from surface water (71 percent or 1.1 million acre-feet per year), and the remaining from groundwater (29 percent or 0.4 million acre-feet per year) (USGS 2017).

Wastewater Collection and Treatment

Wastewater collection and treatment services are provided by municipal and county agencies within the public utilities RSA. On-site sewage systems (e.g., septic tanks) are generally used in rural and low-density areas of the RSA, including some unincorporated areas of Santa Clara, San Benito, and Merced Counties. More densely populated and urban areas of the RSA are serviced by wastewater treatment systems operated by municipal agencies. Table 3.6-5 summarizes local wastewater system locations and operating and design capacities for urban areas of Santa Clara County and Merced County.

Table 3.6-5 Wastewater Treatment Plant Capacity within the Resource Study Area

Location	Wastewater Treatment Plant	Operator	Address	Design Capacity (mgd)	Average Dry Weather Flow (mgd)
City of San Jose[1]	San Jose-Santa Clara Regional Wastewater Facility	City of San Jose Environmental Services Department	700 Los Esteros Road, San Jose	167	105
City of Gilroy[2]	SCRWA Wastewater Treatment Plant	South County Regional Wastewater Authority	1500 Southside Drive, Gilroy	8.5	6.0
City of Los Banos	Los Banos Wastewater Treatment Plant	City of Los Banos Public Works	17963 W Henry Miller Road, Los Banos	6.1[3]	3.4[3]
Santa Nella	Santa Nella Wastewater Treatment Plant	Santa Nella County Water District	12931 S. Highway 33, Santa Nella	0.4	0.3

Source: City of San Jose 2018c; SCRWA 2016; SCVWD 2014, 2017; City of Los Banos 2010; EPS 2007.
[1] The City of Santa Clara and the City of San Jose are jointly served by a single wastewater treatment plant operated by the City of San Jose.
[2] Morgan Hill and Gilroy are served by and jointly operate a single wastewater treatment plant operated by the SCRWA.
[3] Additional 49,500 gallons per day is expected to be needed by 2020.
mgd = million gallons per day
SCRWA = South County Regional Wastewater Authority

Santa Clara County

Residents and businesses in urban areas of Santa Clara County receive sewage collection and wastewater treatment services from municipal sewer systems or special sanitary districts. Residents and businesses in unincorporated areas of Santa Clara County generally rely on septic systems or on-site wastewater treatment systems for management of wastewater (County of Santa Clara 1994, 2016). The Santa Clara County Consumer Protection Division oversees on-site wastewater treatment systems through the County On-Site Wastewater Treatment System Ordinance (County of Santa Clara 2013).

City of Santa Clara

The City of Santa Clara Sewer Utility provides sewer services to residents and businesses in the city. Sanitary sewer flows are collected and transported through more than 270 miles of sewer main by way of six pumping stations to the San Jose-Santa Clara Regional Wastewater Facility (City of Santa Clara 2018). This facility, jointly owned by the Cities of Santa Clara and San Jose and operated by the City of San Jose's Environmental Services Department, provides primary, secondary, and tertiary wastewater treatment to remove solids, pollutants, and harmful bacteria (City of Santa Clara 2018). This wastewater facility can process up to 167 mgd of untreated wastewater and discharges most of the treated wastewater through Coyote Creek into South San Francisco Bay (City of San Jose 2018b). About 20 percent of the treatment facility discharge is recycled for use in agriculture/landscape irrigation, industrial processes, building cooling, and toilets and urinals.

City of San Jose

The City of San Jose Environmental Services Department collects wastewater from residents and businesses throughout the city (City of San Jose 2014). The sewer system consists of approximately 2,294 miles of wastewater collection system pipeline that ranges from 6 to 90 inches in diameter, and approximately 45,000 manholes and 16 sewage lift stations that convey to the San Jose-Santa Clara Regional Wastewater Facility by major interceptor pipelines in the northern part of San Jose. In addition to the City's collection system, wastewater is conveyed to the plant from several sewage collection systems operated by and serving Santa Clara and Milpitas, County Sanitation District 2-3, West Valley Sanitation District, Cupertino Sanitary District, and Burbank Sanitary District. Sewage generated within SJWC and SJMWS service areas is conveyed through the City of San Jose and West Valley Sanitation District collection systems and treated at the San Jose-Santa Clara Regional Wastewater Facility.

City of Morgan Hill

The City of Morgan Hill's Department of Public Works operates a wastewater collection system that collects wastewater within the City's service area and transports it to the SCRWA WWTP in Gilroy for processing (City of Morgan Hill 2002a). The Morgan Hill sewer system consists of approximately 135 miles of sewers with diameters up to 30 inches, 15 sewage lift stations, associated force mains, an interceptor and trunk sewers (generally 12 inches in diameter and larger) that convey wastewater through an outfall that continues south of the city to the WWTP in Gilroy, where it is treated and discharged.

The SCRWA owns and operates the WWTP under a Joint Powers Agreement with Morgan Hill and Gilroy (SCRWA 1992, 2017). The WWTP can process up to 8.5 mgd of untreated wastewater. A 3-million-gallon storage reservoir is located on-site at the WWTP to support the recycled water distribution system, described in more detail in the Recycled Water Suppliers section (SCRWA 2016). The WWTP discharges the remaining treated wastewater into percolation ponds. The ponds allow the water to soak into the soil and eventually add water to the underground aquifer. The ponds allow for settling out of solids and are further distributed through a pipe system (SCRWA 2017).

City of Gilroy

The City of Gilroy's Water Department operates a wastewater collection system that collects wastewater within the City's service area and transports it to the SCRWA WWTP in Gilroy (City of Gilroy 2004b). The Gilroy sewer system consists of approximately 110 miles of sewers with diameters up to 33 inches and trunk sewers (generally 10 inches in diameter and larger) that convey wastewater to the WWTP (SCRWA 2016).

San Benito County

The San Benito County Resource Management Agency is responsible for planning, operation, and maintenance of sewer collection systems within San Benito County (County of San Benito 2018). Most unincorporated areas of San Benito County lack public sewer infrastructure and are serviced by community septic systems or individual septic systems and leach field disposal. Incorporated areas of San Benito County including Hollister and San Juan Bautista are serviced by municipal wastewater and sewer services. WWTPs in San Benito County are operated by four service providers: City of Hollister, City of San Juan Bautista, Sunnyslope Water District, and Tres Pinos Water and Sewer District. Four unincorporated communities in San Benito County are served by public wastewater systems operated by four Community Service Area service providers (County of San Benito 2010, 2015a).

Merced County

Sanitary sewer service is provided by special districts, including community service districts, water districts, and sanitary districts within some unincorporated communities in Merced County. Unincorporated communities that lack sanitary sewer infrastructure are serviced by septic systems (County of Merced 2013).

Santa Nella

The Santa Nella County Water District collects, treats, and disposes of wastewater within their service area. The water district owns, maintains, and operates all wastewater facilities within their service area, including the Water District’s 0.4 mgd capacity WWTP adjacent to the San Luis Wasteway. Wastewater is treated in aerated ponds and then is discharged to land for disposal (Santa Nella County Water District 2017a; 2017b; County of Merced 2013).

Volta

Volta is not connected to a local sanitary sewer system. The community relies on individual or community septic systems for wastewater management (County of Merced 2016).

City of Los Banos

The City of Los Banos’ Public Works Department collects, treats, and disposes of wastewater within their service area. The City owns, maintains, and operates all wastewater facilities within the sewer service area, which is approximately 4,580 acres (including developed and undeveloped land) or 7.2 square miles. Treatment of wastewater at the City of Los Banos WWTP is conducted in four treatment ponds and three storage ponds, totaling approximately 509 acres. Disposal of treated wastewater is accomplished by irrigation of pastureland, in addition to the percolation and evaporation of water that occurs in the ponds. The 14,380-acre (22.5-square-mile) Wastewater Management Master Plan study area extends beyond the city limits to include the boundaries of the CCID Main Canal and the GWD San Luis Canal. The Master Plan forecasts sewer improvements in this extended study area. The city maintains approximately 124 miles of sewer mains and trunk sewers, sanitary sewer lines 4–30 inches in diameter, and 13 lift stations. In addition to the collection system, the city also operates a WWTP northeast of the city. Los Banos is expanding the capacity of its existing WWTP to a capacity of 18.9 mgd. This capacity is projected to be adequate to serve General Plan buildout (City of Los Banos 2010, 2016).

Stormwater Management

Stormwater management is provided by municipalities in Santa Clara, San Benito, and Merced Counties in the developed urban areas and densely populated areas. In some of the less densely populated, rural, and unincorporated areas of the counties, roadside ditches, irrigation canals, and natural drainages convey stormwater runoff.

Santa Clara County

The Santa Clara County Clean Water Program oversees stormwater management through implementation of two regional NPDES municipal stormwater permits covering the northern section and southern section of Santa Clara County (County of Santa Clara 2018a). The San Francisco Bay RWQCB (Region 2) regulates waters discharging to San Francisco Bay from the northern section of the county and the Central Coastal Basin RWQCB (Region 3) regulates waters discharging to the Monterey Bay from the southern section of the county (County of Santa Clara 2018a; San Francisco RWQCB 2017; Central Coastal RWQCB 2019). Stormwater management systems in urban areas of Santa Clara County are operated and maintained by municipal public works departments. Stormwater management systems on public roads in unincorporated areas of Santa Clara County are maintained by the Santa Clara County Roads Administration. The County maintains 635 miles of rural and urban roadways in unincorporated areas, including 2,185 drain inlets (County of Santa Clara 2018b).

City of Santa Clara

The City of Santa Clara Public Works Department operates and maintains the storm sewer and stormwater management system in the City of Santa Clara (City of Santa Clara 2018). The stormwater management system includes 22 stormwater pump stations and an estimated 200 linear miles of pipe (8,452 links) and 8,452 nodes (including manholes, catch basins, pump stations, detention basins, and outfalls) (City of Santa Clara 2015).

City of San Jose

The City of San Jose's Department of Transportation operates and maintains the storm sewer system in San Jose. Construction of new portions of the storm drain system is the responsibility of the Department of Public Works. The City of San Jose's storm drainage system consists of more than 850 miles of storm drain lines, 27,900 catch basins and 30 stormwater pump stations (City of San Jose 2016).

City of Morgan Hill

The City of Morgan Hill Utilities Department operates its own storm drainage system within the city limits (City of Morgan Hill 2002b). The city's stormwater drainage system flows into existing channels and detention ponds owned and operated by the SCVWD. Morgan Hill's storm drainage system consists of a combination of curb and gutter facilities, curb inlets, underground pipelines, and bubblers draining to the nearest creek or to retention areas built to appear natural. The city is divided into several hydrologically distinct drainage areas, and each drainage area has a system of conveyance facilities, pumps, and detention basins to collect and dispose the runoff. The stormwater runoff from these areas is collected and ultimately discharged into creeks that flow through the city and are tributary to either Monterey Bay or San Francisco Bay. Each drainage area has a system of conveyance facilities, pumps, and basins to collect and dispose of the runoff.

City of Gilroy

The City of Gilroy Public Works Department owns, maintains, and operates its own storm drainage system within city limits, which flows into creeks and existing channels owned and operated by the SCVWD. The city's storm drainage system consists of a combination of curb and gutter facilities, curb inlets, and underground pipelines draining to the nearest creek or to constructed channel. The city is divided into several hydrologically distinct drainage areas. Each drainage area has a system of conveyance facilities to collect and dispose of runoff. The stormwater runoff from these areas is ultimately discharged into creeks that flow through the city and eventually reach Monterey Bay via the Pajaro River (City of Gilroy 2004a).

San Benito County

The San Benito County Resource Management Agency is responsible for planning, operation, and maintenance of stormwater collection systems within San Benito County (County of San Benito 2018). While most unincorporated areas of San Benito County are not served by stormwater drainage systems and instead rely either on individual stormwater drainage systems or small-scale stormwater drainage systems, five municipal service providers and several County Services Areas outside the public utilities RSA provide water and/or wastewater management services (County of San Benito 2015a). RWQCB Region 3 has jurisdiction over Santa Clara County (south of Morgan Hill) and northern San Benito County (SWRCB 2017; Central Coast RWQCB 2019).

Merced County

The Merced County Department of Public Works is the lead agency for providing stormwater management infrastructure in unincorporated areas of Merced County. Developments in unincorporated areas are required to construct stormwater management systems, which Merced County then manages and operates. Drainage canals managed by irrigation districts in Merced County may be used to manage stormwater (County of Merced 2012). Unincorporated areas generally rely on surface drainage rather than underground stormwater management systems.

RWQCB Region 5 has jurisdiction over Merced County (SWRCB 2017; Central Valley RWQCB 2018).

Santa Nella

The Santa Nella County Water District operates and maintains stormwater management systems within Santa Nella. Stormwater runoff from Santa Nella is collected and drains into the San Luis Wasteway (Santa Nella County Water District 2017a).

Volta

Volta does not have roadside curbs and gutters or other engineered stormwater management systems (County of Merced 2016).

City of Los Banos

The City of Los Banos owns, maintains, and operates 21 stormwater pump stations, detention basins, and over 79 miles of storm drains 6 to 66 inches in diameter. It provides storm drainage services to its residential, commercial, institutional, and industrial customers within its service area. The existing storm drainage system collects and conveys surface water runoff throughout the city and discharges the runoff into canals operated and maintained by GWD or CCID. Storm retention basins capture most storm runoff, which is later discharged into water conveyance systems operated by the CCID or the GWD, although a few neighborhoods have direct discharge to canals. The CCID and GWD water conveyance systems follow historic drainage patterns in the region. The storm drainage system has neighborhood collection systems, detention basins, pump stations, and large-diameter storm drains. In addition, there are several major water features in the region. The major features include, but are not limited to Los Banos Creek, CCID Main Canal, GWD San Luis Canal, and GWD Santa Fe Canal (City of Los Banos 2010; EPS 2012).

Solid Waste Disposal

Solid Waste Disposal Facilities

The following sections discuss solid waste facilities that may serve the project. Table 3.6-6 summarizes landfill location, maximum permitted capacity, remaining capacity, and estimated closure date. There are three landfills in Santa Clara County, one landfill in San Benito County, and two landfills in Merced County that could provide solid waste disposal capacity for construction and operation of the project.

Santa Clara County

The three solid waste landfills within the public utilities RSA in Santa Clara County that could serve the project include the following:[1]

- **Kirby Canyon Recycling and Disposal Facility**—Waste Management of California, Inc. operates the Kirby Canyon Recycling and Disposal Facility. The facility is in southeastern San Jose and serves Santa Clara County and adjacent counties. As of July 2015, 45 percent of the permitted landfill capacity remained. The reported estimated closure date for this landfill is 2022; a permit extension to 2059 was proposed in October 2017 (CalRecycle 2019a, 2019g). Permitted waste types at this facility are Class III nonhazardous solid wastes, treated medical wastes and various alternative daily cover materials such as treated auto-shredder waste and petroleum hydrocarbon contaminated soils. The Kirby Canyon Recycling and Disposal Facility also accepts construction debris, nonfriable asbestos, contaminated soils, and industrial wastes and sludges with a solid content greater than 50 percent (Kirby Canyon Recycling and Disposal Facility 2002).

[1] The Zanker Road facility in the City of San Jose is a licensed recycling facility that is permitted to accept C&D debris wastes for recycling; the Zanker Road facility is not permitted as a solid waste disposal facility and does not have any solid waste disposal capacity (CalRecycle 2014a). The facility could be used for recycling of construction and demolition debris generated by project construction.

Table 3.6-6 Solid Waste Landfill Facility Permitted and Remaining Capacities

Landfill[1]	Landfill Permitted Daily Tonnage (tons per day)	Maximum Permitted Landfill Capacity (cubic yards)	Remaining Landfill Capacity (cubic yards)	Remaining Capacity as of Date	Estimated Permitted Closure Date
Santa Clara County					
Kirby Canyon Recycling and Disposal Facility	2,600	36,400,000	16,191,600	July 31, 2015	2022
Guadalupe Community Facility	1,300	28,600,000	11,055,000	January 01, 2011	2048
Newby Island Sanitary Landfill	4,000	57,500,000	21,200,000	October 31, 2014	2041
San Benito County					
John Smith Road Class III Landfill	1,000	9,354,000	4,625,800	November 30, 2012	2032
Merced County					
Billy Wright Landfill (Unit 01)	1,500	14,800,000	11,370,000	September 30, 2010	2054
Highway 59 Landfill [2]	1,500	30,012,000	28,025,000	September 01, 2005	2030
TOTAL	**11,900**	**176,666,000**	**92,467,400**	**N/A**	**N/A**

Source: CalRecycle 2019a, 2019b, 2019c, 2019d, 2019e, 2019f
[1] All landfills are permitted to accept construction and demolition wastes
[2] The Merced County Regional Waste Management Authority has proposed updating the 2030 closure date for the Highway 59 Landfill in the CalRecycle database to 2065 based on revised capacity calculations (Merced County Regional Waste Management Authority 2016).

- **Guadalupe Sanitary Landfill**—Guadalupe Rubbish Disposal Company, Inc. owns and operates Guadalupe Sanitary Landfill, which serves San Jose and southern Santa Clara County. According to CalRecycle data, this landfill was approximately 60 percent full as of January 2011; the landfill is projected to close in 2048 (CalRecycle 2019b). The permitted Class III landfill currently accepts yard waste and clean wood waste from residential self-haulers, gardeners and landscapers, governmental landscape maintenance and road crews, and franchised and nonfranchised municipal waste haulers. The facility also recycles wood waste that is transported to fuel markets and recycles C&D debris (e.g., soil, concrete, and asphalt), which is used on-site as construction material and daily landfill cover (County of Santa Clara 2014; Waste Management 2017a).
- **Newby Island Sanitary Landfill**—The International Disposal Corporation (also known as Republic Services) owns and operates Newby Island Sanitary Landfill, which serves all of Santa Clara County. It is in northern San Jose, just west of I-880. As of October 2014, the Newby Island Sanitary Landfill was approximately 65 percent full and it is projected to close in 2041 (CalRecycle 2019c). This landfill accepts C&D material, industrial and mixed municipal wastes, sludge (biosolids), tires, green materials, and contaminated soil, and recycles wood waste to fuel markets (County of Santa Clara 2014).

San Benito County

San Benito County owns and operates the John Smith Road Class III Landfill, which serves San Benito County. This is the only landfill in San Benito County and is in Hollister. As of November 2012, the John Smith Road Landfill was approximately 50 percent full; it is projected that the landfill will close in 2032 (CalRecycle 2019d). This landfill accepts agricultural, industrial, inert, and mixed municipal wastes. The landfill also accepts C&D and green materials, manure, tires, and wood waste (CalRecycle 2019d; John Smith Road Landfill 2017).

Merced County

The two landfills in Merced County that could provide solid waste disposal capacity for construction and operation of the project include the Billy Wright Landfill and the Highway 59 Landfill. A brief description of each follows:

- **Billy Wright Landfill**—Merced County and its incorporated cities jointly own and operate Billy Wright Landfill, which serves the western part of the county. As of September 2010, the Billy Wright Landfill was approximately 75 percent full, and the estimated landfill closure date is 2054. The Billy Wright Landfill accepts agricultural, C&D, and mixed municipal solid waste (CalRecycle 2019e).
- **Highway 59 Landfill**—Merced County and its incorporated cities jointly own and operate the Highway 59 Landfill approximately 1.5 miles north of the city of Merced. The Highway 59 Landfill accepts agricultural, C&D, and mixed municipal solid waste. The overall design capacity of the existing landfill is approximately 36,358,000 cubic yards, of which approximately 24,000,000 cubic yards was unused and available as of 2014 (CalRecycle 2019f). The estimated closure date of the landfill is 2030 according to the landfill's Solid Waste Facility Permit issued by CalRecycle, but the current estimated closure date is actually 2065 based on the corrected design capacity for the landfill; the Merced County Regional Waste Management Authority has proposed updating the closure date to 2065 by permit revision. A proposed landfill expansion project would extend the life of the landfill by approximately 15 years and design capacity by 6,857,000 cubic yards (Merced County Association of Governments 2016; Merced County Regional Waste Management Authority 2016).

Solid Waste Volumes

Table 3.6-7 summarizes waste disposal characteristics of communities in Santa Clara, San Benito, and Merced Counties. A total of approximately 1.1 million tons of solid waste was landfilled in Santa Clara, San Benito, and Merced Counties in 2015, with the largest amount (643,688 tons) from San Jose. Annual per capita disposal rates per resident range from 3.0 pounds per day (PPD) for unincorporated areas of Santa Clara County to 6.2 PPD for Morgan Hill (CalRecycle 2019h through 2019n). Annual per capita disposal rates per employee range from 9.1 PPD for San Jose to 19.2 PPD for San Benito County.

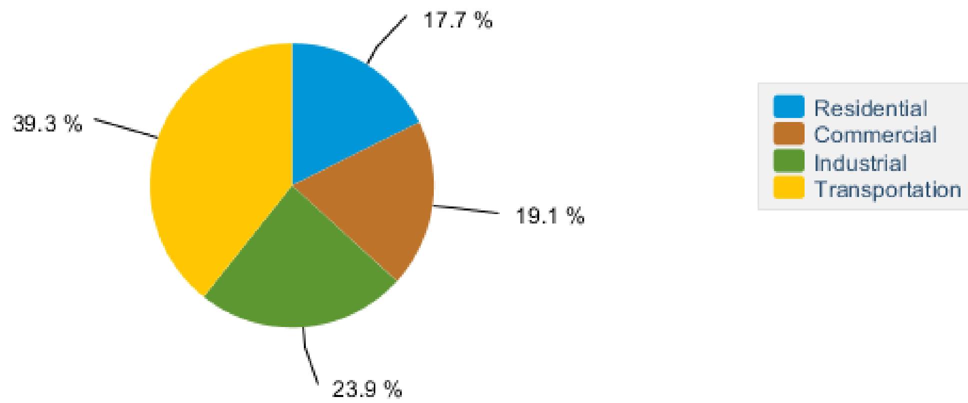
Table 3.6-7 Solid Waste Disposal Volumes and Diversion Summary

Jurisdiction	Amount of Solid Waste Landfilled in 2015 (tons)	Annual Per Capita Disposal Rate (PPD) Per Resident		Annual Per Capita Disposal Rate (PPD) Per Employee	
		Actual	Target	Actual	Target
Unincorporated Santa Clara County	48,390	3.0	4.0	9.9	13.1
City of Santa Clara	151,010	6.8	8.2	7.3	9.0
City of San Jose	643,775	3.5	5.2	9.1	14.5
City of Morgan Hill	47,440	6.2	6.1	17.1	16.3
City of Gilroy	48,324	5.0	6.2	14.8	16.1
San Benito County Integrated Waste Management Regional Authority[1]	72,450	6.8	5.1	24.6	18.3
Merced County Regional Waste Management Authority[2]	235,590	4.9	10.7	16.9	38.8
Total	**1,246,980**	**N/A**	**N/A**	**N/A**	**N/A**

Sources: CalRecycle 2019h, 2019i, 2019j, 2019k, 2019l, 2019m, 2019n,
[1] The San Benito County Integrated Waste Management Regional Agency includes management of waste from Hollister and San Juan Bautista and unincorporated communities in San Benito County; the Agency does not manage waste from other unincorporated areas of San Benito County.
[2] The Merced County Solid Waste Regional Authority includes management of waste from the cities of Merced, Livingston, Atwater Los Banos, Gustine, and Dos Palos. The Authority does not manage waste from unincorporated areas of Merced County.
N/A = not applicable
PPD = pounds per day

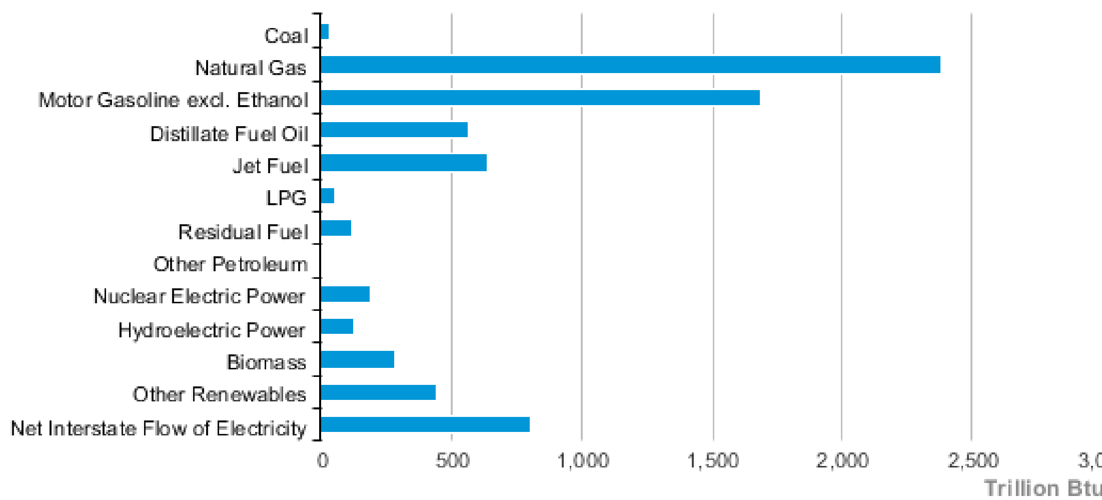
3.6.5.2 Energy

California's total energy consumption in 2015 was 7,322 trillion Btus. The transportation sector in 2015 accounted for 39.3 percent of California's energy use, the industrial sector 23.9 percent, the commercial sector 19.1 percent, and the residential sector 17.1 percent (EIA 2017b). Figure 3.6-6 illustrates California's energy consumption by sector in 2015, and Figure 3.6-7 illustrates the California energy consumption estimates by type in 2015.



