3.6 Public Utilities and Energy

3.6.1 Introduction

This section describes the regulatory setting, affected environment, potential impacts and mitigation measures for public utilities and energy within the area potentially affected by the Fresno to Bakersfield Section of the California HST System. The Final Program EIR/EIS for the Proposed California HST System (Statewide Program EIR/EIS) (Authority and FRA 2005) concluded that the HST System alternative would not be expected to result in a significant effect on utilities and utility services when viewed on a systemwide basis. The 2005 Statewide Program EIR/EIS also concluded that the systemwide energy demand would be potentially significant under CEQA. Project design elements that reduce effects include elevated guideway that avoids utilities, construction phasing to avoid interruptions of utility service, and identification of conflicts with utilities. The 2005 Statewide Program EIR/EIS also concluded that the systemwide energy demand would be significant under CEQA. Project features that reduce energy consumption include designing the HST System with regenerative braking and implementing energy saving measures during construction. More information regarding public utilities and energy is provided in Section 3.2, Transportation; Section 3.5, Electromagnetic Fields and Electromagnetic Interference; Section 3.8, Hydrology and Water Resources; Section 3.10, Hazardous Materials and Wastes; Section 3.13, Station Planning, Land Use, and Development; and Section 3.14, Agricultural Lands.

3.6.2 Laws, Regulations, and Orders

The following sections discuss federal, state, and local laws; regulations; and agency jurisdiction and management guidance that are relevant to this resource.

A. FEDERAL

Section 403(b) of the Power Plant and Industrial Fuel Use Act [Executive Order 12185, 44 Federal Register Section 75093; Public Law 95-620]

This section of the Power Plant and Industrial Fuel Use Act and of the Executive Order 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]

This act, established by the United States Department of Transportation, 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, pipeline safety is administered by the Office of the Fire Marshal.

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 standards are federal regulations that are set to reduce energy consumed by on-road motor vehicles. The National Highway Traffic Safety Administration regulates the standards and the EPA measures vehicle fuel efficiency. The standards specify minimum fuel consumption efficiency standards for new automobiles sold in the United States. The current standard is 27.5 miles per gallon (mpg) for passenger cars and 20.7 mpg for light-duty trucks. On May 19, 2009, President Obama issued a Presidential Memorandum proposing a new national fuel economy program that adopts uniform federal standards to regulate both fuel economy and greenhouse gas emissions. The program covers model year 2012 to model year 2016 and ultimately requires an average fuel economy standard of 35.5 mpg in 2016 (39 mpg for cars and 30 mpg for trucks). In response to the Presidential Memorandum, an October 2010 Regulatory Announcement developed with support from industry, the State of California, and environmental stakeholders was issued by the EPA and DOT.

Executive Order 12186, Conservation of Petroleum and Natural Gas (December 17, 1979, 44 F.R. 75093)

This executive order encourages additional conservation of petroleum and natural gas by recipients of federal financial assistance.

B. STATE

CEQA [Section 21000 et seq.] and CEQA Guidelines [Section 15000 et seq.]

Requires state and local agencies to identify the significant environmental impacts of their actions, including potential significant impacts on public utilities and energy, and to avoid or mitigate those impacts when feasible.

Public Resources Code Section 21100(b)(3) provides that an EIR shall include a statement setting forth the mitigation measures proposed to minimize the significant effects on the environment, including measures to reduce the wasteful, inefficient, and unnecessary consumption of energy. Appendix F to the CEQA Guidelines addresses energy conservation goals, notes that potentially significant energy implications of a project should be considered in an EIR, and contains general examples of mitigation measures for a project’s potentially significant energy impacts.

CEQA Guidelines Section 15126.2 discusses requirements for an EIR to address potentially significant effects and, although it does not include energy specifically, it mentions use of nonrenewable resources. CEQA Guidelines Section 15126.4(a)(1)(C) requires an EIR to discuss energy conservation measures, if relevant.

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

Title 24, Part 6 of the California Code of Regulations, Energy Efficiency Standards, promotes 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.

Renewable Portfolio Standard Program [Senate Bill 1078]

Requires retail sellers of electricity to increase their purchases of electricity generated by renewable sources and establishes a goal of having 20% 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% of total use by 2020 (CARB 2010). Increasing California's renewable supplies will diminish the state's heavy dependence on natural gas as a fuel for electric power generation.

Integrated Waste Management Act [Assembly Bill (AB) 939]

Mandates a reduction of waste being disposed and establishes an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance. The California Integrated Waste Management Board (CIWMB) oversees a disposal reporting system and facility and program planning. On January 1, 2010, all CIWMB duties and responsibilities, along with the Division of Recycling of the Department of Conservation, transferred to the new California Department of Resources Recycling and Recovery (CalRecycle), which is within the Natural Resources Agency.

Local Government Construction and Demolition (C&D) Guide [Senate Bill 1374]

Seeks to assist jurisdictions with diverting their C&D material, with a primary focus on the CalRecycle (formerly CIWMB) developing and adopting a model C&D diversion ordinance for voluntary use by California jurisdictions.

Protection of Underground Infrastructure [California Government Code, Section 4216]

Requires that an excavator must contact a regional notification center (i.e., Underground Service Alert [URS]) at least 2 days prior to excavation of any subsurface installations. An Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the excavation. Representatives of the utilities are required to mark the specific location of their facilities within the work area prior to the start of excavation. The construction contractor is required to probe and expose the underground facilities by hand prior to using power equipment.

Pavley Rule [AB 1493]

In California, the Pavley regulations for automobile efficiency (AB 1493) are expected to reduce greenhouse gas emissions from California passenger vehicles by about 22% in 2012 and about 30% in 2016, all while improving fuel efficiency and reducing motorists' costs.

CPUC General Order No. 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 will insure adequate service and secure safety to persons engaged in the construction, maintenance, operation or use of overhead electrical lines and to the public in general.

C. LOCAL JURISDICTIONS PLANS AND POLICIES

The Fresno to Bakersfield Section of the California HST System traverses several local government jurisdictions, including Fresno, Kings, Tulare, and Kern counties and the cities of Fresno, Hanford, Corcoran, Wasco, Shafter, and Bakersfield.

Local jurisdictions (counties and cities) have implemented policies and ordinances to regulate public utilities and energy. The general plans for Fresno, Kings, Tulare, and Kern counties contain goals and policies associated with the development, availability, and adequate service of public facilities (County of Fresno 2000, 4-1 to 4-16, 4-21, 4-22; Kings County Planning Department 2010a, LU-9, LU 42–46; Kings County Planning