Source: EIA 2017f

Figure 3.6-6 California Energy Consumption by Sector, 2015



Source: EIA 2017f

Figure 3.6-7 California Energy Consumption Estimates by Type, 2015

Petroleum products, including motor gasoline, distillate fuel oil, jet fuel, liquefied petroleum gas, residual fuel oil, and other petroleum, were the largest source of energy consumed in 2015 in California at 41.7 percent of the total in 2015, corresponding to 3,055 trillion Btus. The second largest source of energy consumed in California is natural gas, at 32.5 percent of the total in 2015, corresponding to 2,382 trillion Btus. Coal represented 0.4 percent of California's total energy consumption in 2015, corresponding to 21 trillion Btus (EIA 2017c). For energy consumption sources for the transportation sector in California in 2015, petroleum is by far the largest source at 97.4 percent, representing 2,974 trillion Btus (EIA 2017d). Ethanol is the second largest source of energy for transportation in California, at 4.1 percent, representing 124 trillion Btus, followed by natural gas (1.2 percent, representing 36 trillion Btus) and electricity (0.1 percent, representing 2.6 trillion Btus) (EIA 2017d, 2017e).

Electricity

Demand

There are two ways to measure electricity demand—consumption and peak demand. Electricity consumption is the total amount of electricity used over a period of time. According to the CEC, total statewide electricity consumption grew from 166,979 million kilowatt hours in 1980 to 283,000 million kilowatt hours in 2015 (CEC 2016a). Table 3.6-8 shows electricity consumption in Santa Clara, San Benito, and Merced Counties in 2015. Santa Clara County consumed the most electricity (83.5 percent of the region's 20,107 million kilowatt hours), followed by Merced County (14.5 percent), and San Benito County (2 percent).

Table 3.6-8 Electricity Consumption in Santa Clara, San Benito, and Merced Counties, 2015

County	2015 Usage (millions of kilowatt hours/year)	2015 Usage (1,000 MMBtu/year)
Santa Clara	16,812	57,365
San Benito	368	1,256
Merced	2,927	9,987
Total regional consumption	20,107	68,608
Total statewide consumption	283,000	965,636,000

Source: CEC 2016b
Numbers are rounded
MMBtu = million British thermal units

The highest electric power requirement during a specified period, known as peak demand, is measured as the amount of electricity consumed at any given moment, usually integrated over a 1-hour period. Because electricity must be generated at the instant it is consumed, this measurement specifies the greatest generating capacity that must be available during periods of peak demand. Peak demand is important in evaluating system reliability, identifying congestion points on the electrical grid, and designing required system upgrades. California's peak demand typically occurs in August, between 3 p.m. and 5 p.m. (Cal-ISO 2016a). In the energy RSA, high air conditioning loads contribute to the summer peak demand.

Generation

The projected net power supply[2] within the grid controlled by the California-ISO for summer 2015 was 65,288 MW (Cal-ISO 2015). Table 3.6-9 summarizes fuel sources for electric power in California for 2015. California annual in-state electric power generation was 196,195 gigawatt hours (GWh) in 2015 (CEC 2016b).

[2] The projected net power supply is defined as the maximum generating capacity of a unit during typical seasonal peak conditions, minus the unit's capability used for station service or auxiliaries (Cal-ISO 2015).

Table 3.6-9 Fuel Sources for Electric Power in California in 2015

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation
Coal	538	0.3
Large Hydro	11,569	5.9
Natural Gas	117,490	59.9
Nuclear	18,525	9.4
Oil	54	0
Other	14	0
Biomass	6,362	3.2
Geothermal	11,994	6.1
Small Hydro[1]	2,423	1.2
Solar	15,046	7.7
Wind	12,867	6.2
Total Electric Industry	**196,195**	**100**

Source: CEC 2016b
Data as of July 11, 2016 from Quarterly Fuel and Energy Reports and SB 1305 Reporting Requirements. In-state generation is reported generation from units 1 MW and larger
[1] Hydroelectric facilities smaller than 30 MW of generation capacity are considered "small" hydro and are part of the Renewables Portfolio Standard.
GWh = gigawatt hours
MW = megawatt

Electricity Market Outlook

Statewide, the average summer net power supply in 2015 was estimated at 65,288 MW and existing spring 2015 generation capacity was estimated at 54,044 MW for Cal-ISO (Cal-ISO 2015). Assuming 1-in-2 summer temperatures,[3] summer peak electricity demand was estimated at approximately 47,188 MW in 2015. The result is a predicted planning reserve margin[4] of 36 percent (Cal-ISO 2015). The Cal-ISO 2016 1-in-2 peak demand forecast is 47,529 MW, which is 0.8 percent above the 2015 weather normalized peak demand of 47,167 MW (Cal-ISO 2016c). California's population was 39.5 million as of January 1, 2017 (CDOF 2017), and is projected to exceed 42 million by 2025 and 47 million by 2040, requiring an additional 86,000 MW of peak summer capacity between 2017 and 2040[5] to meet the projected 2040 demand and have an adequate reserve margin (Cal-ISO 2015).

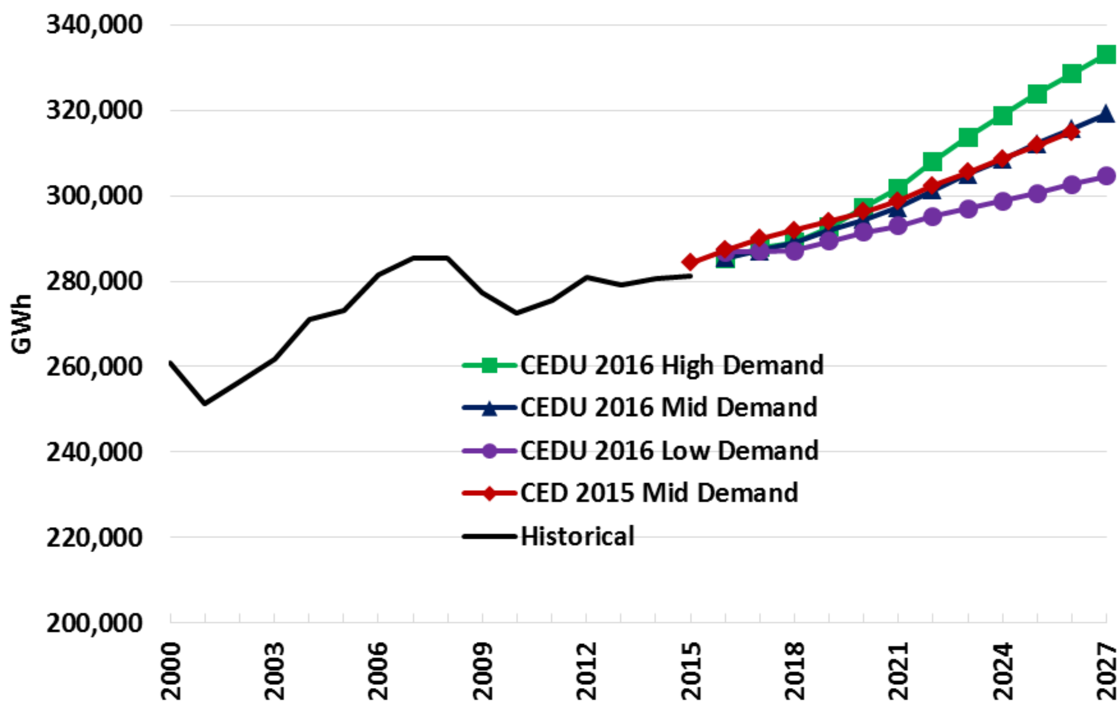
The CEC *California Energy Demand (CED) 2017–2027, Preliminary Electricity Forecast* (CEC 2017b) describes the CEC's preliminary 10-year forecasts for electricity consumption, retail sales, and peak demand for each of five major electricity planning areas and for the state as a whole. The CED considers three cases (low, mid, and high) based on different statewide economic growth and demographic growth assumptions that are designed to capture a reasonable range of statewide energy demand projection outcomes for 2017–2027:

- Low demand—The low energy demand case incorporates lower economic/demographic growth, higher assumed rates, and higher self-generation impacts.

[3] 1-in-2 forecast temperatures are temperatures with a 50 percent chance of not being exceeded.
[4] Planning reserve calculation = ((Total Net Supply + Demand Response + Interruptible Power)/1-in-2 Demand) – 1.
[5] This value assumes a 1.5 percent annual growth rate in peak demand and includes a 15 percent reserve margin.

- Mid demand—The mid energy demand case uses input assumptions at levels between the high demand and low demand cases. These scenarios are referred to as baseline cases, meaning they do not include additional achievable energy efficiency savings.
- High demand—The high energy demand case incorporates relatively high economic/demographic growth and climate change impacts, and relatively low electricity rates and self-generation impacts.

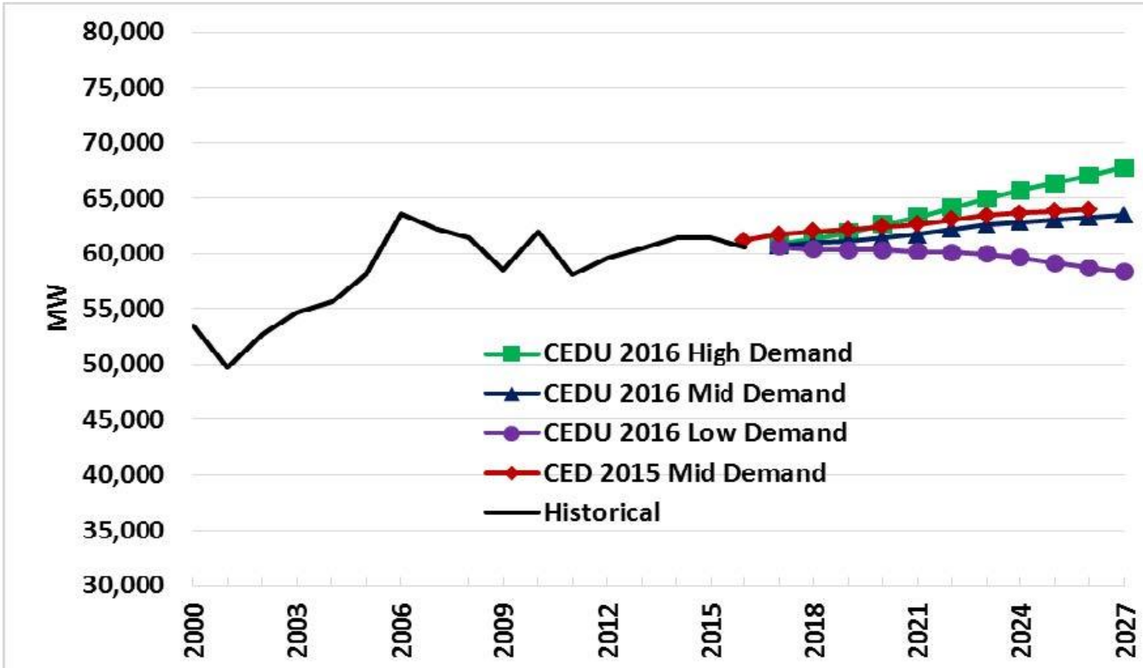
Figure 3.6-8 illustrates projected base demand electricity consumption for the three CED 2016 baseline cases. California electricity consumption in 2015 was approximately 280,000 GWh. Electricity consumption in 2027 is projected to be approximately 320,000 GWh for the mid demand case. Average annual projected base energy demand growth rates from 2015 to 2027 for the CED 2016 forecast averages are 1.4 percent, 1.1 percent, and 0.7 percent in the high energy demand, mid energy demand, and low energy demand cases, respectively, compared to a 0.93 percent projected energy demand growth rate in the CED 2015 mid demand case (CEC 2017c). The increasing demand for electrical energy is based on growth in both population (i.e., households) and commerce (i.e., commercial and industrial businesses). Weather can also influence electricity demand.



Source: CEC 2017b
CED = California Energy Demand (2015)
CEDU = California Energy Demand—Updated Forecast (2016)

Figure 3.6-8 Historical Trends and Projected Statewide Annual Electricity Consumption – Base Demand

Figure 3.6-9 illustrates projected peak electricity demand for the three CED 2016 baseline cases. California electricity peak demand in 2015 was approximately 60,000 MW. Peak electricity demand in 2027 is projected to be approximately 64,000 MW for the mid demand case. Annual projected statewide growth rates in peak demand from 2016 to 2027 for the CEDU 2016 cases shown in Figure 3.6-9 average 1.03 percent, 0.44 percent, and -0.30 percent in the high, mid, and low cases, respectively, compared to a 0.45 percent projected energy demand growth rate in the CED 2015 mid demand case (CEC 2017c).



Source: CEC 2017b
CED = California Energy Demand (2015)
CEDU = California Energy Demand—Updated Forecast (2016)

Figure 3.6-9 Historical Trends and Projected Statewide Annual Electricity Consumption – Peak Demand

Transmission

Cal-ISO operates approximately 26,000 miles of high-voltage electric transmission lines, which connect the different regions of the state to each other, to varying degrees, as well as to the transmission systems of the surrounding western states, Canada, and Mexico (Cal-ISO 2016b; FERC 2017). The system links generation to distribution in a complex electrical network that balances supply and demand on a nearly instantaneous basis. The degree to which areas are interconnected depends upon the availability of transmission capacity between the areas. These interconnected electric transmission systems allow power purchases and sales to extend beyond state and national borders. Cal-ISO, a nonprofit entity responsible for the system's reliability and nondiscriminatory transmission of energy, operates California's transmission system (Cal-ISO 2017a).

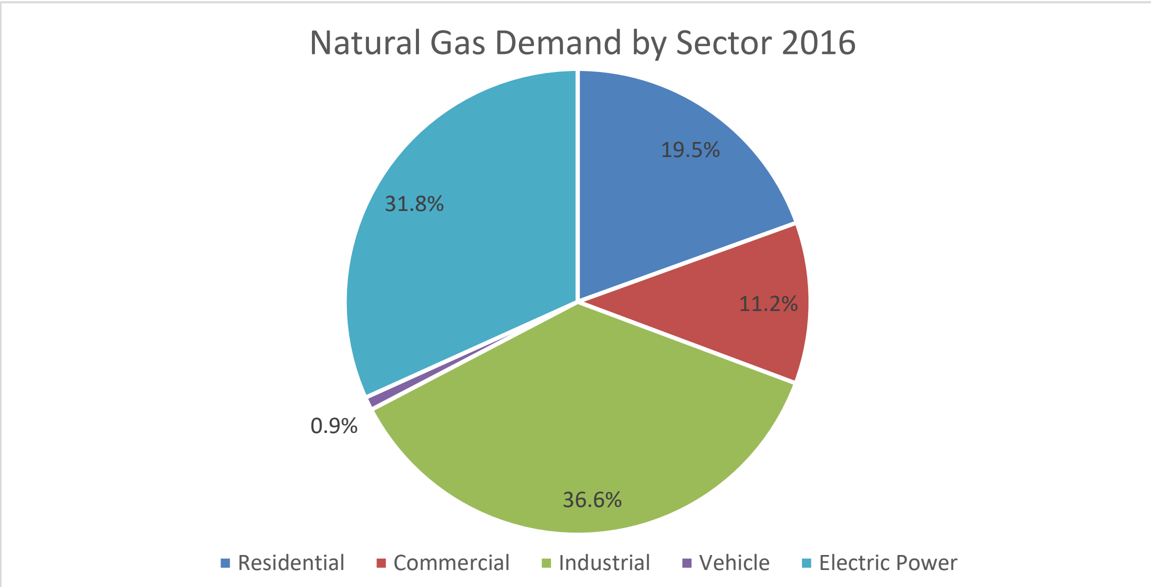
> *High-Voltage Electric Transmission Lines*
>
> The electrical power industry defines high-voltage electric transmission lines as those that are more than 100 kV.

Long-term electric transmission planning identifies transmission upgrades needed to serve future loads, as well as to compensate for changes in generation patterns, such as the renewable power generation being introduced into the grid to meet RPS pursuant to state law (SB 350), requiring that 50 percent of retail sales of all utilities in the state come from renewable resources by the end of 2030 (Cal-ISO 2017b; CEC 2017d).

Natural Gas

Demand

California is the second largest consumer of natural gas in the nation, with consumption of 2,177,467 million cubic feet (MMcf) per year in 2016 (EIA 2017g). Natural gas is the most used fuel for electricity generation in California, and approximately 32 percent of this total daily consumption in 2016 was for electricity generation (EIA 2017b). Figure 3.6-10 illustrates the natural gas demand in California by sector for 2016.



Source: EIA 2017g

Figure 3.6-10 California Natural Gas Demand by Sector in 2016

The CEC expects natural gas consumption in California to increase by 0.75 percent annually between 2016 and 2028 for the high demand forecast case and to increase by 0.55 percent annually for the mid demand forecast case. Projected natural gas consumption in 2028 is 1,395,200 MMcf for the high demand case and 1,361,300 MMcf for the mid demand case, from 2016 natural gas consumption of 1,275,100 MMcf (CEC 2017e, 2017f). After implementation of the California RPS and full penetration of energy efficiency, CEC expects overall natural gas demand increases from population growth and associated demand, reaching 5.9 billion cubic feet (Bcf) per day by 2030 in the mid demand case. The projected total 2030 natural gas consumption would remain below the total 2015 consumption rate (CEC 2015). The CEC (2015) estimates for the Mid-Demand Case that the *total* natural gas consumption in units of MMcf/day will decrease from 6,334 MMcf/day in 2015 to 5,920 MMcf/day in 2030 as a result of energy efficiency measures.

Table 3.6-10 summarizes natural gas consumption in Santa Clara, San Benito, and Merced Counties in 2015 (CEC 2016c). The three counties used 47,500 MMcf of natural gas in 2015. Of that amount, 86.6 percent was consumed in Santa Clara County, 2.7 percent in San Benito County, and 10.7 percent in Merced County.

As shown in Figure 3.6-10, residential and commercial customers used 31 percent of natural gas consumed in California in 2016. Power plants generating electricity used 32 percent and the industrial sector used 37 percent. Transportation, primarily fleet vehicles, accounted for 1 percent of natural gas use in California in 2016 (EIA 2017g).

Table 3.6-10 Natural Gas Consumption in Santa Clara, San Benito, and Merced Counties in 2015

County	2015 Usage (millions of cubic feet)
Santa Clara County	41,100
San Benito County	1,300
Merced County	5,100

Source: CEC 2016a
Numbers are rounded.

Production

Natural gas marketed production in California in 2016 was 205,024 MMcf, accounting for 9.7 percent of 2016 in-state consumption of 2,113,847 MMcf (EIA 2017h, 2017i); out-of-state supply of natural gas to California in 2016 included Arizona (805,528 MMcf), Nevada (510,817 MMcf), and Oregon (680,979 MMcf) (EIA 2017j).

Updated Natural Gas Market Outlook

Although California's natural gas market is affected by nationwide price conditions, the state has taken steps to insulate itself from the full magnitude of the price-swing amplitudes. Since the height of the 2000–2001 energy crisis, California has built 2.2 Bcf of daily capacity to deliver natural gas supplies from Canada, the Rocky Mountains, and the Southwest, in addition to adding almost 1 Bcf of daily intrastate pipeline capacity. The State of California has also invested in underground storage capacity, an effective mechanism for controlling annual costs that will allow them to dampen the effect of future severe price increases by drawing on stored gas instead of buying high-priced natural gas on the open market.

Petroleum

Production

California produced 186 million barrels of crude oil in 2016 (EIA 2016a) and had proven crude oil reserves (including in-state offshore reserves) of 2,333 million barrels as of December 2015 (EIA 2016b). In 2016 approximately 600 million barrels (1.65 million barrels per day) of petroleum were processed into a variety of products, with gasoline representing about 62 percent of the total product volume. In 2016, approximately 16 percent of petroleum product production from California's refineries was aviation fuel, 20 percent was distillate fuel oil and 2 percent was residual fuel oil (CEC 2017g).

Imports

California imported approximately 316 million barrels of crude oil from foreign countries in 2016 and obtained approximately 69 million barrels of crude oil from Alaska (CEC 2017h, 2017i). The CEC reported in-state crude oil production and domestic crude oil imports of 205 million barrels for 2016; this value includes both crude oil produced in California and crude oil transported to California from the other lower 48 states including North Dakota and Gulf Coast states. Overall petroleum supply in 2016 in California was therefore approximately 590 million barrels of crude oil. Based on U.S. Energy Information Administration import data and CEC import data, California imported approximately 19 million barrels of crude oil from other lower 48 U.S. states (i.e., states other than Alaska) in 2016. Approximately 2.3 million barrels of crude oil were shipped to California by rail car in 2016; 50 percent of this total originated in Canada and another 50 percent originated in New Mexico (CEC 2017j).

Demand

Almost 40 percent of California's energy consumption results from the transport of goods and people. In 2015 sales of diesel fuel to California end users was approximately 1,093,000 gallons per day (gpd) and sales of gasoline to California end users was approximately 4,341,000 gpd (approximately 16 billion gallons per year) (EIA 2017k, 2017l). The population in California is projected to increase by approximately 28 percent by the year 2040 from the population recorded in the 2010 Census. That growth equates to almost 10 million people (CDOF 2013). Because of trends in travel demand, congestion, and other travel conditions, the market for intercity travel in California that the proposed HSR system could serve is projected to grow by up to 46 percent from 2010 to 2040 (CDOF 2013).

Automobile travel is the predominant mode of passenger transportation within the energy RSA. Historically, demand for transportation services (and petroleum consumption) in California has mirrored the growth of the state's population and economic output. The recent trend toward electrical vehicles has generated renewed interest in more fuel-efficient cars and in living closer to the workplace. Although it is a slow process to transform an automobile fleet, drivers are increasingly making automobile purchasing decisions based on fuel consumption concerns. Automobiles powered by diesel engines and hybrid engines composed of both electrical and gasoline components offer substantial fuel-efficiency upgrades over traditional gasoline engines.

Rail and transit systems in the RSA include Caltrain, (Santa Clara) Valley Transportation Authority (VTA), BART, Altamont Corridor Express (ACE), and Amtrak. The BART and VTA systems are electric rail systems. The VTA provides light rail passenger rail service in Santa Clara County from Mountain View to Almaden and Santa Teresa including San Jose Diridon Station (VTA 2017). BART provides passenger rail transit service between downtown San Francisco and cities in the northern portion of the San Francisco Peninsula, Oakland, and other cities in the East Bay. BART and VTA are in the process of implementing an extension to Santa Clara that will include new BART stations in downtown San Jose, Diridon Station, and Santa Clara. The ACE provides passenger rail service between Stockton and San Jose and Santa Clara (ACE 2018). Amtrak Capitol Corridor and Coast Starlight routes provide passenger rail service to San Jose Diridon Station (Amtrak 2018). Caltrain provides passenger rail service from San Francisco to Gilroy through San Jose Diridon Station and Morgan Hill (Caltrain 2017). The Caltrain, Amtrak, and ACE systems are diesel locomotive systems. Caltrain reported consumption of approximately 4.3 million gallons of diesel fuel in 2015 (FRA 2015).

3.6.6 Environmental Consequences

3.6.6.1 Overview

This section discusses the potential impacts on public utilities and energy that could result from implementing the project alternatives. It is organized according to topic: public utilities, including electricity, natural gas, and petroleum fuels, water[6], wastewater, stormwater, and solid waste disposal; and energy resources, including electricity, natural gas, and petroleum fuels. Each topic area discusses potential impacts from the No Project Alternative and the project alternatives.

Overall, once construction is complete and passenger service is in operation, the HSR system would result in a net decrease in energy consumption for other modes of transportation as a result of reduction in VMT and airplane flights. Reduced transportation energy use would begin upon the start of passenger service and build over time to the 2040 horizon year for analysis. Further, the project would be constructed and operated in an energy-efficient manner. For example, the stations would qualify for Leadership in Energy and Environmental Design certification. The Authority has committed to powering the system on 100 percent renewable energy. To achieve this, the design would incorporate the means to produce or procure enough renewable energy to offset the amount of power used to operate the trains and facilities taken from the state's power grid. California has an abundance of renewable energy resources that have the capacity to substantially meet the state's RPS as well as the minimal demand of the HSR system. The RPS approved renewable sources include biomass, micro-hydro, geothermal, solar, and wind. Those not included were ocean thermal, wave, and tidal action. Initial findings from the Authority's call to industry are that a variety of companies have the capacity to supply the entire electricity needs of the system at full volume and are prepared and interested in

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[6] The potential effects on water supply from tunneling are addressed in Section 3.8, Hydrology and Water Resources.

delivering that capacity. The next step would be to determine the final loads for initial operational segments, as well as the expected start date for testing and commissioning of systems. After that, the Authority would issue a request for proposals to meet its renewable energy demands.

3.6.6.2 Public Utilities

Construction of the project would result in temporary and permanent impacts on public utilities, including the temporary and permanent relocations of public utilities and reduction of access by public utility operators to public utilities remaining in the HSR right-of-way after construction is completed. Construction of the project would also result in planned and unplanned temporary interruptions of utility services to public utility customers. Operation of the project would result in permanent impacts on public utilities such as the ongoing use of water for operation of the stations and maintenance facilities, generation of wastewater and stormwater from operations, and generation of solid waste and hazardous waste from operations.

No Project Impacts

The population in Santa Clara, San Benito, and Merced Counties is expected to grow through 2040 (see Section 2.5.1.1, Projections Used in Planning). Development to accommodate the population increase under the No Project Alternative would result in associated direct and indirect impacts on public utilities. The No Project Alternative considers the effects of conditions forecasted by current land use and transportation plans in the vicinity of the project extent, including planned improvements to the highway, aviation, conventional passenger rail, freight rail, and port systems through the 2040 planning horizon. Without the HSR project, the forecasted population growth would increase pressure to expand highway and airport capacities. The Authority estimates that additional highway and airport projects (up to 4,300 highway lane miles, 115 airport gates, and 4 airport runways) would be needed to achieve equivalent capacity and relieve the increased pressure (Authority 2012a). Planned and other reasonably foreseeable projects that are anticipated to be built by 2040 include residential, commercial, industrial, recreational, transportation, and agricultural projects. A full list of anticipated future development projects is provided in Volume 2, Appendix 3.19-A, Nontransportation Plans and Projects, and Appendix 3.19-B, Transportation Plans and Projects.

Under the No Project Alternative, recent development trends are anticipated to continue, leading to impacts on public utilities. Existing land would be converted for residential, commercial, industrial, and transportation infrastructure development to accommodate future growth. These conversions would likely require demolition activities that could result in direct impacts on above ground and below-ground utilities, Furthermore, these conversions would place potential pressures on public utilities. Planned development and transportation projects that would occur under the No Project Alternative would likely include various forms of mitigation to address impacts on public utilities.

As discussed in Section 3.6.5, Affected Environment, local utilities prepare capital improvement plans to accommodate anticipated population growth. These improvements include utility service infrastructure additions and upgrades, including electricity generation, water conveyance, and waste management infrastructure. Several planned improvements within the public utilities RSA include a landfill expansion, a new solar energy facility, and two proposed water transfer agreements. The Panoche Valley Solar Farm Project, under construction in San Benito County, is a 247-MW solar energy generation facility that would increase electric generating capacity in the RSA and would deliver electricity to the regional transmission system by connecting to the PG&E Moss-Panoche/Coburn-Panoche 230-kV transmission line on the Panoche Valley facility site (County of San Benito 2015b; Panoche Valley Solar 2016).

Two water transfer agreements are proposed within the public utilities RSA. The Long-Term North to South Water Transfer Program would involve increased water transfers through the Delta using CVP or SWP pumps, or local facilities to CVP contractors in areas south of the Delta or in the San Francisco Bay Area (Bay Area) (SLDMWA 2015a). The 25-Year Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority involves a proposed water transfer agreement with the SLDMWA that would make available up to 80,000 acre-feet of water conserved through tailwater recapture[7] or other conservation measures to transfer for use by certain members of the SLDMWA for irrigation, municipal, and industrial purposes, providing additional recaptured water capacity for irrigation and other uses in Merced County (SLDMWA 2015b).

Project Impacts

Construction Impacts

Construction of the project would include demolition of existing structures; clearing and grubbing; handling, storing, hauling, excavating, and placing fill; and construction of aerial structures, bridges, tunnels, HSR electrical systems, and railbeds. Construction would also require utility network upgrades and reconductoring of electric utility lines, removal of utility lines from the proposed project's rights-of-way, and temporary and permanent utility relocations from the proposed project's rights-of-way that could include temporary interruption of utility services to customers. Construction activities would require water for preparation of concrete, TBM operations, concrete work and earthwork, controlling dust and supplying street-cleaning equipment, and also for landscaping and reseeding of areas temporarily disturbed by construction. Construction would generate wastewater, stormwater, solid waste (including C&D debris) and hazardous waste that would need to be managed by local and regional water and waste management infrastructure. Chapter 2, Alternatives, describes construction activities in more detail.

Impact PUE#1: Planned and Accidental Temporary Interruption of Utility Service

Planned, or accidental, temporary interruption of major utility service to public utility customers could occur during construction at any given location under all four project alternatives. Construction in the right-of-way that would occur for each of the alternatives, including clearing, grading and excavation, demolition of structures, and operation of cranes and other construction equipment could require the temporary shutdown of aboveground, below-ground, or overhead electrical transmission lines; natural gas transmission pipeline facilities; petroleum product conveyance facilities; and water conveyance infrastructure. Shutdowns would interrupt utility services to industrial, commercial, agricultural, and residential customers. As shown in Table 3.6-3, Alternative 2 has the greatest potential for planned temporary interruption of utility services due to the alignment's proximity to 400 major public utilities in the RSA. Alternative 1 has 296 public utility lines in the RSA, and Alternative 4 has 412 public utility lines in the RSA. Alternative 3 has the lowest potential for temporary interruption of utility services with 271 public utility lines in the RSA. In addition, construction activities could result in the accidental temporary interruption of utility lines (e.g., electricity, potable water, recycled water, wastewater, natural gas lines) that were not identified through the preliminary reconnaissance. Construction activities would be similar for the four project alternatives and the level of existing development is similar in the RSAs, resulting in similar potential for accidental temporary impacts on unknown utilities. These disruptions could interrupt utility services to industrial, commercial, and residential customers.

Established practices of utility identification, which would be completed prior to construction, would minimize the potential for accidental disruption. Regulations require development of a construction safety management plan and a safety and security management plan that include identification and mapping of buried and overhead utility lines. The contractor would coordinate with utility service providers and local government agencies to identify and map the locations of underground utilities prior to construction and would establish safety and response procedures in the event that a previously unidentified or unmapped underground utility is identified during construction (SS-IAMF#2: Safety and Security Management Plan). In compliance with California law (California Government Code § 4216), the construction contractor would use a utility locator service and manually probe for buried utility lines within the project footprint prior to initiating ground-disturbing activities. Once buried utilities are identified, excavators would be required to

[7] Tailwater is water running off of the lower end of an irrigated field. Tailwater recapture systems capture the tailwater and reuse the tailwater for irrigation (UCANR 2007).

physically mark with white paint or other suitable markings their location in the area to be excavated. Overhead utility lines would be identified and safety zones established prior to operation of cranes or other overhead equipment that could contact overhead lines. These procedures would minimize the potential for accidental interruption of utility service through construction-related damage to utility lines.

New utility infrastructure would also be bult to support construction and operation of the project. Network upgrades required to support this project include the reconductoring of three existing 115-kV power lines and construction of three traction power substations (TPSS) and electrical interconnections. Construction associated with the reconductoring of the electric transmission lines and the electrical interconnection facilities to connect the project to the electrical grid would require the temporary shutdown of electric utilities, which may result in the temporary interruption of utility services to customers.

Although construction of all four project alternatives would result in planned temporary interruption of utility service, project features would minimize the planned disruption of utility services. Prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public through a combination of communication media (e.g., phone, email, mail, newspaper notices, or other means) within that jurisdiction and would notify the affected utility service providers of the planned outage (PUE-IAMF#3: Public Notifications). The public notifications would specify the estimated duration of the planned outage and would be published no less than 7 days prior to the scheduled outage, in accordance with Cal-ISO requirements (Cal-ISO 2015). Construction would be coordinated with utility service providers and utility customers to avoid interruptions of utility service to hospitals and other critical users. In addition, prior to construction the contractor would prepare a technical memorandum documenting how construction activities would be coordinated with utility service providers to minimize or avoid interruptions of utility service (PUE-IAMF#4: Utilities and Energy). When relocating an irrigation facility would be necessary, the contractor would verify that the new irrigation facility is installed and operational prior to disconnecting the original facility, where feasible (PUE-IAMF#2: Irrigation Facility Relocation) to minimize interruption of irrigation service to customers. The contractor’s design-build contract would include irrigation facility relocation preferences, and implementation of these relocation preferences would minimize unnecessary impacts on irrigation customers and would support continued operation of irrigation facilities.

CEQA Conclusion

There would be a less than significant impact under CEQA from planned and accidental temporary interruption of utility service during construction for any of the project alternatives. Temporary interruption of utilities would be limited to short durations during construction, and therefore would not require the expansion of existing or construction of new infrastructure that would result in significant environmental effects. Project features would effectively minimize utility interruptions by requiring coordination with service providers in advance, notifying the public and affected service providers of any planned outages, and verifying that new facilities are operational prior to disconnecting the original facility. Temporary planned and accidental utility conflicts associated with the alternatives would not require temporary relocation of nonlinear fixed facilities that would result in significant environmental effect; the planned temporary reconstruction or relocation of major linear non-fixed facilities during project construction would be conducted in accordance with the construction safety management plan and safety and security management plan for the project (SS-IAMF#2) and would therefore not result in lengthy or harmful interruption of service. Accidental interruptions might still occur but would be of short duration and could be managed in accordance with these project features. Thus, the impact from planned and accidental utility conflicts would be less than significant under CEQA. Therefore, CEQA does not require mitigation.

Impact PUE#2: Temporary Impacts from Water Use

Construction of the project would require water to prepare concrete, increase the water content of soil to optimize compaction, clean equipment, control dust, and reseed disturbed areas; operate TBMs; and conduct drilling and other ground excavation activities. Table 3.6-11 shows the estimated water use for construction of the project. Water used during construction activities would be obtained from existing, permitted commercial sources of potable water, recycled water, and groundwater in Santa Clara, San Benito, and Merced Counties.

Table 3.6-11 Construction Water Use by Alternative and Activity

Length of Construction	Construction Activity	Water Use	
		Annual Construction Use (acre-feet/year)	Total 5-Year Construction Use Acre-Feet
Alternative 1			
89.6 miles	Concrete batch plants (tunnel)	17	83
	Concrete batch plants (alignment)	57	285
	Tunnel boring[1]	366	1,829
	Construction water use[2]	428	2,141
	Total	**868**	**4,339**
Alternative 2			
89.3 miles	Concrete batch plants (tunnel)	17	83
	Concrete batch plants (alignment)	60	300
	Tunnel boring	366	1,829
	Construction water use[2]	399	1,993
	Total	**842**	**4,205**
Alternative 3			
88.1 miles	Concrete batch plants (tunnel)	17	83
	Concrete batch plants (alignment)	61	304
	Tunnel boring	366	1,829
	Construction water use[2]	468	2,339
	Total	**912**	**4,555**
Alternative 4			
88.9 miles	Concrete batch plants (tunnel)	17	83
	Concrete batch plants (alignment)	51	253
	Tunnel boring	366	1,829
	Construction water use[2]	453	2,261
	Total	**887**	**4,426**

Source: Tung 2017; Authority 2018a

[1] Annualized water use is based on a total of 784 working days of tunnel boring machine operation.

[2] Construction water use includes water used for on-site concrete work, earthwork, dust control, and landscaping.

The difference in construction water use between the alternatives is a function of the total guideway length and the type of construction (e.g., at-grade, aerial, tunnel), which vary by alternative. The type of construction affects the amount of concrete work and earthwork construction required, which require differing amounts of water. Alternative 2 would use 4,205 acre-feet of water during construction, compared to 4,339 acre-feet for Alternative 1, 4,555 acre-feet for Alternative 3, and 4,426 acre-feet for Alternative 4.

Tunnel boring activities would range from 40 to 43 percent of the total construction water use, depending on alternative. All four project alternatives would require the construction of bored tunnels through the Pacheco Pass. The specific type of TBM used for construction would be determined as part of the tunnel design process, however it is anticipated that the selected TBMs would require cooling with recirculated water during operation. The Authority has estimated that each TBM operating from each twin tunnel portal would require a total of 1,829 acre-feet (366 acre-feet per year) for maintenance and cleaning of the excavated sections of the tunnel; operation of conveyor belts and hoppers; dust control and vehicles/engine wash down; operation of tunnel excavation-area workshops; and potable water for construction workers. Water used for tunnel construction would be obtained from surface water or groundwater sources. The construction contractor would recycle and reuse water on-site to reduce water consumption for construction of the tunnels.

Water usage for electrical reconductoring would generally be limited to dust suppression associated with construction activities. Construction associated with the Spring to Llagas and Green Valley to Llagas 115-kV power lines would require approximately 9,080 gallons of water (<0.001 percent of the total construction water usage) over the entire construction period. PG&E would obtain water from existing municipal supplies. Construction vehicles would transport potable water for construction personnel to the construction site.

A variety of water sources would be available from water suppliers within the RSA to provide water for construction-related activities. The largest water suppliers in the RSA are SCVWD in Santa Clara and SBCWD in San Benito County. A number of water districts and agencies serve Merced County and obtain their water from CVP and SWP surface waters. When available, reclaimed nonpotable water would be used for dust control, tunnel construction, and landscaping. This water would be obtained from private vendors, delivered in trucks, and stored in tanks that could be moved around to construction work sites. This use would not result in increased long-term demand on local potable water supplies. For other construction water uses for which potable water is required, water conservation design features would be implemented. The design-build contractor would prepare a water conservation plan (Authority 2015) that clearly describes how water conservation would be incorporated in the design and construction of the project. Water use during construction would be in compliance with the Authority's Water Conservation Guidance (Authority 2015).

As shown in Table 3.6-12, existing water use for the land within the project footprints of the project alternatives, primarily for agriculture, is 8,704 to 9,525 acre-feet/year, using both surface water and groundwater. Depending on the alternative selected, annual water use for construction would range from 842 to 912 acre-feet/year, or about 9 to 10 percent of the current water usage for the land within the project footprints. Alternative 3 would require the greatest amount of water for construction (912 acre-feet/year), followed by Alternative 4 (887 acre-feet/year) and Alternative 1 (868 acre-feet/year); Alternative 2 would require the least amount of water for construction (842 acre-feet/year). Table 3.6-12 provides a summary of annual construction use by alternative as compared to estimated water consumption for existing land uses.

Table 3.6-12 Annual Construction Water Use Summary by Alternative

County	Annual Water Use (acre-feet per year)		
	Existing Use	Construction Use	Percent of Existing Use
Alternative 1			
Santa Clara County	4,043	494	12
San Benito County	1,729	22	1
Merced County	2,931	351	12
Total	**8,704**	**868**	**10**
Alternative 2			
Santa Clara County	4,799	477	10
San Benito County	1,811	21	1
Merced County	2,915	343	12
Total	**9,525**	**842**	**9**
Alternative 3			
Santa Clara County	4,241	512	12
San Benito County	1,844	31	2
Merced County	2,931	369	13
Total	**9,016**	**912**	**10**
Alternative 4			
Santa Clara County	4,172	497	12
San Benito County	1,714	30	2
Merced County	2,931	361	12
Total	**8,817**	**887**	**10**

Sources: City of Santa Clara 2010; City of San Jose 2018c; County of Santa Clara 1994, 2016; City of Morgan Hill 2016a; City of Gilroy 2002, 2005; County of Merced 2013; County of San Benito 2016a, 2016b; City of Fresno 2008; DWR 2005, 2006, 2007, 2008, 2009, 2010; Authority 2018a.

Construction of the project would occur between 2022 and 2027. The SCVWD projected normal year water supply for 2025 exceeds projected 2025 water demand by 36,800 acre-feet. The estimated project construction water consumption in Santa Clara County (Table 3.6-12) is approximately 11 percent of the surplus supply projected by the SCVWD. The SBCWD projected normal year water supply for 2025 exceeds projected 2025 water demand by 3.683 acre-feet. The estimated project construction water consumption in San Benito County (Table 3.6-12) is approximately 0.6 percent of the surplus supply projected by the SBCWD. Construction of the project in Merced County would occur in the SLDMWA Westside-San Joaquin region and adjacent water management regions. Surface water in the SLDMWA region is supplied primarily from the CVP. Groundwater is also used in the region for both municipal and industrial and agricultural purposes; groundwater supplies in the region would be managed in accordance with the applicable groundwater sustainability plans, once developed (SLDMWA 2019). Conversion of agricultural land within the project footprints in Merced County, and also in Santa Clara County and San Benito County, would reduce water consumption because the land would no longer be used for agricultural purposes, and water allocated to the agricultural land for irrigation would no longer be used.

Consequently, the average annual water use over the construction period for the project alternatives would be about 90 percent less than existing water use within the project footprints because of the temporary and permanent removal of agricultural land from production. Because the water use within the footprints for construction of the project alternatives would be lower relative to existing water use for agricultural activities within the same area, sufficient water supplies would be available to serve construction of the project alternatives and reasonably foreseeable future development during normal, dry, and multiple dry years. Information regarding existing water use and anticipated water use for each of the project alternatives is summarized in Appendix 3.6-C.

CEQA Conclusion

There would be a less than significant impact under CEQA from temporary water use during project construction. Through implementation of a water conservation plan and compliance with the Authority's Water Conservation Guidance (Authority 2015), project features (including water conservation and use of nonpotable and recycled water for construction activities) would minimize water use during construction. The project would result in a temporary increase in water use; however, this increase would be small relative to existing demand. Furthermore, as shown in Table 3.6-12, annual construction water use would be approximately 9 to 10 percent of existing water use for each of the alternatives. Thus, there is sufficient water supply to accommodate the construction water use and reasonably foreseeable future development during normal, dry, and multiple dry years. As a result, the impact on water supplies from construction water use would be less than significant under CEQA. Therefore, CEQA does not require mitigation.

Impact PUE#3: Reduced Access to Existing Utilities in the HSR Right-of-Way

Appendix 3.6-A in Volume 2 identifies existing utilities within the right-of-way. These utilities include electric transmission towers, electric power lines, electric substations, fiber optic and telecommunication lines, potable water and recycled water lines, water conveyance structures, natural gas and petroleum product pipelines, and wastewater and stormwater lines.

Table 3.6-13 shows the number of major utility lines that would need to be permanently relocated or protected in place or that would be removed, extended, abandoned in place, or realigned during construction under each project alternative. Alternative 4 would result in the most (380) utility conflicts and would result in the most (154) utilities protected in place and remaining within the right-of-way, while Alternative 3 would result in the fewest (201) utility conflicts and the fewest utilities (44) protected in place. Alternative 1 would result in 211 utility conflicts and 45 utilities protected in place. Alternative 2 would result in 301 utility conflicts and 60 utilities protected in place.

Table 3.6-13 Major Utility Conflicts and New Utility Installations

Alternative	Relocate	Protect in Place	New Installation	Removed	Extend	Abandon	Realign	Total Utility Conflicts
Alternative 1	158	45	39	1	2	1	4	**211**
Alternative 2	234	60	69	0	2	1	4	**301**
Alternative 3	150	44	39	0	1	2	4	**201**
Alternative 4	169	154	39	4	5	1	6	**380**

Source: Authority 2019
These are estimates of the total number of conflicts, and do not double-count electrical facilities that, for instance, jointly locate electrical utility lines and telecommunications lines. As a result, these totals differ from Table 3.6-3

Construction of the project would require that the right-of-way be permanently fenced and secured to prevent unauthorized access to the right-of-way. Any underground utilities that conflict with the HSR right-of-way either would be relocated or would be reinforced underneath the HSR right-of-way inside a casing pipe that is strong enough to carry the HSR facilities and that would allow for utility maintenance access from outside the HSR right-of-way. For those utilities remaining within the right-of-way after completion of construction and protected in place, maintenance access by utility owners would be limited. For this reason, utility lines that would require routine maintenance by utility service providers would be removed or relocated and would not remain within the HSR right-of-way after completion of construction. The four project alternatives would be in similar geographic locations with similar proximity to major utilities and would be permanently fenced and secured, which would result in similar controlled access to utilities within the HSR right-of-way.

It is common practice that utility districts coordinate and schedule in advance any field visits to their facilities with the owner of the property within which their facilities lie. Thus, the procedure for utility districts to access existing utilities remaining within the right-of-way would be similar to existing practices. The alternatives would not reduce access to existing utilities in the HSR right-of-way because utilities would be relocated or protected in place such that utilities would be accessed from outside of the fenced HSR right-of-way.

CEQA Conclusion

There would be a less than significant impact under CEQA for access to utilities remaining in the right-of-way after completion of construction, because utility service levels would remain unchanged after construction work is completed and the continued ability of utility services providers to access to utilities after completion of construction would maintain the existing level of utility services. Construction of new utility facilities and expansion and upgrade of existing utility facilities is part of the project. Utilities and service systems would be temporarily affected typically only during a brief relocation period. Construction work that could result in temporary interruption of utility services would be conducted in coordination with the utility provider and with prior public notification, and utility service levels would remain unchanged after construction work is completed. Reduced access to existing facilities would not result in the need for additional new utility facilities or the expansion or upgrade of existing utility facilities beyond that already identified and assessed. The alternatives would not reduce access to existing utilities in the HSR right-of-way because existing major utilities within the HSR right-of-way would be relocated or protected in place such that maintenance of relocated utilities could occur outside the HSR right-of-way and utility owners would still be able to access any existing utilities protected in place and remaining within the HSR right-of-way. Project features include effective measures to address utility owners' access needs; these measures would protect and maintain continued controlled access to utility lines remaining within the right-of-way during and after construction by coordinating and scheduling utility service provider field visits with the property owner in advance. Thus, the alternatives would not result in the construction or expansion of electrical facilities; the relocation of nonlinear fixed facilities; or the reconstruction or relocation of a major linear non-fixed facility, that would cause significant environmental impacts. The alternatives would not result in lengthy and harmful interruption of service due to reduced access or require or result in the construction of new utility facilities or expansion and upgrade of existing utility facilities that could cause significant environmental effects. Thus, the impact from reduced access would be less than significant under CEQA. Therefore, CEQA does not require mitigation.

Impact PUE#4: Existing Major Utilities Requiring Relocation or Removal

Construction of any of the project alternatives would require excavation to support construction of various HSR facilities including elevated structures, railbeds, below-ground tracks, or tunnels. During excavation activities, buried utility lines (including water supply pipelines, natural gas, fuel, communication, and sanitary sewer lines, storm drains, and electrical lines) may be uncovered, which could result in conflicts with existing major utilities during construction because major utilities may need to be permanently relocated as a result of construction. In addition, conflicts could result from existing surface structures, including electrical substations and water conveyance facilities, aboveground or overhead electric lines, transmission towers, communication lines, and other major utilities that are in conflict with construction of HSR facilities because the utilities may need to be permanently relocated or permanently removed as a result of construction.

Appendix 3.6-A in Volume 2 identifies the owner/operators, types, and locations of major utilities that would need to be permanently relocated for construction of the project, and utilities that would be removed, extended, abandoned in place, or realigned for construction of the project. Table 3.6-13 summarizes the number of major utility lines that would need to be permanently relocated, or removed, extended, abandoned in place, or realigned during construction of each project alternative. Alternative 2 would result in the most (234) utility relocations, while Alternative 3 would result in the fewest (150) utility relocations. Alternative 1 would result in 158 utility relocations and Alternative 4 would result in 169 utility relocations. In addition, under Alternative 2, the need to depress roadways to grade-separate the HSR alignment along Monterey Road, may require the installation of pump stations to maintain current functions of gravity-driven utility lines such as storm drains and sanitary sewers within those roadway rights-of-way.

Construction of Alternative 1 and Alternative 2 would necessitate the acquisition of three percolation ponds (51 acres) in southern Gilroy that are currently owned and operated by the SCRWA WWTP. These are shallow earthen diked ponds, about 5–8 feet deep (berm height) with sloped sides, and unpaved service roads extending between them. As described under Section 3.6.5.1, Public Utilities, these ponds first percolate secondary treated effluent from the WWTP, which is then piped through a distribution network. Construction of Alternatives 1 and 2 would also require closure of two of the groundwater monitoring wells that are included in the SCRWA WWTP's groundwater monitoring plan and that monitor the three percolation ponds that would be acquired and closed. Because the ponds would be closed, the groundwater wells that currently monitor the ponds would no longer be needed. Acquisition of land for construction of Alternatives 1 and 2 would reduce the capacity of the percolation ponds and has the potential to affect the wastewater treatment capacity of the facility.

Pursuant to utility agreements negotiated between the Authority and the utility service providers, the Authority would work with utility owners during final engineering design and construction of the project to relocate utility lines to outside of the right-of-way, abandon the utility lines in place within the right-of-way, or protect the utility lines in place within the right-of-way. Where overhead distribution lines cross the alignment, the Authority and the utility service provider may decide to place the line below-ground and protect the line in place to avoid potential conflict with HSR operations. Utility lines that would need to be relocated to outside of the right-of-way would be replaced or reinstalled in cooperation with utility service providers so as not to permanently affect utility services to customers. Relocations and reinstallation of utility lines would be conducted by the contractor in cooperation with the utility service providers in accordance with design standard and regulatory requirements including CPUC General Order 131-D for electrical systems. General Order 131-D requires electric utility service providers to obtain PTCs for construction of electric power lines or substations designed for operation between 50 kV and 200 kV or construction of new or upgraded substations with high side voltage exceeding 50 kV. Minor relocation of existing power lines up to 2,000 feet in length and conversion of overhead utilities to below-ground utilities are exempt from General Order 131-D PTC requirements.

Where relocating an irrigation facility is necessary, the contractor would verify that the new facility is operational prior to disconnecting the original facility, where feasible (PUE-IAMF#2). Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts on continued operation of irrigation facilities. Any new or relocated utility facilities would be located within existing utility or road rights-of-way to the extent feasible. Where water agency irrigation systems run parallel to the alignment and would fall within the project footprint, the Authority would acquire land required to relocate the parallel segments outside and parallel to the permanent right-of-way, construct the new canal segment with replacement turnouts, tie-in the new segment during an outage period, and transfer the land and the facility to the water agency when the irrigation facility is rebuilt. Operating turnouts on existing canals would remain in service during the new facility construction period, which could require installation of temporary pumps and conduits. Other features such as ponding and storage areas may need to be relocated during construction. Replacement facilities would be designed and construction staged to allow operations to continue during construction of the project (Authority 2012b).

CEQA Conclusion

There would be a significant impact under CEQA for Alternatives 1 and 2 because acquisition of land currently in use for percolation ponds at SCRWA WWTP would permanently reduce the treatment capacity of this major fixed facility. This reduction in treatment capacity could result in a lengthy and harmful interruption of service to WWTP customers and in the potential need for relocating the percolation ponds to restore the treatment capacity. Mitigation Measures to address this impact are identified in Section 3.6.9, CEQA Significance Conclusions. Section 3.6.7, Mitigation Measures, describes these measures in detail.

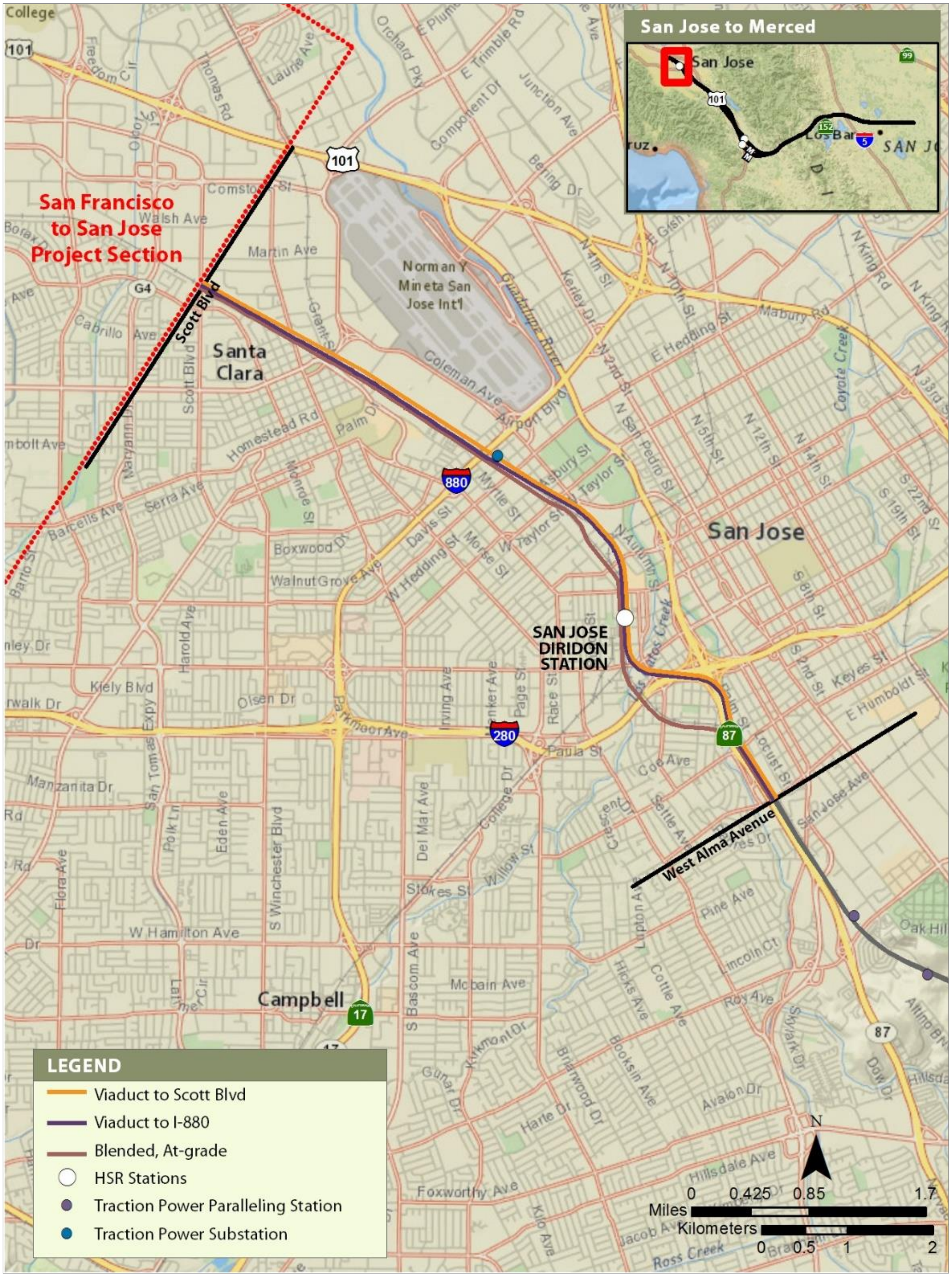
Construction of Alternative 1 and Alternative 2 would not result in any other permanent conflicts with other major utilities because other existing electrical utilities and water utilities including potable water, irrigation and drainage systems, electrical transmission lines, electrical substations, and communications lines would be permanently relocated or protected in place through agreements between the Authority and utility service providers.

There would be a less than significant impact under CEQA for Alternative 3 and Alternative 4 associated with permanent conflicts with existing major utilities because Alternative 3 and Alternative 4 would not affect the SCRWA treatment facility, and because existing electrical utilities and water utilities including potable water, irrigation and drainage systems, electrical transmission lines, electrical substations, and communications lines would be permanently relocated or protected in place through agreements between the Authority and utility service providers.

All project alternatives would minimize permanent conflicts between major utilities because existing electrical utility lines and water utility lines including potable water, agricultural irrigation and drainage systems, electrical transmission lines, electrical substations, and communications lines would be permanently relocated or protected in place through agreements between the Authority and utility service providers. The contractor would conduct relocations and reinstallation of utility lines, in cooperation with the utility service provider, in accordance with design standards and regulatory requirements including CPUC General Order 131-D for electrical systems. Through effective coordination in the planning and implementation of major utilities relocations, conflicts between project construction and major linear non-fixed utilities would be minimized and would not result in lengthy and harmful interruption of service impacts on utility service providers or customers other than impacts on the SCRWA WWTP utility property for Alternative 1 and Alternative 2. SCRWA WWTP services would not be interrupted as a result of construction; new service would be provided before existing service is taken off line.

Impact PUE#5: Temporary Impacts from Construction of New Utility Infrastructure

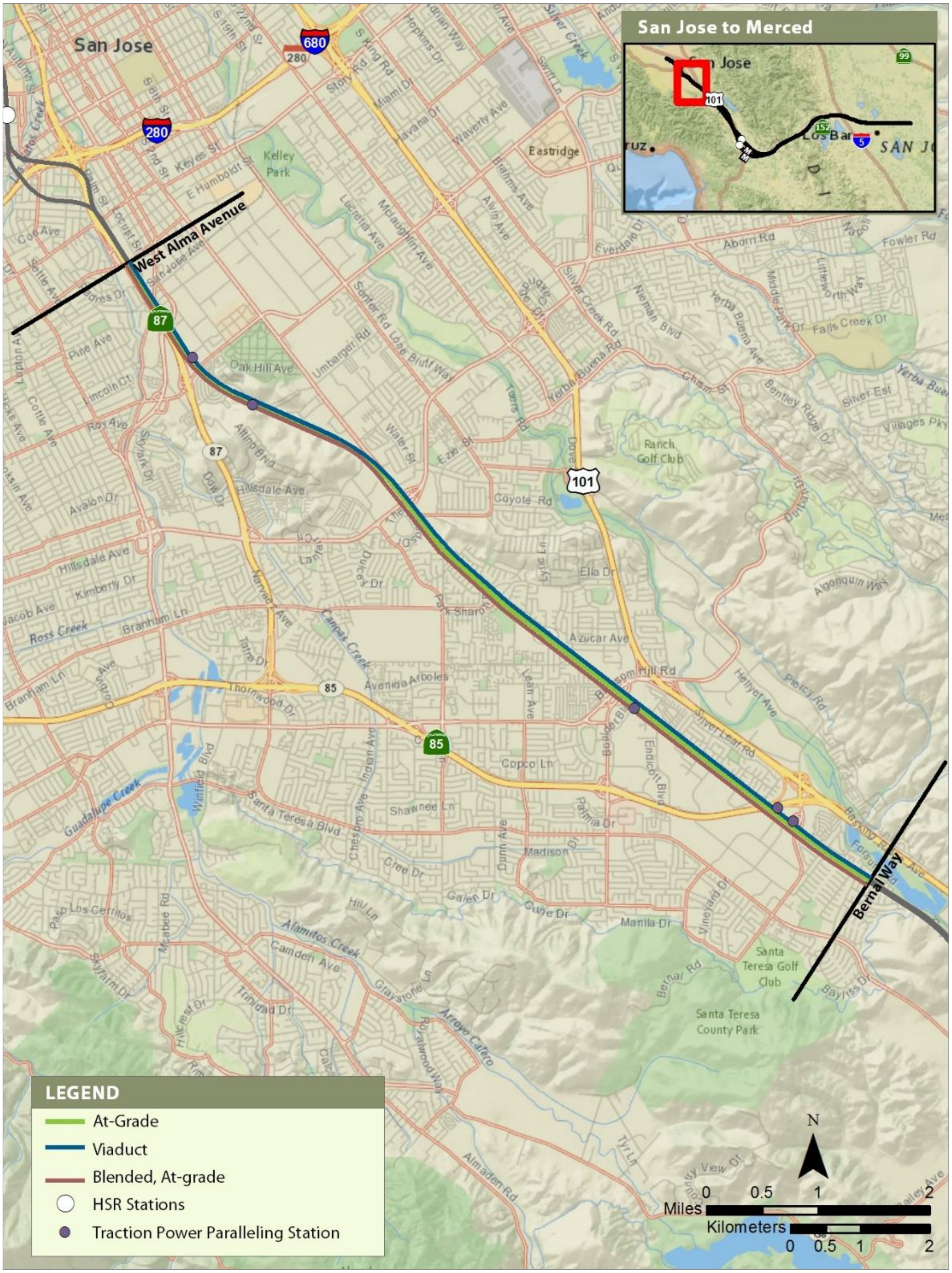
The project would require construction of new utility infrastructure, including electrical infrastructure to power the HSR system, potable water and wastewater utility connections to serve the stations and maintenance facilities, and new stormwater management structures and drainage infrastructure. The electrical infrastructure components of the project include construction of three TPSSs, traction power switching stations, and traction power paralleling stations, traction power supply drops, and other electricity distribution infrastructure to provide electric power to the HSR. The locations of these proposed electrical components are depicted on Figure 3.6-11 through Figure 3.6-15 and detailed descriptions are provided in Chapter 2. Project construction would also involve the extension of below-ground or overhead power transmission lines connecting the TPSSs to either a new utility switching station or an existing PG&E switching station via a short section of 230-kV transmission or 115-kV power lines. Per Authority requirements, the interconnection points between the switching stations and the TPSS would be equipped with redundant transmission (i.e., double-circuit electrical lines) from the point of interconnection. All network upgrades would be implemented pursuant to CPUC General Order 131-D (Rules Relating to the Planning and Construction of Electric Generation, Transmission Power Distribution Line Facilities and Substations Located in California). Construction would result in installation of new major utilities in the right-of-way. Alternatives 1 and 3 would result in installation of 39 new major utilities; Alternative 2 would result in installation of 69 major utilities; and Alternative 4 would result in installation of 46 major utilities.



Source: Authority 2019

JULY 2019

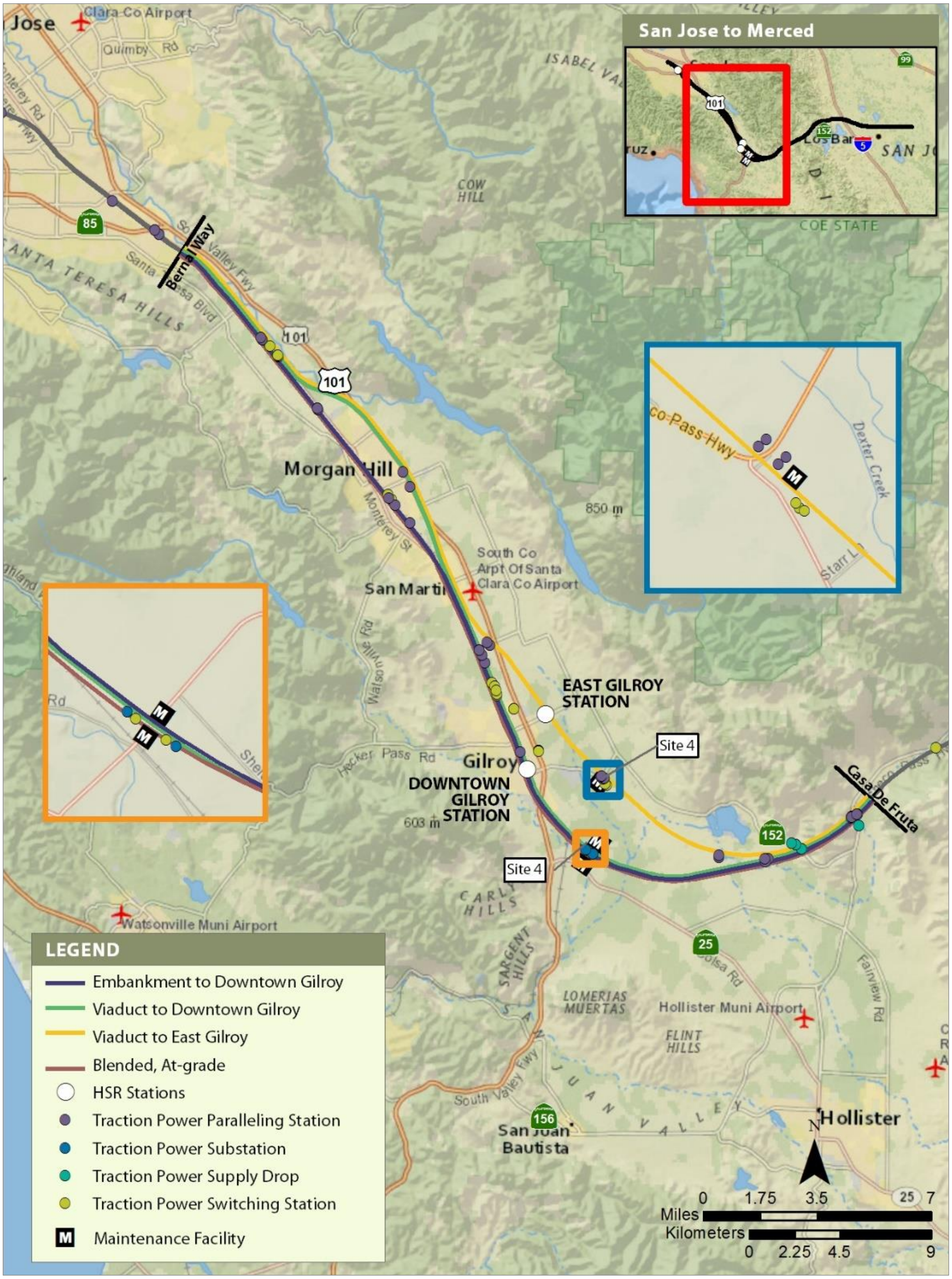
Figure 3.6-11 Proposed HSR Electrical Components—San Jose Diridon Station Approach Subsection



Source: Authority 2019

JULY 2019

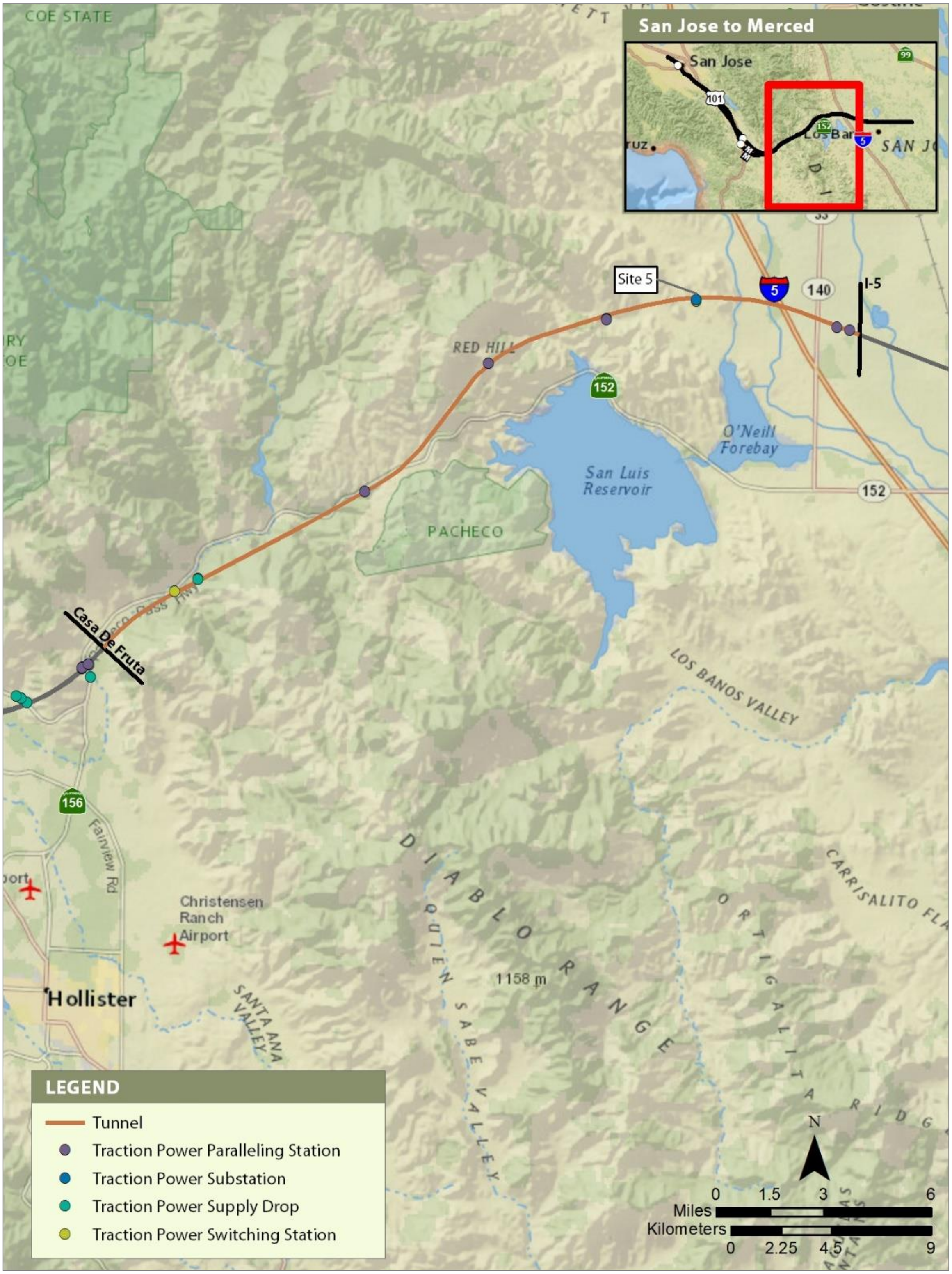
Figure 3.6-12 Proposed HSR Electrical Components—Monterey Corridor Subsection



Source: Authority 2019

JULY 2019

Figure 3.6-13 Proposed HSR Electrical Components—Morgan Hill and Gilroy Subsection



Source: Authority 2019

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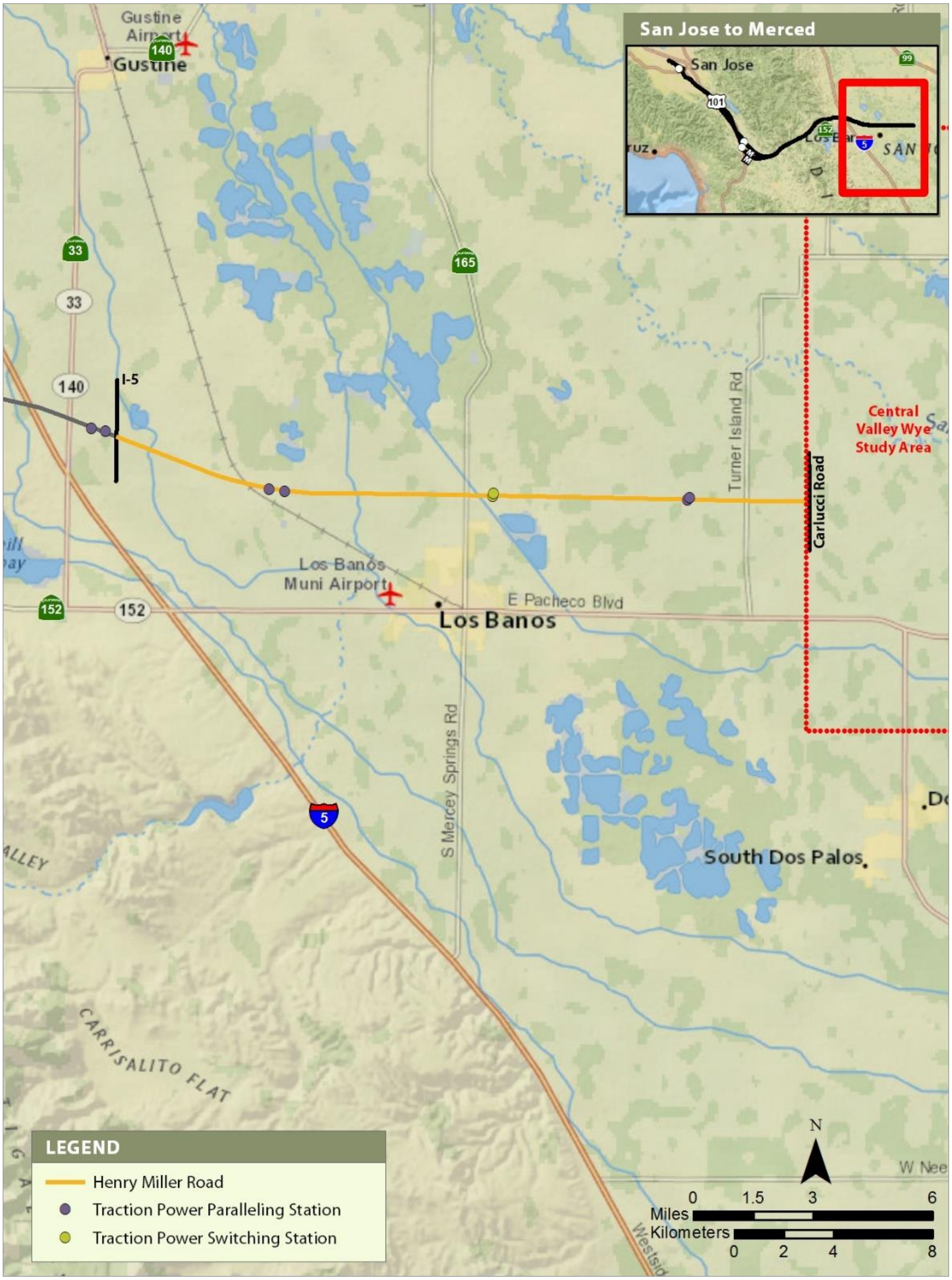
Figure 3.6-14 Proposed HSR Electrical Components—Pacheco Pass Subsection



Source: Authority 2019

JULY 2019

Figure 3.6-15 Proposed HSR Electrical Components—San Joaquin Valley Subsection

The three TPSSs for all alternatives, referred to as Site 3—San Jose, Site 4—Gilroy, and Site 5—O'Neill, would be built at locations where high-voltage power lines cross the alignment for each alternative. Each TPSS would include an approximately 450-square-foot (18 feet by 25 feet) control room and would require permanent use of a parcel of up to 2 acres. Switching stations (120 feet by 80 feet) would be co-located with TPSS where possible, and would be midway between the TPSSs, at approximately 15-mile intervals. Paralleling stations (18 feet by 25 feet) would be built at approximately 5-mile intervals between the switching stations and the TPSSs.

A permanent distribution line from the existing PG&E Quinto switching station (located north of the O'Neill Forebay near Santa Nella) to the McCabe Road tunnel portal location would provide power to the tunnel portal during construction and operation. PG&E electrical network upgrades required to support the project include the reconductoring of three existing 115-kV power lines for all alternatives. Construction activities associated with this reconductoring could result in temporary interruption of electrical service to utility customers and would require operation of helicopters to move electrical equipment. Impact PUE#1 discusses planned and accidental temporary interruption of electrical service, including temporary interruptions that may result from reconductoring of power lines.

Potable water and wastewater utility connections would be built for the San Jose Diridon Station, Downtown Gilroy/East Gilroy Stations, South Gilroy or East Gilroy MOWF, and MOWS near Turner Island Road for all alternatives to provide potable water for use by employees and to provide wastewater discharge to the local wastewater treatment system. Temporary construction impacts of the utility connection construction would include excavation and placement of the buried utility lines; there would be no permanent impacts from the buried utility connection construction. Establishment, design, and construction of potable water and wastewater discharge connections to the facilities would be subject to permits issued by local water and wastewater service providers in San Jose and Gilroy.

New stormwater management structures would be built for all alternatives. Stormwater drainage infrastructure would be constructed at the Guadalupe River crossing in San Jose for all alternatives. New storm drainage infrastructure would be built on the west side of the project at Atherton Way in Morgan Hill and at Carnadero Avenue in Gilroy in the Morgan Hill and Gilroy Subsection for Alternative 1 and Alternative 2. The contractor would construct new stormwater management structures in accordance with the stormwater pollution prevention plan (SWPPP) and stormwater management and treatment plan and in accordance with local water management authority permit requirements (HYD-IAMF#1), thereby minimizing environmental impacts.

CEQA Conclusion

The impact would be less than significant under CEQA for all four alternatives for temporary impacts from construction of new utility infrastructure. Construction of the project would require the construction of new utility infrastructure, including new and expanded electric power, electrical utility connections, water and wastewater utility connections, and stormwater management structures, however, the construction of the new and expanded utility infrastructure would not cause significant environmental effects.

Construction of new stormwater management structures would result in less than significant impacts because compliance with the SWPPP, stormwater management and treatment plan, and local water management authority permit requirements (HYD-IAMF#1) would minimize environmental impacts. Project features would include effective measures to manage and treat stormwater through the installation of infiltration or detention facilities and incorporation of permeable vegetated surfaces to accommodate increased rates and amount of runoff, and to increase infiltration and groundwater recharge. In addition, the contractor would construct new water and wastewater connections in accordance with local water management authority standards and permit requirements to minimize impacts from the construction of new potable water and wastewater utility line connections to the stations and maintenance facilities. Construction of new utility infrastructure would result in less than significant impacts due to compliance with established plans and permit requirements that would effectively address potential environmental effects. Therefore, CEQA does not require mitigation.

Impact PUE#6: Temporary Impacts from Stormwater and Wastewater Generation during Construction

During construction, temporary dewatering could be required in some locations in the RSA because of the shallow depth to groundwater (see Section 3.8). Dewatering operations may be needed when construction requires the removal of accumulated precipitation or groundwater from a construction work location. Dewatering operations may occur during demolition of pavement or structures; grading (including cut-and-fill slopes); excavation; paving; trenching and underground drainage; utility installation; bridge or structure construction; concrete work; or landscaping and irrigation. During dewatering, wastewater (i.e., extracted water) could be discharged through one of two methods: direct discharge into the local sanitary sewer system, or discharge to a surface waterbody. Temporary impacts to drainage patterns and stormwater runoff during construction are described in Section 3.8 in Impact HYD#1. Impact HYD#8: Temporary impacts on groundwater quality and volume during construction are described in Section 3.8 in Impact HYD#8.

Permit requirements for discharge of water from dewatering activities to surface water are described in Section 3.8. Under the Clean Water Act, entities discharging stormwater from construction sites must comply with the conditions of an NPDES permit. The SWRCB is the permit authority in California and has adopted the Construction General Permit (CGP); permittees are required to prepare an SWPPP. The NPDES also requires that states develop and implement municipal stormwater management programs to meet the requirements for stormwater discharges from municipal separate storm sewer systems (MS4). The Authority is designated as a nontraditional permittee under the Phase II MS4 permit. The MS4 permit requirements that apply to watersheds in the project footprint are shown in Table 3.8 1. Discharges to surface water would be permitted under the NPDES through the CGP and the MS4 permit programs.

Wastewater generated from tunnel boring machine operation could be discharged to a surface waterbody in accordance with an individual Waste Discharge Requirement/NPDES permit that would be issued by the RWQCB. The RWQCBs with jurisdiction over the project extent are RWQCB Region 2—Santa Clara County (north of Morgan Hill); RWQCB Region 3—Santa Clara County (south of Morgan Hill) and northern San Benito County; and RWQCB Region 5—Merced County (SWRCB 2017). The Authority would obtain permits for wastewater discharge from wastewater discharge permit agencies in Santa Clara, San Benito, and Merced Counties prior to commencement of construction activities that would entail wastewater generation and discharge. Water quality discharge permit conditions for discharges of wastewater to surface water would be established in accordance with the water quality objectives and other provisions of the Regional Board Water Quality Control Plan for the RWQCB Region; the permitting authority would develop a permit specifically for the wastewater-generating construction activity based on information contained in the discharge permit application (e.g., the type of activity, nature of discharge, receiving water quality) (SWRCB 2013, 2016a, 2016b, 2017; San Francisco RWQCB 2017; Central Valley RWQCB 2018; Central Coast RWQCB 2019).

Direct discharge of wastewater into the local sanitary sewer system would only occur if the receiving wastewater treatment facility approves such disposal. Because the local wastewater treatment authority must approve any disposal of extracted water through the sewer system, it is assumed this would only be allowed if there is adequate wastewater treatment capacity. If wastewater is discharged to the sewer, the wastewater treatment service provider would establish allowable flow rates, volumes, and frequency subject to a discharge permit. Runoff of water applied in construction areas to control dust and water for operation of TBMs would also generate construction wastewater. Construction water from dust control would generally be discharged to the stormwater management system in accordance with a non-stormwater discharge permit issued by the local board. Construction water from operation of TBMs would be recirculated for reuse after separating the excavated solids from TBM operation, thereby reducing water consumption.

The project would minimize potential temporary impacts on stormwater management system capacity by managing and controlling stormwater and resulting runoff and erosion and pollution from stormwater discharges to minimize effects on stormwater management facility capacity. Temporary ground-disturbing activities from construction that could result in temporary changes to drainage patterns and stormwater runoff would be effectively minimized through development and implementation by the contractor of a SWPPP (HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan), compliance with the RWQCBs' dewatering requirements and dewatering plans that would be approved by the regulatory agencies (HYD-IAMF#3; GEO-IAMF#1: Geologic Hazards), and regular monitoring and enforcement of construction site permit conditions related to dewatering and diversion sites (BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors; HYD-IAMF#3).

The contractor would prepare and implement a construction SWPPP prior to construction under the CGP, including design features to minimize or avoid impacts on stormwater management facility capacity from the generation of stormwater (HYD-IAMF#3). The contractor's implementation of the SWPPP would provide best management practices (BMP) that would minimize potential short-term increases in stormwater generation and sediment transport caused by construction, including BMPs for erosion control requirements, stormwater management requirements, and channel dewatering for affected stream crossings. These BMPs would provide permeable surfaces where feasible and systems to retain or detain and treat stormwater from construction areas on-site. The SWPPP under the CGP for construction of the project would include BMPs that would minimize discharges of sediment from the construction site and manage construction equipment and materials to prevent leaks, spills, and accidental discharges to stormwater management facilities. These project features would reduce the amount of construction-area wastewater discharged to stormwater management systems and would therefore reduce the impacts on the capacity of existing stormwater management system facilities managed by local stormwater management authorities. In addition, these project features would improve the quality of the stormwater discharge from construction areas by requiring the contractor to develop and implement the SWPPP under the CGP.

Table 3.6-11 summarizes construction water use by alternative and construction activity. The amount of water that would be consumed for operation of concrete batch plants, construction (including excavation), and TBM operation is assumed to be equal to the amount of wastewater that would be generated from those activities; the amount of additional wastewater that would be generated from dewatering activities would vary depending on site characteristics and therefore has not been separately estimated. Impacts related to construction dewatering activities are assessed in the Chapter 3.8 under Impact HYD#8: Specific excavation and foundation depths for viaducts, overcrossings, radio communication antennae, and other structures would not be determined until the design phase, and the exact locations of water-bearing formations and boundaries for the tunnel construction would not be determined until geotechnical investigations have been conducted for the project. Based on preliminary groundwater monitoring data performed for the project, groundwater is expected to be encountered during tunnel boring, and based on the relatively shallow depths of groundwater in the RSA, dewatering is likely to be required for excavation and foundation construction. The Authority would minimize impacts on groundwater quality during all excavations, including tunnels, in accordance with the CGP (HYD-IAMF#3) and the Caltrans *Field Guide to Construction Dewatering* (Caltrans 2014) (GEO-IAMF#10 Geology and Soils)."

For assessment of the adequacy of the local wastewater treatment system capacity and stormwater management system capacity, it is assumed that 100 percent of the construction water used would be discharged as either wastewater to municipal wastewater treatment facilities or as stormwater to stormwater management facilities. Alternative 1 would use 4,339 acre-feet of water over the 5-year construction period, Alternative 2 would use 4,205 acre-feet, Alternative 3 would use 4,555 acre-feet, and Alternative 4 would use 4,426 acre-feet (Tung 2017; Authority 2018a). In construction locations remote from municipal wastewater treatment and stormwater management infrastructure, construction water could be discharged to surface waterbodies, subject to surface water discharge permit conditions.

Table 3.6-5 summarizes the design capacities of municipal WWTPs within the public utilities RSA. The wastewater treatment capacity of the San Jose-Santa Clara Regional Wastewater Facility is 167 mgd and the treatment capacity of the SCRWA WWTP is 8.5 mgd. The wastewater treatment capacity of the Los Banos WWTP is 6.1 mgd. The wastewater treatment capacity of the Santa Nella WWTP is 0.4 mgd. The total wastewater treatment capacity of these municipal wastewater treatment systems is 182 mgd and the total average dry weather flow rate is 114.7 mgd.

Assuming that 100 percent of the water used is discharged either to wastewater treatment systems or stormwater management systems, the wastewater generation associated with construction of the project alternatives would be 0.38 mgd for Alternative 1, 0.36 mgd for Alternative 2; 0.42 mgd for Alternative 3, and 0.40 mgd for Alternative 4. Therefore, construction-related wastewater generation would less than 0.5 percent of the total wastewater treatment capacity within the public utilities RSA. Based on these estimates, current municipal wastewater treatment facilities have the capacity to accept and treat wastewater generated from construction of any of the project alternatives.

Each local stormwater management jurisdiction under the local jurisdiction's CGP program would permit stormwater discharges from project construction sites. Implementation of SWPPPs for construction sites and conformance of the project construction with local jurisdiction MS4 permit requirements and RWQCB requirements would minimize generation of stormwater from project construction. The Authority would use California Stormwater Quality Association BMP handbooks or equivalent to comply with the conditions of applicable Phase II MS4 permits within its right-of-way. In accordance with the SWPPP and applicable permit requirements, temporary stormwater management structures would be built as needed so the capacity of existing stormwater management systems would not be exceeded. Stormwater management facilities have the capacity to accept wastewater generated under any of the project alternatives.

CEQA Conclusion

There would be a less than significant impact under CEQA from temporary wastewater generation during construction, including wastewater generated from concrete work, earthwork, or TBM operation for any of the alternatives. The amount of temporary wastewater generation from construction activities would not exceed available wastewater treatment capacity or require expansion or new construction of wastewater treatment facilities. While construction would cause temporary increases in wastewater generation, project features such as water reuse, would minimize the amount of additional water use and wastewater generation, and the contractor would apply BMPs including requirements for providing permeable surfaces and detaining and treating water from construction areas on-site. In addition, wastewater generated and discharged to WWTPs during construction would be discharged and treated in a manner approved by permits issued by the local wastewater management authority, and wastewater discharged to surface waterbodies would be subject to wastewater discharge permit conditions. The amount of water discharged for treatment at existing WWTPs operated by local authorities would not require the expansion of utilities because wastewater would not exceed the capacity of local authority wastewater treatment or stormwater management facilities. The current capacities and demands allow for the estimated amount of wastewater under all of the alternatives to be accommodated.

There would be a less than significant impact under CEQA from temporary stormwater generation during construction. Temporary impacts on drainage patterns and stormwater runoff during construction are described in Chapter 3.8 under Impact HYD#1. Project features, including implementation of the SWPPP and conformance with the CGP and local stormwater management jurisdiction permit requirements, would minimize stormwater generation from construction activities. In accordance with the SWPPP and applicable permit requirements, temporary stormwater management structures would be built as needed such that the capacity of existing stormwater management systems would not be exceeded. These project features would minimize temporary impacts from wastewater generation on water use and demands and capacities of local WWTPs and stormwater management facilities and result in a less than significant impact. Therefore, CEQA does not require mitigation.

Impact PUE#7: Temporary Generation of Solid and Hazardous Waste during Construction

Construction of the project alternatives would generate solid waste from clearing of vegetation, grading, demolition of existing structures, and cut-and-fill construction activities. Construction would also generate hazardous waste consisting of welding materials, fuel and lubricant containers, paint and solvent containers, treated wood, and cement products containing strong basic or acidic chemicals. Demolition of older buildings could also generate hazardous waste, such as asbestos-containing materials and lead-based paint.

Construction of Alternative 1 would require approximately 813 acres of grading and would generate approximately 7.1 million cubic yards of excess cut material, assuming that cut material generated from construction is reused as fill material elsewhere for construction. Alternative 1 would therefore require disposal or reuse of 7.1 million cubic yards of cut material in excess of the amount that would be required for construction fill. Construction of Alternative 2 would require 1,047 acres of grading and would generate approximately 6.7 million cubic yards of excess cut material. Construction of Alternative 3 would require approximately 870 acres of grading and would generate approximately 5.3 million cubic yards of excess cut material, and Alternative 4 would require 1,048 acres of grading and would generate approximately 6.5 million cubic yards of excess cut material (Authority 2018a). Project construction would be conducted in accordance with the Authority's Sustainability Policy including policies pertaining to waste diversion and recycling. Solid waste (C&D debris) generated from demolition activities and excess fill material generated from grading may not be reusable or recyclable and may therefore need to be disposed of in solid waste landfills.

Table 3.6-14 presents solid and hazardous waste landfill capacity by facility and estimated solid waste generation by project alternative including application of the project demolition plan that would be developed under HMW-IAMF#5: Demolition Plans, and that would minimize generation of C&D debris from construction activities and demolition of building floor space. Alternative 1 would involve demolition of 4.3 million square feet of building floor space. Alternative 2 would involve demolition of 7.1 million square feet of floor space. Alternative 3 would involve demolition of 4.0 million square feet of floor space. Alternative 4 would involve demolition of 2.0 million square feet of floor space. For construction of the alternatives, approximately 199,300 cubic yards of C&D debris would be generated under Alternative 1, 325,000 cubic yards under Alternative 2, 184,800 cubic yards under Alternative 3, and 90,100 cubic yards under Alternative 4 (Authority 2018a). Data for hazardous waste generation from construction activities are not available; however, the amount of hazardous waste generation from construction is assumed to be no greater than the amount of nonhazardous waste generation from construction for the purposes of comparison to available hazardous waste disposal capacity. Tunnel excavation for all project alternatives would generate approximately 4.8 million cubic yards of soil and rock materials (an estimated 0.5 million cubic yards from Tunnel 1, at the eastern end of the Morgan Hill and Gilroy Subsection and 4.3 million cubic yards from Tunnel 2, through Pacheco Pass).

Solid waste landfills identified in Table 3.6-14 in the RSA in the vicinity of Santa Clara, San Benito, and Merced Counties could be used for nonhazardous solid waste disposal. Collectively these nonhazardous solid waste landfills have an estimated 92.5 million cubic yards of remaining disposal capacity. Therefore, existing nonhazardous solid waste landfills would have adequate estimated capacities through 2038 or longer for the disposal of C&D material, which would comprise up to 0.6 percent of the remaining capacity.

There are three RCRA-permitted hazardous waste landfills in California—the Kettleman Hills Facility in Kings County; the Clean Harbors Facility in Buttonwillow in Kern County; and the Clean Harbors Facility in Westmorland in Imperial County (California Department of Toxic Substances Control (DTSC) n.d., 2014; Clean Harbors 2017a, 2017b). The Kettleman Hills facility is approximately 140 miles south of Gilroy and the Clean Harbors Buttonwood Facility is approximately 200 miles south of Gilroy. The Clean Harbors Westmorland Facility is approximately 500 miles south of Gilroy and services Southern California and Mexico (Clean Harbors 2017b). These sites and their capacities relative to the project alternatives are listed in Table 3.6-15.

Table 3.6-14 Solid Waste Generation Estimates by Alternative in Cubic Yards

Estimated Solid and Hazardous Waste Generation by Alternative[1]			
Alternative 1	Alternative 2	Alternative 3	Alternative 4
199,300	325,000	184,800	90,100

Solid Waste Landfill Facility and Capacity					
Remaining Landfill Capacity (cubic yards)		Sufficient Remaining Capacity?			
		Alternative 1	Alternative 2	Alternative 3	Alternative 4
Kirby Canyon Recycling and Disposal Facility	16,191,000	Yes	Yes	Yes	Yes
Guadalupe Community Facility	11,055,000	Yes	Yes	Yes	Yes
Newby Island Sanitary Landfill	21,200,000	Yes	Yes	Yes	Yes
John Smith Road Class III Landfill	4,625,830	Yes	Yes	Yes	Yes
Billy Wright Landfill Unit 01	11,370,000	Yes	Yes	Yes	Yes
Highway 59 Landfill	28,025,330	Yes	Yes	Yes	Yes

Source: CalRecycle 2019a; 2019b, 2019c, 2019d, 2019e, 2019f, Authority 2018a
Waste required under each alternative is not broken down by facility, but is rather provided as a total. The amount of waste would be distributed to available facilities as needed based on the location and the available capacities of those facilities.
[1] Solid waste generation values are for C&D debris that would be generated from building and other demolition activities and that would be disposed of in licensed C&D debris landfills. Solid waste generation values do not include tunnel boring machine spoils or cut-and-fill material that would generally be reused for construction and not disposed of in landfills.
C&D = construction and demolition

Table 3.6-15 Hazardous Waste Generation Estimates by Alternative in Cubic Yards

Estimated Hazardous Waste Generation by Alternative[1]			
Alternative 1	Alternative 2	Alternative 3	Alternative 4
199,300	325,000	184,800	90,100

Hazardous Waste Landfill Facility and Capacity					
Remaining Landfill Capacity (cubic yards)		Sufficient Remaining Capacity?			
		Alternative 1	Alternative 2	Alternative 3	Alternative 4
Clean Harbors Westmorland Landfill, Westmorland CA	5 million	Yes	Yes	Yes	Yes
Clean Harbors Landfill, Buttonwillow CA (hazardous waste capacity)	5 million (estimated)	Yes	Yes	Yes	Yes
Kettleman Hills Landfill, Kettleman City CA (hazardous waste capacity)	4.9 million	Yes	Yes	Yes	Yes

Sources: Clean Harbors 2017a, 2017b
[1] The amount of hazardous waste generation from construction is assumed to be no greater than the amount of nonhazardous waste generation from construction for the purposes of comparison to available hazardous waste disposal capacity

The Kettleman Hills hazardous waste disposal facility in Kings County has a remaining disposal capacity of approximately 4.9 million cubic yards based on DTSC) approval of a permitted expansion in 2014 (DTSC 2014). The Kettleman Hills facility is planning the development of a new hazardous waste landfill (Unit B-20) on currently undeveloped land at the Kettleman Hills site, to open after current unit B-18 reaches capacity, and the facility is planning to operate for approximately 24 years (Waste Management 2017b). The Clean Harbors Buttonwillow Facility has a permitted hazardous waste disposal capacity of 13.25 million cubic yards and an estimated closure date of 2040 (CalRecycle 2014b). Clean Harbors reported a permitted disposal capacity in excess of 10 million cubic yards for the Buttonwillow landfill (Clean Harbors 2017a). The California DTSC database does not include an estimate of the remaining disposal capacity of the Clean Harbors Buttonwillow landfill. Based on the reported closure date of 2040 it is estimated that 50 percent of the permitted capacity remains available. Based on the estimated 14.9 million cubic yards of available hazardous waste landfill capacity for the three hazardous waste landfills in Kern County, Imperial County, and Kings County, hazardous waste landfill capacity within California is adequate for the anticipated hazardous waste generation for the construction of each alternative, which would comprise up to 3.5 percent of remaining capacity.

The Authority would develop and implement a demolition plan, which would include procedures to identify and minimize generation of hazardous waste from C&D activities (HMW-IAMF#5). Prior to demolition activities, the contractor would evaluate whether the structures proposed for demolition contain asbestos or lead, in accordance with federal regulatory requirements as discussed in Impact HMW#4 and Impact HMW#5 in Section 3.10 Hazardous Materials and Waste. Determining the existence of lead and removing it safely is important to preserving the long-term health of individuals working near or with potentially contaminated structures or sites. General personal protection practices would also be implemented as part of HMW-IAMF#5 and in accordance with California Division of Occupational Safety and Health regulatory requirements. The plan would include plans and procedures for safe dismantling and removal of building components and debris, including a plan for the abatement of lead and asbestos, which may be prevalent in older structures. Implementation of the demolition plan would promote segregation of asbestos and lead-containing waste from nonhazardous solid waste and would therefore reduce the amount of hazardous waste generated from demolition activities and the need for hazardous waste disposal capacity.

CEQA Conclusion

There would be a less than significant impact under CEQA from temporary solid waste generation during construction and a less than significant impact from temporary hazardous waste generation during construction. Construction of the project would not generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure and would not impair the attainment of state or local solid waste reduction goals.

Solid waste management facilities within the RSA and hazardous waste management facilities within California would have sufficient permitted capacity to accept solid waste and hazardous waste generated from construction of the project, and the CEQA impact from temporary solid and hazardous waste generation would be less than significant. There would be a less than significant impact under CEQA from solid and hazardous waste generation and disposal during construction for any of the alternatives because solid waste produced would not exceed the permitted disposal capacity of existing solid waste disposal facilities in the RSA and hazardous waste generation would not exceed the permitted disposal capacity of existing hazardous waste disposal facilities in California. Therefore, the project would not require construction and permitting of any new solid waste disposal or hazardous waste disposal infrastructure, and the CEQA impact would be less than significant. Impacts from hazardous wastes would be avoided through safe handling and disposal procedures. Solid waste, including solid waste produced during grading and cut-and-fill activities, would be reused where applicable, while any additional solid wastes would be sent to proper disposal facilities (landfills). Solid waste and hazardous waste disposal procedures would comply with federal, state, and local statutes and regulations related to solid waste and hazardous waste management and the CEQA impact would therefore be less than significant. Therefore, CEQA does not require mitigation.

The Authority would require construction contractors to prepare demolition plans with specific provisions for the safe dismantling and removal of building components and debris and segregation and management of solid and hazardous waste generated in accordance with regulatory requirements. The demolition plans would include requirements for identification and abatement of lead and asbestos hazards for commercial and industrial buildings and roadways slated for demolition or renovation. As part of the project design the contractor would comply with regulations that control the transport, use, storage, and disposal of hazardous materials and hazardous wastes generated during construction. The contractor would implement a written hazardous materials and waste management plan that would describe responsible parties and procedures for hazardous waste transport, containment, storage and disposal and hazardous material and hazardous waste management BMPs (HMF-IAMF#7, HMW-IAMF#8, HMW-IAMF#10). The contractor would implement procedures to safely handle and dispose of hazardous waste and separate hazardous wastes from nonhazardous wastes to reduce the amount of hazardous waste generated, including procedures to identify potential asbestos-containing structures and lead-containing structures prior to demolition, abatement of lead and asbestos hazards, and segregation of hazardous and nonhazardous wastes. Through implementation of IAMFs, construction of the alternatives would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials and there would be a less than significant impact. Therefore, CEQA does not require mitigation.

Operations Impacts

Operation of the project alternatives would include operation of HSR trains, stations, and maintenance facilities and maintenance of the trains, track, and right-of-way. Operation of the project would result in consumption of water for operation of stations and maintenance facilities and generation of wastewater, solid wastes, and hazardous wastes from operation of stations and maintenance facilities. Runoff of precipitation on impervious services in the right-of-way and at stations and maintenance facilities would generate stormwater. Chapter 2 describes operations activities in more detail.

Impact PUE#8: Continuous Permanent Impacts from Water Use

HSR stations and maintenance facilities, including the South Gilroy or East Gilroy MOWF and MOWS near Turner Island Road, would require operational water supply for a variety of uses, including drinking fountains and restrooms, landscaping irrigation, and station and facility maintenance wash water. Operations at the San Jose Diridon Station and the Downtown Gilroy or East Gilroy Stations would also require water.

The expanded San Jose Diridon Station would require additional water for restroom facilities, drinking water fountains, and cleaning and station maintenance activities in addition to the existing water demand for the station. The estimated average potable water demand for the San Jose Diridon Station after expansion would be 24,200 gpd, two-thirds of which would be potable water use within the station (16,025 gpd) and one-third of which would be used for landscaping and other outdoor use (8,150 gpd). The existing San Jose Diridon Station used 5,400 gpd of water in 2016 for indoor and outdoor uses. The Downtown Gilroy Station would use an estimated 15,800 gpd based on the estimated station and grounds square footage. The East Gilroy Station would use an estimated 15,350 gpd based on the estimated station and grounds square footage. Approximately 10,500 gpd potable water would be used within the Downtown Gilroy Station and the remaining 5,330 gpd would be used outdoors. For the East Gilroy Station, approximately 10,200 gpd potable water would be used within the station and the remaining 5,200 gpd would be used outdoors. The existing Gilroy Station is only a platform, with no restrooms or landscaping water use; water at the existing Gilroy Station is required only for cleaning and maintenance activities. Water consumption for the existing Gilroy Station was 356 gpd in 2016. The total water consumption for both the San Jose Diridon Station and the Downtown Gilroy Station would be 40,000 gpd, and for the San Jose Diridon Station and East Gilroy Station would be 39,500 gpd, two-thirds of which is anticipated to be potable water consumption.

Maintenance activities that would require a water supply at the South Gilroy or East Gilroy MOWF would include cleaning and servicing activities between HSR train trips, maintenance activities, and operation of train wash and wheel defect detection facilities. The MOWF would provide for dispatch, maintenance, and repair of rail-mounted equipment and include support quarters for maintenance personnel. Water would be used for train wash and maintenance activities and to provide potable water for the maintenance personnel quarters. The MOWS would support maintenance activities by providing a location for layover of maintenance of infrastructure equipment and temporary storage of materials and other resources. Water consumption for operation of the MOWF would be required for personnel, including operation of drinking fountains, restrooms, kitchen/canteens, showers, and other potable uses.

Potable water consumption would be approximately 84,000 gpd at the MOWF and 98,000 gpd at the MOWS, for a total of 182,000 mgd of potable water for both maintenance facilities. Water consumption would also be required for use by road and rail-mounted equipment including rail-grinding train runs and other maintenance activities. Water used for maintenance activities at the MOWF and the MOWS would not need to be of drinking water quality, and nonpotable water consumption is estimated as 1,000 gpd for the MOWF and 1,000 gpd for the MOWS (Tung 2017). Annual total water consumption for the MOWF and the MOWS including potable water and nonpotable water would be 184,000 gpd, of which 182,000 gpd would be for potable uses and 2,000 gpd would be for industrial (nonpotable) uses.

The total water demand for water usage at the two stations would be approximately 40,000 gpd and total water usage at the two maintenance facilities would be 184,000 gpd, for a total of 224,000 gpd (250 acre-feet per year) water demand. Because the average California household uses 446–893 gpd, this is equivalent to the amount of water consumed annually by approximately 250–500 California households. The demand for potable water in urban areas of the public utilities RSA was approximately 165,724 acre-feet per year in 2015, with the highest demand in San Jose (139,907 acre-feet per year). Water consumption for operation of the San Jose Diridon Station, Gilroy Station, MOWF, and MOWS would constitute 0.15 percent of the total water demand for urban areas in the RSA.

The project stations and maintenance facilities could use recycled water provided by the regional water service providers that provide recycled water for nonpotable uses, such as the SBWR in Santa Clara and San Jose and the SCRWA in Gilroy. The Authority would assess the availability of recycled water and use it for nonpotable uses at stations and maintenance facilities when feasible, minimizing water consumption (Authority 2015). Prior to construction, the Authority would determine the availability of recycled water supply to the San Jose Diridon and Downtown Gilroy/East Gilroy Stations and the South Gilroy or East Gilroy MOWF and MOWS near Turner Island Road from each regional water service provider, and would incorporate the use of recycled water for nonpotable water uses at project stations and facilities if the regional service providers have the capability and capacity to provide recycled water.

Use of potable water for operation of the stations, MOWF, and MOWS would be minimized through compliance with the Authority's Water Conservation Guidance (Authority 2015). This guidance includes specific requirements that would minimize the use of potable water, including requiring the use of efficient facilities; using nonpotable water for irrigation, wherever possible; and requiring reusing water from water flushing. Therefore, the demand for potable water during operation could be less than that estimated in this analysis.

CEQA Conclusion

There would be a less than significant impact under CEQA from continuous permanent water use during project operation. Through compliance with the Authority's Water Conservation Guidance requirements (Authority 2015), the Authority would minimize water use during operation. The project would result in a permanent increase in water use; however, this increase would be small relative to existing water supply. Water consumption for operation of the San Jose Diridon Station, Gilroy Station, MOWF, and MOWS would constitute 0.15 percent of the total water demand for urban areas in the RSA (equivalent to the amount of water consumed by 250 – 500 California households). Project features would include systems and procedures to reuse water and reduce consumption that would minimize the need for water during operations. Stations and maintenance facilities would use recycled or reclaimed water for nonpotable uses where recycled water is available and where such use is permitted to reduce overall water use and reduce the amount of potable water needed for operation.

Construction of the project would result in a net decrease in water consumption compared to existing land uses (e.g., agricultural uses) of the project footprint, as shown in Appendix 3.6.C, Water Use Assessment. Therefore, sufficient water supplies would be available to serve operation of the project and reasonably foreseeable future development during normal, dry, and multiple dry years. Accordingly, the impact on water supplies from operational water use would be less than significant under CEQA. Therefore, CEQA does not require mitigation.

Impact PUE#9: Continuous Permanent Impacts from Wastewater Generation

A variety of uses, including drinking fountains and restrooms, landscaping irrigation, and station and facility maintenance wash water, would generate wastewater at San Jose Diridon Station, Downtown Gilroy/East Gilroy Station, and maintenance facilities including the South Gilroy or East Gilroy MOWF. Potable water consumption and nonpotable water consumption would generate wastewater at the MOWF. The amount of wastewater generated from each maintenance facility is assumed to be 100 percent of the potable and nonpotable water consumption. As described under Impact PUE#8, annual water consumption for the MOWF and the MOWS would be a total of 184,200 gpd, of which 182,200 gpd would be for potable uses and 2,000 gpd would be for industrial (nonpotable) uses.

Wastewater from the South Gilroy or East Gilroy MOWF would be discharged to the sewer, which is operated and maintained by SCRWA. Wastewater generated from operation of the South Gilroy or East Gilroy MOWF would represent 1.0 percent of the 8.5 mgd wastewater treatment capacity provided by the SCRWA. Wastewater generated from the MOWS near Turner Island Road would be discharged to the sewer, which is operated and maintained by the Merced County Water District (County of Merced 2017). Wastewater generation from operation of the MOWS would represent 1.6 percent of the 6.0 mgd wastewater treatment capacity provided by the City of Los Banos.

The San Jose Diridon Station would include restroom facilities that would generate wastewater discharges to the local sewer system. The average wastewater flows for the San Jose Diridon Station would be 24,200 gpd assuming that the amount of water used at the station would be equal to amount of wastewater discharged from the station. The wastewater generated from the San Jose Diridon Station would represent 0.01 percent of the 167 mgd wastewater treatment capacity provided by the San Jose-Santa Clara Regional Wastewater Facility.

Wastewater generation for the Downtown Gilroy or East Gilroy Station would be associated with maintenance and cleaning activities. This wastewater generation—15,800 gpd for the Downtown Gilroy Station and 15,350 gpd for the East Gilroy Station—would represent 0.18 percent of the 8.5 mgd wastewater treatment capacity provided by the SCRWA. Wastewater generation from operation of the MOWF would represent 1.1 percent of the 8.5 mgd wastewater treatment capacity provided by the SCRWA.

The amount of wastewater generated by the San Jose Diridon and Downtown Gilroy or East Gilroy Stations, South Gilroy or East Gilroy MOWF, and MOWS near Turner Island Road would be approximately the same for all project alternatives because these features are common to all alternatives. Water consumption and wastewater generation for the East Gilroy Station would be approximately 500 gpd lower than water consumption and wastewater generation for the Downtown Gilroy Station.

CEQA Conclusion

There would be a less-than-significantless than significant impact under CEQA from continuous permanent wastewater generation during project operation. Wastewater generated at stations and maintenance facilities during operations would be discharged to the sewer system and would represent less than 1 percent of the available treatment capacities of local wastewater treatment facilities. Thus, there is adequate capacity at existing wastewater treatment plants to serve the project's projected wastewater treatment demand, in addition to its existing commitments. The construction of new wastewater infrastructure or the expansion of existing facilities would not be required. Furthermore, the wastewater treatment plants that would serve the pProject are required to adhere to RWQCB treatment requirements. The wastewater generated by the pProject would, therefore, not exceed RWQCB wastewater treatment requirements. Thus, the impact from wastewater generated during operation of the pProject would be less-than-significantless than significant under CEQA. Therefore, CEQA does not require mitigation.

There would be a less than significant impact under CEQA from continuous permanent wastewater generation from operations and maintenance activities for any of the alternatives. Wastewater generated at stations and maintenance facilities during operations would be discharged to the sewer system and would represent approximately 0.1 percent of the available wastewater treatment capacity in the RSA. Therefore, the wastewater generated from operation of the stations and maintenance facilities would not exceed the available treatment capacity of local WWTPs. Wastewater generated at stations and maintenance facilities during operations would represent less than 1 percent of the available treatment capacities of local wastewater treatment facilities. There is adequate capacity at the existing WWTPs and therefore project operation would not result in the need to expand existing or construct new wastewater treatment capacity. The wastewater treatment plants that would serve the project are required to adhere to RWQCB treatment requirements, and the wastewater generated by the project would not result in any exceedance of RWQCB wastewater treatment requirements. Thus, the impact from wastewater generated during operation of the project would be less than significant under CEQA. Therefore, CEQA does not require mitigation.

Impact PUE#10: Continuous Permanent Impacts on Storm Drainage Facilities

Construction of the project would cause permanent changes in drainage patterns from the excavation and placement of fill, widening of existing embankments, and new impervious surfaces. These changes would affect stormwater runoff during rain events, including changes in runoff volume and rates and increased pollutant loading, compared to existing conditions. The design of the project would include on-site stormwater management facilities, which would capture runoff and provide treatment prior to discharge (HYD-IAMF#1, Stormwater Management). The on-site storm drainage system would consist of open ditches or subsurface drains placed at the outer sides of the railbed. An open ditch is a natural or built structure that conveys water with the top surface in contact with the atmosphere. Subsurface drainage systems are necessary to rapidly remove and prevent water from interfering with track stability, roadbeds, and side slopes, or where right-of-way constrains the use of open ditches. The runoff generated on-site would be discharged into the drainage system of the adjacent at-grade guideway. Water from the open ditches and under drains would either enter the local storm drain system or directly enter into the off-site drainage systems. Conceptual drainage was evaluated, and adequate right-of-way is available for drainage and detention. Permanent impacts to drainage patterns and stormwater runoff are discussed Section 3.8 in Impact HYD#2.

Construction of new infrastructure would be designed to prevent saturation, increase infiltration, and stabilize soils where streamflow velocities are increased to minimize potential impacts related to erosion and surface water hydrology (HYD-IAMF#2: Flood Protection). Stormwater management practices and measures as well as permeable surfaces to retain or detain and treat stormwater on-site would also be incorporated into the design of the project (HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan). In addition, stormwater runoff would be effectively managed and treated through the installation of infiltration or detention facilities and incorporation of permeable vegetated surfaces to accommodate increased rates and amount of runoff, and to increase infiltration and groundwater recharge (HYD-IAMF#4: Prepare and Implement an Industrial Stormwater Pollution Prevention Plan). The Authority would also implement additional flow control measures where local regulations or drainage requirements dictate. Section 3.8 provides further detailed analysis regarding potential impacts on drainage and stormwater runoff.

CEQA Conclusion

The impact to stormwater drainage facilities would be less than significant under CEQA because the project would not require or result in the relocation or construction of new or expanded stormwater drainage facilities beyond those built within the project footprint as part of the project analyzed throughout this EIR/EIS, the construction of which could cause significant environmental effects. Permanent impacts on drainage patterns and stormwater runoff are described in Chapter 3.8 under Impact HYD#2. Project features would include effective measures to manage and treat stormwater through the installation of infiltration or detention facilities and incorporation of permeable vegetated surfaces to accommodate increased rates and amount of runoff, and to increase infiltration and groundwater recharge. Thus, operation of the project would not result in the construction of new or expanded stormwater drainage facilities beyond those constructed within the project footprint as part of the project analyzed throughout this EIR/EIS. This impact would be less than significant. Therefore, CEQA does not require mitigation.

Impact PUE#11: Continuous Permanent Generation of Solid Waste and Hazardous Waste

Operation of the San Jose Diridon Station would generate approximately 570 cubic yards per year of nonhazardous solid waste under all of the project alternatives. Nonhazardous solid waste would include domestic trash generated by rail passengers and station employees and waste from station cleaning and maintenance activities. This would be an increase of approximately 450 percent from the existing San Jose Diridon Station, which currently generates approximately 130 cubic yards per year of nonhazardous solid waste (Authority 2018b). The Downtown Gilroy Station would generate approximately 370 cubic yards of nonhazardous waste, and the East Gilroy Station would generate approximately 360 cubic yards per year of nonhazardous solid waste, under each of the alternatives, compared to the approximately 15 cubic yards of nonhazardous solid waste generated per year from existing operations at the existing Gilroy Station without implementation of the project (Authority 2018b). The amounts of solid waste from operation of the two stations would not affect the available capacity of municipal solid waste landfills servicing Santa Clara County. As shown in Table 3.6-6, the remaining capacity of municipal solid waste landfills in Santa Clara County is approximately 50 million cubic yards, and permitted disposal capacity is approximately 7,900 tons per day. The annual generation of 570 cubic yards of solid waste from the San Jose Diridon Station represents approximately 0.0012 percent of remaining disposal capacity in Santa Clara County. The annual generation of 370 cubic yards of solid waste from the Downtown Gilroy Station or 360 cubic yards of solid waste from the East Gilroy Station represents approximately 0.0005 percent of remaining permitted solid waste disposal capacity in Santa Clara County. The solid waste landfills within the RSA are licensed for decades of operation (one facility in Merced County is licensed to operate until 2054) and the facilities collectively have 100 million cubic yards of disposal capacity (see Table 3.6-6 in Section 3.6.5.1). County and municipal government planning processes would anticipate the need for replacement of solid waste disposal capacity as the licensed operation periods of these facilities approach their conclusion, therefore no shortage of disposal capacity is expected over the operating life of the HSR facilities.

Operation of the South Gilroy or East Gilroy MOWF and the MOWS near Turner Island Road would also generate nonhazardous solid waste from employee and operational activities, such as domestic trash from employees and nonhazardous industrial solid waste from maintenance of trains and operation of maintenance equipment. The South Gilroy or East Gilroy MOWF and the MOWS near Turner Island Road would generate approximately 755 cubic yards and approximately 885 cubic yards of nonhazardous solid waste, respectively. These amounts of solid waste would not exceed the available disposal capacity of municipal solid waste landfills servicing Santa Clara, San Benito, and Merced Counties. The remaining capacity of municipal solid waste landfills in San Benito and Merced Counties is approximately 16 million cubic yards and the permitted disposal capacity is 2,000 tons per day. The remaining capacity of municipal solid waste landfills in Santa Clara County is approximately 50 million cubic yards, and permitted disposal capacity is approximately 10,000 tons per day. The annual generation of 755 cubic yards of solid waste from the South Gilroy or East Gilroy MOWF represents approximately 0.04 percent of remaining disposal capacity in Santa Clara County, and the annual generation of 833 cubic yards of solid waste from the MOWS near Turner Island Road represents approximately 0.05 percent of remaining permitted solid waste disposal capacity in San Benito and Merced Counties. The Authority would be required to adhere to state law (AB 75), which requires state agencies to divert at least 50 percent of solid waste from landfill disposal. The amount of solid waste disposed of in landfills in Santa Clara, San Benito, and Merced Counties would be reduced through the Authority's adherence to the solid waste diversion requirements.

Operation of the San Jose Diridon Station, Downtown Gilroy or East Gilroy Station, South Gilroy or East Gilroy MOWF, and MOWS near Turner Island Road would also involve the use, storage, and disposal of hazardous materials, including petroleum products, associated with maintenance of HSR equipment. Hazardous waste may consist of welding materials, fuel and lubricant containers, batteries, and paint and solvent residues and containers. All hazardous wastes would be handled, stored, transported, and disposed of in accordance with RCRA requirements (HMW-IAMF#7, HMW-IAMF#10). A certified hazardous waste collection company would transport the waste to an authorized hazardous waste management facility for recycling or disposal.

Hazardous waste landfills in California have adequate capacity to dispose of hazardous waste generated from operation of the San Jose Diridon Station, Downtown Gilroy or East Gilroy Station, South Gilroy or East Gilroy MOWF, and the MOWS near Turner Island Road. The Authority anticipates that the amount of hazardous waste generated from operation of the stations, MOWF, and the MOWS near Turner Island Road would be less than the amount of nonhazardous solid waste generated from these facilities. The total amount of hazardous waste generated from the stations, MOWF, and MOWS near Turner Island Road is assumed to not exceed 4,767 cubic yards per year based on the amount of nonhazardous solid waste generated.

The Kettleman Hills hazardous waste disposal facility in Kings County, California has a remaining disposal capacity of approximately 4.9 million cubic yards based on DTSC approval of a permitted expansion in 2014 (DTSC 2014; Kettleman Hills Landfill 2017). The Clean Harbors Buttonwillow Facility has a permitted hazardous waste disposal capacity of 13.25 million cubic yards and an estimated closure date of 2040 (CalRecycle 2014b). The estimated generation of 4,767 cubic yards of hazardous waste from the maintenance facilities represents approximately 0.05 percent of the estimated 9.9 million cubic yards of available hazardous waste landfill capacity for the two landfills. Therefore, hazardous waste landfill capacity is adequate for the anticipated hazardous waste generation for the operation of each project alternative.

CEQA Conclusion

There would be a less-than-significantless than significant impact under CEQA from continuous permanent solid waste generation during operation and a less-than-significantless than significant impact from continuous permanent hazardous waste generation during operation. Operation of the project would not generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure, and would not impair the attainment of sState or local solid waste reduction goals.There would be a less than significant impact under CEQA from nonhazardous solid and hazardous waste generation during operation and maintenance activities for any of the alternatives because solid nonhazardous and hazardous waste generated during these operations and maintenance activities would not exceed the capacity of permitted solid waste landfills in the RSA and would not exceed the permitted capacity of hazardous waste landfills in California. No new solid waste disposal infrastructure and no new hazardous waste disposal infrastructure would need to be constructed and permitted as result of the project, and solid waste generation from project operation would not impair the attainment of solid waste reduction goals. Solid waste would be disposed of in accordance with solid waste landfill permit requirements and hazardous waste would be disposed of in a manner consistent with RCRA regulations (HMW-IAMF#7, HMW-IAMF#10). As part of project operations, the Authority would comply with regulations that control the transport, use, storage, and disposal of hazardous materials and hazardous wastes generated during operation. The Authority would implement a written hazardous materials and hazardous waste management plan that would describe responsible parties and procedures for hazardous waste transport, containment, storage and disposal and hazardous material and hazardous waste management BMPs and monitor regulatory compliance of operations (HMW-IAMF#7, HMW-IAMF#10). Through proper disposal at landfills and the safe handling and management of solid and hazardous wastes, the project would minimize impacts from the continuous permanent generation of nonhazardous solid and hazardous waste. Therefore, CEQA does not require mitigation.

3.6.6.3 Energy

Construction of the project would result in temporary and permanent impacts on energy resources, including electricity, natural gas, and petroleum products. Construction of the alternatives would consume energy for demolition of existing structures; clearing and grubbing; handling, storing, hauling, excavating, and placing fill; and construction of aerial structures, bridges, tunnels, road modifications, utility upgrades and relocations, HSR electrical systems, and railbeds. Operation of the project would consume energy for operation of the HSR trains, stations, and maintenance facilities.

No Project Impacts

The population in Santa Clara, San Benito, and Merced Counties is projected to grow through 2040, as discussed in Chapter 2. Demand for energy would increase at a level commensurate with population growth. The region would increase peak and base period electricity demand and would require additional generation and transmission capacity. According to the CEC Energy Assessments Division's Demand Analysis Office, the average annual growth rate for statewide base electricity demand between 2017 and 2027 is forecasted to increase between 0.7 percent (low energy demand) and 1.4 percent (high energy demand) (CEC 2017b). The CEC analysis included forecasted impacts of approved efficiency programs, climate change, electric vehicles, other electrification (including ports and HSR), and demand response (time of use pricing) programs. Energy use in Santa Clara, San Benito, and Merced Counties would be anticipated to trend along the forecasted state average during this same time period.

Without the HSR project, the forecasted population growth would increase pressure to expand highway and airport capacities. The Authority estimates that additional highway and airport projects (up to 4,300 highway lane miles, 115 airport gates, and 4 airport runways) would be needed to achieve equivalent capacity and relieve the increased pressure (Authority 2012a). This expansion of airports and highways would increase VMT and airline flights and increase the demand for energy resources including electricity, natural gas, and petroleum fuels. Under the No Project Alternative, the beneficial effect of reductions in statewide energy consumption related to reductions in VMT and reductions in airline flights from operation of the HSR would not occur.

Under the No Project Alternative, recent development trends are anticipated to continue, leading to impacts on energy. Impacts would include the conversion of existing land to residential, commercial, industrial, and transportation infrastructure to accommodate future growth, placing potential pressures on energy resources. Increased electricity demand would be provided by fossil fuel and renewable electricity sources in California and in other states. Under California SB X1-2 (2011) retail sellers of electricity in California will be required to serve 33 percent of their electricity load with renewable energy by December 31, 2020 (CEC 2017d). Planned development and transportation projects that would occur under the No Project Alternative would likely include various forms of mitigation to address impacts on energy.

Project Impacts

Construction Impacts

Construction of the project would include demolition of existing structures; clearing and grubbing; handling, storing, hauling, excavating, and placing fill; and construction of aerial structures, bridges, trenches, tunnels, HSR electrical systems, railbeds, and stations and maintenance facilities. Construction activities would involve operation of vehicles for transporting materials, equipment and workers, operation of excavators, graders, TBMs, and other earthmoving equipment for construction in the right-of-way, operation of cranes and other overhead equipment for demolition of buildings and structures and construction in the right-of-way, operation of helicopters that would be used for reconductoring of electric transmission lines to provide electricity to the HSR, and operation of portable generators, pumps, and other construction equipment that would consume petroleum fuels. Construction activities would also include providing lighting for construction work areas and operation of equipment that would consume electricity. Chapter 2 describes construction activities in more detail.

Impact PUE#12: Temporary Consumption of Energy during Construction

Construction of the project would require consumption of petroleum fuels temporarily during the construction period for operation of vehicles to transport materials, equipment, and workers, operation of earthmoving equipment, cranes, and other overhead construction equipment, and operation of helicopters for reconductoring electric transmission lines. Construction of the project would require consumption of electricity to provide lighting to construction work areas and to operate construction equipment.

The amount of energy consumed for construction of the project depends on the characteristics of the alternative, particularly the lengths of elevated, tunnel and trench, and at-grade guideway work. Table 3.6-16 provides a comparison of the project alternatives, which shows the estimated construction energy consumption for the construction of the alternatives between 2022 and 2028, and PG&E network upgrades from 2027 to 2028. The energy consumption estimates for constructing the project alternatives are 22,745 billion Btu for Alternative 1, 28,755 billion Btu for Alternative 2, 24,015 billion Btu for Alternative 3, and 29,280 billion Btu for Alternative 4.

Table 3.6-16 Estimated Nonrecoverable Construction-Related Energy Consumption for the Project Alternatives

Year	Gallons per year			Electricity MWh per year	Energy Consumption Billion Btu per year
	Gasoline	Diesel	Jet Fuel[1]		
Alternative 1					
2022	2,195,520	22,379,010	0	37,220	3,340
2023	2,998,245	29,195,440	0	96,790	4,370
2024	3,693,050	33,473,690	0	100,370	5,040
2025	2,736,350	28,644,480	0	100,330	4,265
2026	1,269,370	15,693,310	0	100,280	2,310
2027	1,033,910	15,206,990	250	22,080	2,210
2028	284,450	8,580,280	250	0	1,210
Total	14,209,890	153,173,200	500	457,070	22,745
Alternative 2					
2022	2,735,130	28,257,060	0	37,220	4,210
2023	3,749,550	37,296,170	0	96,790	5,580
2024	4,615,555	42,633,810	0	100,370	6,410
2025	3,206,860	34,153,960	0	100,330	5,080
2026	1,645,340	19,877,040	0	100,280	2,930
2027	1,561,670	22,186,060	250	22,080	3,240
2028	356,500	9,185,400	250	0	1,305
Total	17,870,600	193,589,510	500	457,070	28,755

Year	Gallons per year			Electricity MWh per year	Energy Consumption Billion Btu per year
	Gasoline	Diesel	Jet Fuel[1]		
Alternative 3					
2022	2,119,030	23,108,410	0	37,220	3,430
2023	3,129,215	31,893,810	0	96,790	4,760
2024	3,877,470	35,513,620	0	100,370	5,350
2025	2,684,680	29,488,180	0	100,330	4,375
2026	1,281,910	17,219,965	0	100,280	2,520
2027	1,101.240	16,166,705	250	22,080	2,350
2028	293,140	8,686,490	250	0	1,230
Total	14,486,690	162,077,180	500	457,070	24,015
Alternative 4					
2022	3,128,885	27,029,950	0	37,220	4,090
2023	3,988,430	35,237,200	0	96,790	5,320
2024	4,722,590	42,233,420	0	100,370	6,370
2025	3,826,940	37,784,080	0	100,330	5,650
2026	1,875,750	20,115,895	0	100,280	2,990
2027	1,857,400	24,593,180	250	22,080	3,600
2028	400,340	8,800,860	250	0	1,260
Total	19,800,340	195,794,590	500	457,070	29,280

Source: Authority 2018a
Table values may not sum to totals on account of rounding
[1] Consumption of jet fuel would be for operation of helicopters that would be used to install electrical equipment for reconductoring of transmission towers after the initial Phase I Startup; reconductoring work would begin in 2030 and would be completed within an approximate 24-month timeframe,
MWh = megawatt hour

Although measurable, the energy used for construction would not require significant additional capacity nor significantly increase peak- or base-period demands for electricity. Statewide summer peak electricity demand in 2015 was estimated at approximately 47,188 MW and in 2016 was estimated at approximately 47,529 MW (Cal-ISO 2015, 2016c). Peak electricity consumption for construction is not expected to vary substantially during the construction period; peak electricity consumption during the construction period would be approximately 76 MW for all alternatives based on 6,000 construction hours over the construction period. Projected peak demand for the Greater Bay Area (which includes Santa Clara County) is projected to be 7,745 MW in 2021 and 8,060 MW in 2026, and projected peak demand in the Greater Fresno Area (which includes Merced County) is projected to be 2,214 MW in 2021 and 2,744 in 2026 (Cal-ISO 2017b). Electricity consumption for construction for all alternatives represents approximately 0.7 percent of the projected reginal peak electricity demand in 2026. Based on estimated peak electricity consumption, no new electric generating capacity would need to be built to supply electricity to meet peak demand for electricity during project construction.

Total gasoline demand for construction of the alternatives would be approximately 14.2 million gallons for Alternative 1, 17.9 million gallons for Alternative 2, 14.4 million gallons for Alternative 3, and 19.8 million gallons for Alternative 4. These values include implementation of the HSR Sustainability Policy and implementation of specific sustainability requirements included by the

Authority in the contract for design-build services (PUE-IAMF#1: Design Measures). In 2016, sales of gasoline to end users in California were approximately 4,341,000 gpd (EIA 2017a, 2017b). Gasoline consumption for construction of Alternative 1 represents 0.85 percent of statewide gasoline consumption, 1.13 percent for Alternative 2, 0.91 percent for Alternative 3, and 1.25 percent for Alternative 4.

Total diesel fuel demand for construction of the alternatives would be approximately 153 million gallons for Alternative 1, 193 million gallons for Alternative 2, 162 million gallons for Alternative 3, and 196 million gallons for Alternative 4 over the HSR construction period and the PG&E network upgrades in 2027–2028. These values include implementation of the HSR Sustainability Policy and implementation of specific sustainability requirements included by the Authority in the contract for design-build services (PUE-IAMF#1). In 2016 sales of diesel fuel to end users in California were approximately 1,093,000 gpd (EIA 2017a, 2017b). Project construction diesel fuel consumption therefore represents approximately 12.7 percent of total statewide diesel fuel sales in California for Alternative 1, 16.1 percent for Alternative 2, 13.6 percent for Alternative 3, and 16.4 percent for Alternative 4.

CEQA Conclusion

There would be a less than significant impact under CEQA on electric energy resources from any of the project alternatives because energy consumption during project construction would not place a substantial demand on regional energy supply, require construction of additional electric generating capacity, or substantially increase peak- or base-period electricity demand. Construction of the project would not result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources or conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Based on estimated peak electricity consumption, no new electric generating capacity would need to be built to supply electricity to meet peak demand for electricity during project construction. Construction energy consumption would not require additional petroleum fuel production or distribution capacity to supply gasoline or diesel fuel. The proposed project would decrease overall energy consumption and reduce wasteful, inefficient, and unnecessary consumption of energy resources for other modes of transportation. Energy expended in the construction of the HSR system would be paid back over the course of the payback period in the form of a net decrease in overall transportation energy consumption. After the energy spent building the HSR system is paid back in reduced overall transportation consumption, every year after that would represent energy savings. The project would minimize construction energy consumption through implementation of the Authority's Sustainability Policy and specific sustainability requirements included by the Authority in the contract for design-build services (PUE-IAMF#1). Therefore, CEQA does not require mitigation.

Operations Impacts

Operation of the project would involve scheduled train travel along the HSR line through the project, as well as inspection and maintenance along the track and railroad right-of-way and at stations, on structures, fencing, power system, positive train control, and communications. Chapter 2 describes operations and maintenance activities in more detail.

Impact PUE#13: Continuous Permanent Impacts from Energy Consumption during Operations

Operation of the project would consume energy for operation of the HSR and operation of the stations and maintenance facilities. The project design team estimated that operation of the proposed San Jose Diridon Station would consume 440,680 cubic feet per year of natural gas (approximately 457 million British thermal units [MMBtu] per year) and 2.79 million kWh of electricity per year. The existing San Jose Diridon Station consumed 98,500 cubic feet per year (approximately 102 MMBtu per year) of natural gas and 624,000 kWh per year of electricity (approximately 2,128 MMBtu per year) in 2016 for lighting and operation of electrical equipment. Natural gas and electricity consumption for operation of the San Jose Diridon Station would be the same for all alternatives. The Downtown Gilroy/East Gilroy Station would have natural gas service. Operation of the Downtown Gilroy Station would consume approximately 1.82 million kWh per year and 288,100 cubic feet per year of natural gas. Operation of the East Gilroy Station would consume approximately 1.77 million kWh per year and 280,000 cubic feet per year of natural gas. The existing Gilroy Station consumed approximately 5,040 kWh per year of electricity in 2016 for lighting and operation of electrical equipment. The existing Gilroy Station does not have natural gas service.

Operation of the MOWF and MOWS would also consume electricity and natural gas. The MOWF would consume 1.09 million kWh of electricity per year and 9,500 MMBtu per year (9.16 MMcf) of natural gas. The MOWS would consume 1.37 million kWh per year of electricity and 3,240 MMBtu per year (3.12 MMcf) of natural gas. Estimated electricity consumption for operation of the maintenance facilities would be the same for all alternatives (Authority 2018b).

Vehicle and equipment operations at the MOWF would consume diesel fuel. MOWF vehicle and equipment operations would include operation of locomotives, track treatment machinery, right-of-way inspection and maintenance equipment, and hi-rail construction vehicles on the rail line. MOWF vehicle and equipment operations would consume approximately 224,500 gallons per year of diesel fuel, equivalent to 30,700 MMBtus per year of energy consumption (Authority 2018b).

Operations of any of the project alternatives would use an electrified line supporting electric vehicles with traction power connected to existing PG&E substations (see Chapter 2). For determining HSR energy consumption, analysts assumed use of a Siemens ICE-3 Velaro vehicle operating as two 8-car trainsets and traveling 43.1 million annual train miles by 2040. Table 3.6-17 shows the electricity consumption for HSR operation under two ridership scenarios—medium and high ridership—in 2029 and 2040. Energy consumption for 2029 is estimated to be 147,283 MMBtu per year under the medium ridership scenario and 162,012 MMBtu under the high ridership scenario for all project alternatives. This represents approximately 0.15 percent of the 2015 statewide electricity consumption. Energy consumption for 2040 is estimated to be 172,495 MMBtu per year under the medium ridership scenario and 189,745 MMBtu per year under the high ridership scenario for all project alternatives, which represents between 0.16 and 0.18 percent of the 2015 statewide electricity consumption.

Medium and High Ridership Scenarios

The medium ridership and high ridership forecasts reflect the uncertainty of the ultimate ridership of the HSR system, which is dependent on many factors, such as the future price of gasoline and population growth. Analysts have evaluated two ridership scenarios to be reflective of a range of expected ridership expected over the coming decades.

Table 3.6-17 HSR Operational Electricity Consumption (Medium and High Ridership Scenarios)

County/Region	HSR Operational Electricity Consumption (MMBtu/year) 2029	2040
Medium Ridership Scenario		
Santa Clara, San Benito, and Merced Counties	147,280	172,490
Statewide	1,338,940	1,568,140
High Ridership Scenario		
Santa Clara, San Benito, and Merced Counties	162,010	189,740
Statewide	1,472,830	1,724,950

HSR = high-speed rail
MMBtu = million British thermal units

Project features would incorporate design elements to minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on HSR trains and at station and maintenance facilities, implementing energy-saving measures during construction, and automatic train operations to maximize energy efficiency during operations), such that operations would not overburden utility services (PUE-IAMF#1). The design elements would be included in the design-build contract. Additionally, the Authority has adopted a sustainability policy that establishes project design requirements that avoid and minimize energy consumption during operations (Authority 2016a).

The HSR system, including the project, would obtain power from California's electricity grid. The HSR system is expected to require less than 1 percent of the state's future electricity consumption. In 2008, a study performed by Navigant Consulting, Inc. found that while the HSR would be supplied with energy from the California grid, it is not feasible to physically control the flow of electricity from particular sources (Navigant Consulting, Inc. 2008). However, it would be feasible for the Authority to obtain the quantity of power required for the HSR from 100 percent clean, renewable energy sources through a variety of mechanisms, such as paying a clean-energy premium for consumed electricity. An industry survey in April 2013 indicated that there is sufficient renewable energy capacity to meet the system demand (Authority and FRA 2017). Under the 2013 Policy Directive POLI-PLAN-03, the Authority has adopted a goal to purchase 100 percent of the HSR system's power from renewable energy sources (Authority 2016a).

The HSR system would decrease automobile VMT and reduce energy consumption by automobiles, resulting in an overall reduction in energy use for intercity and commuter travel. Table 3.6-18 shows the change in estimated daily VMT and associated energy consumption with and without the HSR system for the medium and high ridership scenarios for 2029 and 2040. HSR operation would reduce daily VMT in Santa Clara, San Benito, and Merced Counties by 333 to 450 million VMT per year in 2029 for the medium and high ridership scenarios, and by 600 to 816 million VMT per year in 2040 for the medium and high ridership scenarios. These values, together with associated average daily speed estimates, were used to develop predictions of the change in energy use associated with VMT for the three counties. The reduction in energy use from the VMT reduction in Santa Clara, San Benito, and Merced Counties in 2029 ranges from 1,042,630 to 1,407,320 MMBtu per year under the medium and high ridership scenarios. The reduction in energy use from the VMT reduction in Santa Clara, San Benito, and Merced Counties in 2040 ranges from 1,675,010 to 2,346,490 MMBtu per year for all of the alternatives under the medium and high ridership scenarios.

Table 3.6-18 Estimated Changes in Vehicle Miles Traveled and Energy Consumption (Medium and High Ridership Scenarios)[1 2]

County/Region	Existing Conditions (2015)		Future Conditions (2029)		Future Conditions (2040)	
	VMT	Energy Consumption (MMBtu/year)	Change in VMT between 2029 Plus Project and 2029 No Project	Change in Energy Consumption between 2029 Plus Project and 2029 No Project (MMBtu/year)	Change in VMT between 2040 Plus Project and 2040 No Project	Change in Energy Consumption between 2040 Plus Project and 2040 No Project (MMBtu/year)
Medium Ridership Scenario						
Santa Clara	10,312,374,120	49,592,630	(130,784,260)	(418,090)	(229,877,270)	(655,140)
San Benito	620,032,420	2,952,290	(88,111,050)	(275,740)	(170,347,440)	(491,770)
Merced	1,239,904,080	5,758,080	(114,392,300)	(348,800)	(200,035,650)	(528,100)
Region	**12,172,310,620**	**58,303,000**	**(333,287,610)**	**(1,042,630)**	**(600,260,360)**	**(1,675,010)**
Statewide	**205,015,920,150**	**930,015,060**	**(2,266,597,310)**	**(6,782,860)**	**(4,768,401,550)**	**(7,487,640)**
High Ridership Scenario						
Santa Clara County	10,283,778,970	49,455,110	(175,990,310)	(562,610)	(310,866,450)	(885,960)
San Benito County	613,186,470	2,919,690	(119,948,290)	(375,370)	(234,739,760)	(669,620)
Merced County	1,217,771,430	5,655,290	(153,925,340)	(469,340)	(269,980,880)	(790,910)
Region	**12,114,736,870**	**58,030,090**	**(449,863,940)**	**(1,407,320)**	**(815,587,090)**	**(2,346,490)**
Statewide	**203,997,417,630**	**925,394,820**	**(3,137,576,250)**	**(4,067,685)**	**(6,555,992,320)**	**(16,978,030)**

Source: Authority 2019
(Parenthesis) indicate negative values
Table values may not sum to totals on account of rounding
[1] Based on energy consumption for operation of the HSR; these values do not include electricity consumption for operation of the stations and maintenance facilities.
2 Analysts developed the two scenarios (medium ridership and high ridership) for three different years: 2015 Existing Conditions, 2029 Plus Project conditions (opening), and 2040 Plus Project conditions (Phase 1 of the HSR system horizon 2040). Both scenarios are based on the level of ridership as presented in Connecting and Transforming California, 2016 Business Plan (Authority 2016b). These scenarios assume different background conditions. For example, forecast trends in demographics and travel costs can influence ridership for any HSR scenario. The medium scenario was developed using the “most likely” values of all inputs to the HSR ridership forecasting model, while the high scenario used inputs that were set at values that result in ridership at the 75th percentile of the range considered in the ridership risk analysis. The 2016 Business Plan provides additional detail on the travel forecasts and risk analysis.
HSR = high-speed rail
MMBtu = million British thermal units
VMT = vehicle miles traveled

In addition, the number of airplane flights statewide (intrastate) would decrease with implementation of the HSR system when analyzed against the future No Project and existing conditions because some travelers would choose to use the HSR rather than fly to their destination. Table 3.6-19 shows the reduction in the number of airplane flights associated with the project alternatives for the medium and high ridership scenarios.

Table 3.6-19 Estimated Changes in Airplane Flights and Energy Consumption (Medium and High Ridership Scenarios) [1 2]

County/ Region	Existing Conditions (2015)		Future Conditions (2029)		Future Conditions (2040)	
	Flights	Energy Consumption (MMBtu/year)	Change in Flights between 2029 Plus Project and 2029 No Project	Change in Energy Consumption between 2029 Plus Project and 2029 No Project (MMBtu/year)	Change in Flights between 2040 Plus Project and 2040 No Project	Change in Energy Consumption between 2040 Plus Project and 2040 No Project (MMBtu/year)
Medium Ridership Scenario						
Bay Area	91,120	10,932,600	(20,660)	(2,478,640)	(44,000)	(5,279,340)
Statewide	268,570	32,221,210	(52,140)	(6,255,290)	(111,370)	(13,362,110)
High Ridership Scenario						
Bay Area	85,060	10,205,660	(22,640)	(2,716,740)	(42,120)	(5,052,810)
Statewide	250,280	30,026,780	(57,640)	(6,915,450)	(107,150)	(12,855,700)

Source: Authority 2019
(Parenthesis) indicate negative values
[1] Based on energy consumption for operation of the HSR trains; these values do not include electricity consumption for operation of the stations and maintenance facilities.
[2] Analysts developed the two scenarios (medium ridership and high ridership) for three different years: 2015 Existing Conditions, 2029 Plus Project conditions (opening), and 2040 Plus Project conditions (Phase 1 of the HSR system horizon 2040). Both scenarios are based on the level of ridership as presented in Connecting and Transforming California, 2016 Business Plan (Authority 2016b). These scenarios assume different background conditions. For example, forecast trends in demographics and travel costs can influence ridership for any HSR scenario. The medium scenario was developed using the “most likely” values of all inputs to the HSR ridership forecasting model, while the high scenario used inputs that were set at values that result in ridership at the 75th percentile of the range considered in the ridership risk analysis. The 2016 Business Plan provides additional detail on the travel forecasts and risk analysis.
MMBtu = million British thermal units

Analysts estimated the number of air trips removed as a result of the HSR system by using the travel demand modeling analysis conducted for the project. The average full flight cycle fuel consumption rate for aircraft was based on the profile of aircraft currently servicing the San Francisco to Los Angeles airline corridor. Operation under the medium ridership scenario would reduce energy consumption from airplane flights by 2,478,640 MMBtu per year for the Bay Area and by 6,255,290 MMBtu per year statewide in 2029. Operation under the high ridership scenario would reduce energy consumption from airplane flights by 2,716,740 MMBtu per year for the Bay Area and by 6,915,450 MMBtu per year statewide in 2029. Operation under the medium ridership scenario would reduce energy consumption from airplane flights by 5,279,340 MMBtu per year for the Bay Area and by 13,362,110 MMBtu per year statewide in 2040. Operation under the high ridership scenario would reduce energy consumption from airplane flights by 5,052,810 MMBtu per year for the Bay Area and by 12,855,700 MMBtu per year statewide in 2040.

Table 3.6-20 and Table 3.6-21 provide a summary of energy consumption for project operation, as well as the resulting changes in regional and statewide energy consumption from the reduction in VMT and airplane flights that would occur as a result of operation of the HSR for 2029 and 2040. Operation of the project in 2029 would reduce regional energy consumption by 3,373,990 MMBtu per year under the medium ridership scenario and by 3,962,050 MMBtu per year under the high ridership scenario. Operation of the project in 2029 would reduce statewide energy consumption by 11,699,210 MMBtu per year under the medium ridership scenario and by 9,510,300 MMBtu per year under the high ridership scenario. Operation of the project in 2040 would reduce regional energy consumption by 6,781,860 MMBtu per year under the medium ridership scenario and by 7,209,560 MMBtu per year under the high ridership scenario. Operation of the project in 2040 would reduce statewide energy consumption by 19,281,610 MMBtu per year under the medium ridership scenario and by 28,108,780 MMBtu per year under the high ridership scenario.

Construction of the project alternatives would consume energy including electricity and fuels. As shown in Table 3.6-20 and Table 3.6-21, construction of the project alternatives would consume between 22,760,000 MMBtu and 29,290,000 MMBtu. The energy consumed during construction would be offset by the savings in energy consumption from the reduction in VMT and flights. It would take between 6 and 9 years of regional energy reductions to recoup the energy consumed during construction of the project alternatives and between 2 to 3 years of statewide energy reductions to recoup the energy consumed during construction of the project alternatives. The payback period of regional energy reductions for the energy consumption for construction would range from a low of 6.8 years under the medium ridership scenario and 5.7 years under the high ridership scenario for Alternative 1, and a high of 8.7 years under the medium ridership scenario and 7.4 years under the high ridership scenario for Alternative 4.

Operation of the project would not require construction of significant additional electrical generation capacity nor would operation significantly increase peak- or base-period demands for electricity. The project would increase electricity demand. Because of the anticipated times of peak rail travel, impacts on electricity generation and transmission facilities would be particularly focused on peak electricity demand periods (4:00 p.m. to 6:00 p.m.). According to the Statewide Program EIR/EIS (Authority and FRA 2005), the HSR would increase peak electricity demand on the state's generation and transmission infrastructure by an estimated 480 MW. Based on the assumption that this peak demand would be evenly spread throughout the system, the Project Section (17 percent of total system) would require approximately 82 MW of additional peak capacity, and the Project Section would result in approximately 5.8 MW base electricity demand (172,495 MMBtu per year) for the medium ridership scenario and approximately 6.4 MW base electricity demand (189,745 MMBtu per year) for the high-ridership scenario. Although electricity supply in 2040 cannot be predicted, given the planning period available and the known demand from the project, energy providers have sufficient information to include the HSR in their demand forecasts.

Cal-ISO has projected growth in electricity demand through 2040 in planning documents and projects the need for an additional 86,000 MW of peak summer capacity between 2017 and 2040 to meet the projected 2040 demand with an adequate reserve margin (Cal-ISO 2015). The Authority expects that the planned additions in capacity projected by Cal-ISO would be met by electricity providers and that available capacity in 2040 would therefore be sufficient to supply electricity for project operations. Based on the projected increase in electricity demand and projected addition of capacity, electricity consumption for project operations would represent less than 0.25 percent of energy demand in Santa Clara, San Benito, and Merced Counties in 2040 (Table 3.6-17).

Project operations would not require construction of appreciable additional capacity to supply fuel The project would minimize operation energy consumption by adopting and incorporating in the HSR project design utilities and design elements that would minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on HSR trains and at station facilities, and implementing automatic control of train operations to maximize energy efficiency during operations).

Table 3.6-20 Summary of Regional Changes in Energy Consumption (Medium and High Ridership Scenarios) [1]

Construction Energy Consumption (Billion Btu)			
Alt 1	Alt 2	Alt 3	Alt 4
22,760	28,750	24,010	29,290

Project Operation Energy Consumption (MMBtu/year)		Change in Energy Consumption from Reduced VMT (MMBtu/year)		Change in Energy Consumption from Reduced Airline Flights (MMBtu/year)		Total Reduction in Energy Consumption (MMBtu/year)		Payback Period (years) (2029)			
2029	2040	2029	2040	2029	2040	2029	2040	Alt 1	Alt 2	Alt 3	Alt 4
Medium Ridership Scenario											
147,283	172,495	(1,042,630)	(1,675,010)	(2,478,640)	(5,279,340)	(3,373,990)	(6,781,860)	6.8	8.5	7.1	8.7
High Ridership Scenario											
162,011	189,745	(1,407,320)	(2,346,490)	(2,716,740)	(5,052,810)	(3,962,050)	(7,209,560)	5.7	7.3	6.1	7.4

Source: Authority 2019
(Parenthesis) indicate negative values
[1] Analysts developed the two scenarios (medium ridership and high ridership) for three different years: 2015 Existing Conditions, 2029 Plus Project conditions (opening), and 2040 Plus Project conditions (Phase 1 of the HSR system horizon 2040). Both scenarios are based on the level of ridership as presented in Connecting and Transforming California, 2016 Business Plan (Authority 2016b). These scenarios assume different background conditions. For example, forecast trends in demographics and travel costs can influence ridership for any HSR scenario. The medium scenario was developed using the "most likely" values of all inputs to the HSR ridership forecasting model, while the high scenario used inputs that were set at values that result in ridership at the 75th percentile of the range considered in the ridership risk analysis. The 2016 Business Plan provides additional detail on the travel forecasts and risk analysis.
MMBtu = million British thermal units
VMT = vehicle miles traveled

Table 3.6-21 Summary of Statewide Changes in Energy Consumption (Medium and High Ridership Scenarios) [1]

Construction Energy Consumption (Billion Btu)			
Alt 1	Alt 2	Alt 3	Alt 4
22,760	28,750	24,010	29,290

Project Operation Energy Consumption (MMBtu/year)		Change in Energy Consumption from Reduced VMT (MMBtu/year)		Change in Energy Consumption from Reduced Airline Flights (MMBtu/year)		Total Reduction in Energy Consumption (MMBtu/year)		Payback Period (years) (2029)			
2029	2040	2029	2040	2029	2040	2029	2040	Alt 1	Alt 2	Alt 3	Alt 4
Medium Ridership Scenario											
1,338,940	1,568,140	(6,782,860)	(7,487,640)	(6,255,290)	(13,362,110)	(11,699,210)	(19,281,610)	2.0	2.5	2.1	2.5
High Ridership Scenario											
1,472,840	1,724,950	(4,067,690)	(16,978,030)	(6,915,450)	(12,855,700)	(9,510,300)	(28,108,780)	2.4	3.0	2.5	3.1

Source: Authority 2019
(Parenthesis) indicate negative values
MMBtu = million British thermal units
VMT = vehicle miles traveled
[1] Analysts developed the two scenarios (medium ridership and high ridership) for three different years: 2015 Existing Conditions, 2029 Plus Project conditions (opening), and 2040 Plus Project conditions (Phase 1 of the HSR system horizon 2040). Both scenarios are based on the level of ridership as presented in Connecting and Transforming California, 2016 Business Plan (Authority 2016b). These scenarios assume different background conditions. For example, forecast trends in demographics and travel costs can influence ridership for any HSR scenario. The medium scenario was developed using the "most likely" values of all inputs to the HSR ridership forecasting model, while the high scenario used inputs that were set at values that result in ridership at the 75th percentile of the range considered in the ridership risk analysis. The 2016 Business Plan provides additional detail on the travel forecasts and risk analysis.

CEQA Conclusion

There would be a less than significant impact under CEQA because operation under all of the alternatives would result in a net decrease in transportation energy consumption from other modes of transportation. The proposed project results in energy savings, alleviates demand on energy resources, and encourages the use of efficient transportation alternatives, and thereby the project would have a beneficial effect. Operation of the HSR would result in a reduction in VMT in Santa Clara, San Benito, and Merced Counties and would result in a reduction in airplane flights in the Bay Area in which the project is located. The reduction in energy consumption for other modes of transportation that would result from operation of the HSR exceeds the increase in energy consumption for HSR operation of the in the project extent, resulting in a net decrease in statewide energy consumption. As a result, operation of the HSR would result in a net benefit to energy resources. Because the project would minimize energy consumption for operations, operation energy consumption would not place a substantial demand on regional energy supply or require substantial additional capacity or substantially increase peak- and base-period electricity demand. Through effective energy-saving design features and net reduction in energy consumption for transportation modes, there would be a beneficial impact on energy resources. Therefore, CEQA does not require mitigation.

3.6.7 Mitigation Measures

The following mitigation measure would be implemented for Alternative 1 and Alternative 2 to address impacts on public utilities.

Mitigation Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
PUE-MM#1: Replace Percolation Ponds at SCRWA Treatment Plant	X	X	N/A	N/A

N/A = not applicable

PUE-MM#1: Replace Percolation Ponds at SCRWA Treatment Plant

Prior to the commencement of any construction of Alternatives 1 or 2, the contractor would construct percolation ponds on existing SCRWA-owned agricultural land adjacent to the existing percolation ponds or on other land owned or acquired by the SCRWA to replace the net percolation capacity of the percolation ponds taken by project construction. The contractor would construct percolation ponds to provide at least the same amount of net percolation capacity and would demonstrate to the SCRWA that the net percolation capacity of the replacement ponds constructed would be at least equal to the net percolation capacity of the removed ponds. PUE-MM#1 would be implemented by the Authority, SCRWA, and the contractor, with oversight by the RWQCB, the oversight agency for the SCRWA.

Percolation Rate Study

The Authority would provide full funding to the SCRWA to conduct a study of the percolation rates of land owned by the SCRWA or available for acquisition by the SCRWA for the purposes of replacement of the percolation pond capacity. The SCRWA and the contractor would prepare a work plan for presentation to the RWQCB, the oversight agency for the SCRWA, for review and approval prior to installation of groundwater monitoring wells or commencement of other project work. The RWQCB must grant approval before any project work takes place.

Percolation rates are different for different soils and stratigraphies, and generally decrease from south to north in the area around the SCRWA facility. Percolation tests would be conducted to assess the potential locations and acreage of the replacement percolation ponds. Location(s) and acreage of the parcels needed for the replacement of the net percolation capacity would be determined based on the results of the study; the total acreage of replacement may exceed the 51 acres taken by the alignment construction, or may be less than the 51 acres, depending on soil characteristics and other factors. The same percolation rate study may also be used to identify additional parcels for potential expansion of the SCRWA wastewater treatment capacity; the current wastewater treatment capacity of the SCRWA WWTP is 9 mgd. The study would also be used to determine the location(s) of replacement monitoring wells to replace the two closed wells affected by construction of Alternatives 1 and 2, and to determine the locations of additional wells that would need to be installed for the purposes of monitoring the replacement percolation ponds.

Parcels that are adjacent to the existing percolation ponds are primarily agricultural land, and therefore the percolation rate study would include the construction and operation of groundwater monitoring wells to establish existing groundwater quality for parcels within and adjacent to the potential construction area for the replacement percolation ponds. The RWQCB may require installation of three or more monitoring wells (typically the wells would need to be about 50 feet deep in the areas near the SCRWA facility), and typically the RWQCB requires evaluation of groundwater quality and groundwater gradient data and preparation of an engineering report. SCRWA would conduct or oversee the study, installation and operation of monitoring wells, and preparation of the engineering report, at SCRWA's discretion, and fully funded by the Authority.

Preliminary Design and Construction Plan

Based on the results of the investigations and monitoring studies, the contractor, overseen by the SCRWA, would develop a preliminary design and construction plan for construction of replacement percolation ponds to replace by a ratio of at least 1:1 the net percolation capacity of the 51 acres of existing ponds that would be taken by the alignment construction. SCRWA would determine based on the results of the investigations and monitoring studies the location(s) and approximate acreage of the replacement ponds and the extent to which the replacement ponds could be built on land already owned by the SCRWA, and the extent (if any) to which the SCRWA would need to acquire land from private landowners or other parties for construction of the replacement ponds. The Authority would provide assistance to the SCRWA for acquisition of permits and approvals for required land acquisition and would provide full funding for any required land acquisition.

Detailed Design and Construction

The contractor would submit the preliminary design and construction plan to the SCRWA for review and approval prior to commencement of detailed design and construction. The SCRWA would coordinate with and provide oversight of the contractor for detailed design, construction, permitting, performance testing, and commissioning of the replacement ponds and all required ancillary equipment including pipelines, pumps, monitoring wells, other mechanical and electrical equipment, access roads, fences, and enclosures. The SCRWA would oversee the contractor's design, permitting, construction, performance testing, and commissioning of the percolation ponds. Performance testing guarantees would be included in the contractual agreement between the contractor and SCRWA. Performance guarantees would include successful acquisition of all permits and approvals required for construction and operation of the replacement percolation ponds and demonstration that the replacement percolation ponds, in operation, provide a net percolation capacity of at least a 1:1 replacement of the net percolation capacity of the ponds that would be taken by the alignment construction.

The Authority would enter into a contractual agreement with the SCRWA to provide the SCRWA with full funding for all costs associated with the removal of the existing percolation ponds and associated facilities equipment as well as construction of the replacement percolation ponds and associated facilities and equipment, including pre-construction studies, land acquisition (if any), and design, permitting, construction, performance testing, and commissioning of the replacement ponds. The Authority would not be responsible under the contractual agreement with the SCRWA for costs associated with operation of the replacement percolation ponds.

Mitigation Measure Performance Guarantees

This mitigation measure would be effective in replacing the net percolation capacity of the SCRWA percolation ponds that would be taken by the alignment construction, maintaining the SCRWA WWTP's capacity, and maintaining groundwater quality within permit limitations. Construction of replacement ponds of sufficient capacity to replace by at least 1:1 the net percolation capacity of the ponds that would be taken by the Alternative 1 and Alternative 2 alignment construction would maintain the treatment capacity of the SCRWA WWTP and would not result in any decrease in wastewater treatment capacity or result in reduction in the quality of the wastewater treatment. The contractor and the SCRWA would establish performance guarantees that the design, construction, and operation of the replacement ponds meets the performance criteria including the effective replacement of the net percolation capacity of the existing ponds. The RWQCB would require installation of groundwater monitoring wells prior to replacement percolation pond construction to establish existing groundwater quality and would require continued operation of groundwater monitoring wells to monitor operation of the replacement ponds and maintain groundwater quality in accordance with established operating permit conditions and the SCRWA's monitoring plan. The contractual agreement between the contractor and the SCRWA would require that the replacement percolation ponds be fully commissioned and commence full capacity operation prior to decommissioning and removal of the existing percolation ponds in order to avoid any reduction of treatment capacity or interruption of service. The construction and operation of replacement ponds would therefore not result in permanent effects on the operation of public utilities.

Secondary Impacts of Mitigation Measures

Implementing PUE-MM#1 would result in secondary impacts resulting from construction of the replacement ponds. Replacement pond construction would require conversion of existing land into percolation ponds, and may require acquisition of land that is not already owned by the SCRWA. Studies conducted by the contractor and overseen by the SCRWA would determine the total acreage of land that would need to be converted, and also determine the need for the SCRWA to acquire land that the SCRWA does not currently own. The existing ponds that would be taken by Alternative 1 and Alternative 2 alignment construction comprise approximately 51 acres; the amount of land that would be converted for construction of the replacement ponds could be either more or less than 51 acres depending upon the results of the studies and the design of the replacement percolation ponds. The amount of land that the SCRWA would need to acquire (if any) would also depend upon the results of the studies, including the results of percolation tests of various land parcels. Implementation of PUE-MM#1 would therefore result in loss of an amount of existing agricultural land, potential loss of land that is currently in other uses, and potential acquisition of land from private landowners or other parties and displacement of current land uses.

Implementation of PUE-MM#1 would also result in secondary air quality, noise, transportation (traffic), water quality, and waste management effects related to decommissioning and removal of the existing percolation ponds and construction of the replacement ponds. Air quality effects would result from fugitive dust generated from removal of the existing ponds and construction of the replacement ponds and operation of construction vehicles on unpaved roads. Air quality effects would also result from construction equipment (engine) air emissions. Noise effects would result from noise generated by operation of construction equipment and from decommissioning and construction activities. Transportation (traffic) effects would result from operation of workers' personal vehicles, construction equipment, and other vehicles, including for delivery vehicles, on public roads in the vicinity of the existing ponds and the replacement ponds. Solid waste that would require disposal or reuse could be generated from cut-and-fill activities needed for removal of the existing ponds and construction of the replacement ponds. Water quality effects could result from surface water and sediment runoff from construction sites.

Replacement of the percolation ponds and removal of the existing percolation ponds is mitigation. Construction of new percolation ponds and removal of the existing percolation ponds would be conducted by a municipal agency (or by municipal agency contractors) under appropriate permit conditions issued by state and local regulatory agencies. Reconstruction of the percolation ponds and demolition of the existing percolation ponds would be conducted in accordance with state and local regulatory requirements and in compliance with permit conditions. Therefore, there would be no significant secondary impacts from demolition and construction of the percolation ponds.

3.6.8 Impact Summary for NEPA Comparison of Alternatives

As described in Section 3.1.5.4, the effects of project actions under NEPA are compared to the No Project condition when evaluating the impact of the project on the resource. The determination of effect was based on the context and intensity of the change that would be generated by construction and operation of the project. Table 3.6-22 compares the project impacts by alternative, followed by a summary of the impacts.

Table 3.6-22 Comparison of Project Alternative Impacts for Public Utilities and Energy

Impacts	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Public Utilities				
Impact PUE#1: Planned and Accidental Temporary Interruption of Utility Service	Planned and accidental interruptions to utility services would be temporary and for short durations. There are 211 major utility lines within the RSA for Alternative 1.	Same as Alternative 1, except there are 301 major utility lines within the RSA for Alternative 2.	Same as Alternative 1, except there are 201 major utility lines within the RSA for Alternative 3.	Same as Alternative 1, except there are 380 major utility lines within the RSA for Alternative 4.
Impact PUE#2: Temporary Impacts from Water Use	Construction would require 4,339 acre-feet of water, which is 10 percent of the current water usage for the land within the project footprint.	Construction would require 4,205 acre-feet of water which is 9 percent of the current water usage for the land within the project footprint.	Construction would require 4,555 acre-feet of water, which is 10 percent of the current water usage for the land within the project footprint.	Construction would require 4,426 acre-feet of water, which is 10 percent of the current water usage for the land within the project footprint.
Impact PUE#3: Reduced Access to Existing Utilities in the HSR Right-of-Way	Access to utilities would be provided during and after construction of all project alternatives.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Impact PUE#4: Existing Major Utilities Requiring Relocation or Removal	Relocation of 158 major utility lines and protection in place of 45 utility lines; removal, realignment/ abandonment of 8 utility lines. Displacement of 3 percolation ponds comprising 51 acres at SCRWA WWTP.	Relocation of 234 major utility lines and protection in place of 60 major utility lines; removal, realignment/ abandonment of 7 utility lines. Displacement of 3 percolation ponds comprising 51 acres at SCRWA WWTP.	Relocation of 150 major utility lines and protection in place of 44 major utility lines; removal, realignment/ abandonment of 7 utility lines. No impact on the SCRWA WWTP.	Relocation of 163 major utility lines and protection in place of 102 major utility lines; removal, realignment/ abandonment of 12 utility lines. No impact on the SCRWA WWTP.

Impacts	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Impact PUE#5: Temporary Impacts from Construction of New Utility Infrastructure	Alternative 1 includes the construction of three TPSSs and co-located electric utility switching stations; each TPSS site occupying up to 2 acres; TPSS Site 4 would be built at one of two alternative sites in Gilroy. Alternative 1 includes reconductoring of three 115-kV power lines; construction of new potable water and wastewater lines to stations and maintenance facilities; construction of new stormwater management infrastructure in the Morgan Hill and Gilroy Subsection. New storm drainage infrastructure would be built in the Pacheco Pass Subsection.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Impact PUE#6: Temporary Impacts from Stormwater and Wastewater Generation during Construction	Construction would require 4,339 acre-feet of water resulting in potential generation of 0.41 mgd of wastewater, which is less than 0.2 percent of the total wastewater treatment capacity within the RSA.	Construction would require 4,205 acre-feet of water resulting in potential generation of 0.39 mgd of wastewater, which is less than 0.2 percent of the total wastewater treatment capacity within the RSA.	Construction would require 4,555 acre-feet of water resulting in potential generation of 0.45 mgd of wastewater, which is less than 0.25 percent of the total wastewater treatment capacity within the RSA.	Construction would require 4,426 acre-feet of water resulting in potential generation of 0.40 mgd of wastewater, which is less than 0.2 percent of the total wastewater treatment capacity within the RSA
Impact PUE#7: Temporary Generation of Solid Waste and Hazardous Waste during Construction	Construction would result in 199,300 cubic yards of solid waste from demolition activities.	Construction would result in 325,000 cubic yards of solid waste from demolition activities.	Construction would result in 184,800 cubic yards of solid waste from demolition activities.	Construction would result in 90,100 cubic yards of solid waste from demolition activities.

Impacts	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Impact PUE#8: Continuous Permanent Impacts from Water Use	Operations would consume 224,200 gpd including operation of stations and maintenance facilities. Project features would effectively recycle and reuse water where possible and reduce overall consumption	Same as Alternative 1.	Operations would consume 223,800 gpd; East Gilroy Station water consumption would be approximately 500 gpd less than for the Downtown Gilroy Station. Other water consumption would be the same as Alternative 1.	Same as Alternative 1.
Impact PUE#9: Continuous Permanent Impacts from Wastewater Generation	Operations would generate 224,200 gpd of wastewater including the operation of stations and maintenance facilities. Wastewater would be disposed of properly and handled safely and would not exceed the available treatment capacity of local wastewater facilities.	Same as Alternative 1.	Operations would generate 223,800 gpd of wastewater; East Gilroy Station wastewater generation would be approximately 500 gpd less than for the Downtown Gilroy Station. Other wastewater generation would be the same as Alternative 1.	Same as Alternative 1.
Impact PUE#10: Continuous Permanent Impacts on Storm Drainage Facilities	The impact on stormwater drainage facilities would not require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	Same as for Alternative 1	Same as for Alternative 1	Same as for Alternative 1
Impact PUE#11: Continuous Permanent Generation of Solid Waste and Hazardous Waste	Operations would generate approximately 2,560 cubic yards of solid waste annually. Solid waste and hazardous waste generation from operations would not exceed available disposal capacity.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

Impacts	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Energy				
Impact PUE#12: Temporary Consumption of Energy during Construction	Construction would require 22,745 billion Btu.	Construction would require 28,755 billion Btu.	Construction would require 24,015 billion Btu.	Construction would require 29,280 billion Btu.
Impact PUE#13: Continuous Permanent Impacts from Energy Consumption during Operations	Operations would result in a net decrease in regional energy consumption of 6,781,860 MMBtu per year for medium ridership scenario and a net decrease of 7,209,560 MMBtu per year for the high ridership scenario in 2040. It would take approximately 6.8 years and 5.7 years of regional energy reductions to recoup the energy consumed during construction under the medium and high ridership scenarios, respectively.	Same as Alternative 1, with the exception of the payback period for construction energy, which would be 8.5 and 7.3 years under the medium and high ridership scenarios, respectively.	Same as Alternative 1, with the exception of the payback period for construction energy, which would be 7.1 and 6.1 years under the medium and high ridership scenarios, respectively.	Same as Alternative 1, with the exception of the payback period for construction energy, which would be 8.7 and 7.4 years under the medium and high ridership scenarios, respectively.

Btu = British thermal unit
gpd = gallons per day
HSR = high-speed rail
MMBtu = million British thermal units
RSA = Resource Study Area
kV = kilovolt
SCRWA = South County Regional Wastewater Authority
TPSS = traction power substation
WWTP = wastewater treatment plant

The potential for interruptions to utility services would be greatest under Alternative 4, followed by Alternative 2, Alternative 1, and Alternative 3, depending on each alternative's proximity to major utility lines. Utility interruptions during construction would be temporary, and because users would receive advance notice of interruptions, any inconvenience to residents and businesses from relocation activities would be minimal. Utility identification would be completed prior to commencement of construction, thereby minimizing accidental utility interruptions.

Table 3.6-13 summarizes the number of major utility lines that would need to be permanently relocated or protected in place, or removed, extended, abandoned in place, or realigned during construction of each project alternative. Alternative 2 would result in the most (301) utility conflicts, while Alternative 3 would result in the fewest (201) utility conflicts. Alternative 1 would result in 211 utility conflicts. Alternative 4 would result in 380 utility conflicts, including relocations and protections in place and removals, extensions, abandonment in place, and realignments.

Construction of the project would not result in reduced access to existing utilities in the HSR right-of-way or in permanent conflicts with existing major utilities requiring protection in place, relocation, or removal. All conflicting utilities would be removed, relocated, abandoned in place, or protected in place during construction, and therefore there would be no permanent conflicts with utilities resulting from project construction. Project features include coordination with utility service providers to avoid permanent conflicts with utilities and coordination with service providers to allow for the continued access for maintenance of utility lines remaining within the right-of-way during operation. Relocations and reinstallation of utility lines would be conducted by the contractor and the utility service provider in accordance with design standards and regulatory requirements including CPUC General Order 131-D for electrical systems. Construction of new water, wastewater, or stormwater infrastructure would adhere to permit requirements and local water management authority standards and permit requirements, thereby minimizing impacts from construction of new utility infrastructure.

Construction of the project alternatives has the potential to affect existing utility facilities temporarily. The project alternatives would require the relocation of 158 major utility lines under Alternative 1, 234 major utility lines under Alternative 2, 150 major utility lines under Alternative 3, and 169 major utility lines under Alternative 4. The project alternatives would also require the protection in place of between 44 and 154 additional major utility lines. Alternative 2 would require the greatest number of utility relocations and Alternative 4 would require the greatest number of utility protections in place. In addition, under Alternative 2, the need to depress roadways to grade-separate the HSR alignment along Monterey Road, would require the installation of pump stations to maintain current functions of gravity-driven utilities lines such as storm drains and sanitary sewers within those roadway rights-of-way. Alternatives 1 and 2 would require the construction of new stormwater management infrastructure in the Morgan Hill and Gilroy Subsection and would result in the acquisition and displacement of 51 acres of wastewater treatment percolation ponds at SCRWA WWTP in Gilroy. Alternative 3 and Alternative 4 would not require the construction of new stormwater management infrastructure or affect the SCRWA WWTP.

Construction of the project alternatives would use from 4,205 to 4,555 acre-feet of water for the construction period. Alternative 1 would require 4,339 acre-feet, Alternative 2 would require 4,205 acre-feet, Alternative 3 would require 4,555 acre-feet, and Alternative 4 would require 4,426 acre-feet. The contractor would implement the Authority’s Water Conservation Guidance to minimize use of potable water for construction-related activities.

Wastewater would be generated from construction activities including concrete preparation excavation, dewatering, and TBM operation. The amount of water that would be consumed for operation of concrete batch plants, construction (including excavation), and TBM operation is assumed to be equal to the amount of wastewater that would be generated from those activities; the amount of additional wastewater that would be generated from dewatering activities would vary depending on site characteristics and therefore has not been separately estimated — Alternative 3 would generate the greatest amount of wastewater (4,251 acre-feet), while Alternative 2 would generate the least amount of wastewater (3,905 acre-feet), assuming all of the water used in construction results in wastewater generation.

Construction activities would not result in impacts on local wastewater treatment capacity because there would be sufficient capacity to treat the wastewater generated under any of the alternatives. Project features, including BMPs, implementation of the SWPPP, and conformance with the CGP and local wastewater management jurisdiction permit requirements, would minimize water use and thereby minimize wastewater generation.

Construction of the project would generate solid waste and hazardous waste from demolition of buildings and structures, excavation, and operation of construction equipment. The amount of solid waste generated would range from 90,100 cubic yards under Alternative 4 to 325,000 cubic yards under Alternative 2. Through implementation of a demolition plan, proper disposal at landfills, and the safe handling and management of hazardous materials, project features would minimize impacts from the temporary generation of solid and hazardous wastes. Existing landfills have adequate capacity for disposal of C&D material under all alternatives.

Operation of the project would not result in permanent impacts from water use. Potable and nonpotable water would be used for operation of the stations and maintenance facilities. Water use for operations would not result in water use impacts because construction of the project would result in a net decrease in water consumption for the proposed project as compared to existing land uses (e.g., agricultural uses,) of the land that would be used for the project footprint, as shown in Appendix 3.6.C, Water Use Assessment. Therefore, sufficient water supplies would be available to serve operation of the project and reasonably foreseeable future development during normal, dry, and multiple dry years. In addition, because project features allow for use of recycled or reclaimed water for nonpotable uses where available that would minimize the use of water resources, the amount of water consumed for project operations could be less than that estimated for this EIR/EIS analysis.

Operation of the project would not result in impacts from wastewater generation because wastewater generated at stations and maintenance facilities during operations would be discharged to the sewer system and would not exceed the available treatment capacity of local WWTPs or result in the need to expand existing or construct new wastewater treatment capacity. Operation would generate solid waste and hazardous waste from domestic trash at stations and maintenance facilities and waste generated from maintenance facility operation. Permanent generation of solid and hazardous waste would not result in impacts because implementation of a hazardous materials and waste management plan would minimize waste generation, and waste generation would not exceed available disposal capacity.

During construction, energy would be consumed to transport construction materials and to support major staging areas, field offices, and security lighting. Operation and maintenance of construction equipment during the construction period would also consume energy resources (fossil fuels). The energy consumption would range from 22,745 billion Btu to 29,280 billion Btu with payback periods for energy consumed during construction ranging from about 6.1 to 8.7 years. Energy use during construction would be temporary.

Operations of the project alternatives would decrease automobile VMT and reduce energy consumption by automobiles, resulting in an overall reduction in energy use for intercity and commuter travel. Due to the similarity in lengths of the project alternatives, impacts from energy use during operations would be the same for all project alternatives. The net change in energy use associated with the project alternatives would be an energy savings of 6,781,860 MMBtu/year in 2040 under the medium ridership scenario and 7,209,560 MMBtu/year in 2040 under the high ridership scenario.

3.6.9 CEQA Significance Conclusions

As described in Section 3.1.5.4, this section evaluates the impact of project actions under CEQA against thresholds to determine whether a project action would result in no impact, a less than significant impact, or a significant impact. Table 3.6-23 identifies the CEQA significance determinations for each impact discussed in Section 3.6.6, Environmental Consequences. A summary of the significant impacts, mitigation measures, and factors supporting the significance conclusion after mitigation follows the table.

Table 3.6-23 CEQA Significance Conclusions and Mitigation Measures for Public Utilities and Energy

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Mitigation Measures	CEQA Level of Significance after Mitigation
Public Utilities			
Impact PUE#1: Planned and Accidental Temporary Interruption of Utility Service	Less than significant for all alternatives: Through effective coordination and notification activities, project features (e.g., PUE-IAMF#3 and PUE-IAMF#4), would minimize potential effects on public utilities. The planned temporary reconstruction or relocation of major linear non-fixed facilities during project construction would be conducted in accordance with the construction safety management plan and safety and security management plan for the project (SS-IAMF#2).	No mitigation measures are required.	N/A
Impact PUE#2: Temporary Impacts from Water Use	Less than significant for all alternatives: Water conservation measures and use of nonpotable and recycled water for construction activities would reduce water use during construction. There is sufficient water supply available to serve project construction and reasonably foreseeable future development in normal, dry, and multiple dry years.	No mitigation measures are required.	N/A
Impact PUE#3: Reduced Access to Existing Utilities in the HSR Right-of-Way	Less than significant for all alternatives: Implementation of standard engineering and utility access practices for utilities remaining within the right-of-way and implementation of casing and maintenance access requirements for utilities remaining within the right-of-way would allow for the continued access to utilities for repair and maintenance while maintaining HSR operations. The project would not result in lengthy or harmful interruption of utility services due to restricted access.	No mitigation measures are required.	N/A

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact PUE#4: Permanent Conflicts with Existing Major Utilities Requiring Relocation	Significant for Alternative 1: Construction of Alternative 1 would displace wastewater treatment capacity at the percolation ponds operated by the SCRWA WWTP. 51 acres of existing percolation ponds would be displaced by construction of Alternative 1, resulting in a reduction in the facility's wastewater treatment capacity. Restoration of the reduced treatment capacity would require mitigation.	PUE-MM#1: Replace Percolation Ponds at SCRWA WWTP	Less than Significant
	Significant for Alternative 2: Construction of Alternative 2 would displace wastewater treatment capacity at the percolation ponds operated by the SCRWA WWTP. 51 acres of existing percolation ponds would be displaced by construction of Alternative 2, resulting in a reduction in the facility's wastewater treatment capacity, which could lead to a lengthy and harmful interruption of treatment service. Restoration of the reduced treatment capacity would require mitigation.	PUE-MM#1: Replace Percolation Ponds at SCRWA WWTP	Less than Significant
	Less than significant for Alternative 3 and Alternative 4: Alternatives 3 and 4 would not displace wastewater treatment capacity.	No mitigation measures are required.	N/A
Impact PUE#5: Temporary Impacts from Construction of New Utility Infrastructure	Less than significant for all alternatives: Relocation and construction of new and expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, and telecommunications facilities for the project would not cause significant environmental effects.	No mitigation measures are required.	N/A
Impact PUE#6: Temporary Impacts from Stormwater and Wastewater Generation	Less than significant for all alternatives: The contractor would construct new stormwater management structures in accordance with the SWPPP and stormwater management and treatment plan. Project features, such as implementing BMPs and a SWPPP, as well as complying with local jurisdiction municipal separate storm sewer system permit requirements and RWQCB requirements applicable to regional WWTPs, would minimize impacts from stormwater and wastewater generation.	No mitigation measures are required.	N/A

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact PUE#7: Temporary Generation of Solid Waste and Hazardous Waste	Less than significant for all alternatives: Waste generation would not exceed the capacity of existing facilities in the RSA and impacts would be avoided through safe handling and disposal procedures and through compliance with existing regulations. Solid waste landfills within the RSA have sufficient permitted capacity for disposal of solid waste that would be generated during construction of the project alternatives; solid and hazardous waste management for the project alternatives would comply with federal, state, and local requirements related to solid and hazardous waste.	No mitigation measures are required.	N/A
Impact PUE#8: Continuous Permanent Impacts from Water Use	Less than significant for all alternatives: There is sufficient water supply available to serve project operation and reasonably foreseeable future development in normal, dry, and multiple dry years.	No mitigation measures are required.	N/A
Impact PUE#9: Continuous Permanent Impacts from Wastewater Generation	Less than significant for all alternatives: Wastewater generated at stations and maintenance facilities would be discharged to the sewer system and would not exceed available treatment capacities of local WWTPs. The construction of new wastewater infrastructure or the expansion of existing facilities would not be required, and the wastewater generated by the Project would not exceed RWQCB wastewater treatment requirements.	No mitigation measures are required.	N/A
Impact PUE#10: Permanent Impacts on Storm Drainage Facilities	Less than significant for all alternatives: The project would not require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	No mitigation measures are required.	N/A

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact PUE#11: Continuous Permanent Generation of Solid Waste and Hazardous Waste	Less than significant for all alternatives: Waste generation during operations would not exceed the capacity of permitted solid and hazardous waste landfills and would be disposed of in a manner consistent with applicable regulations. Solid waste landfills within the RSA have sufficient permitted capacity for disposal of solid waste that would be generated during operation of the project alternatives; solid and hazardous waste management for the project alternatives would comply with federal, state, and local requirements related to solid and hazardous waste.	No mitigation measures are required.	N/A
Energy			
Impact PUE#12: Temporary Consumption of Energy during Construction	Less than significant for all alternatives: Energy consumption would not place a substantial demand on regional energy supply, require construction of substantial additional electric generating capacity, or substantially increase peak- or base-period electricity demand.	No mitigation measures are required.	N/A
Impact PUE#13: Continuous Permanent Impacts from Energy Consumption during Operations	Less than significant impact for all alternatives: Operation of the project would result in a net decrease in transportation energy use.	No mitigation measures are required.	N/A

BMP = best management practice
HSR = high-speed rail
RCRA = Resource Conservation and Recovery ActN/A = not applicable
RSA = Resource Study Area
RWQCB = Regional Water Quality Control Board
SCRWA = South County Regional Wastewater Authority
SWPPP = stormwater pollution prevention plan
WWTP = wastewater treatment plant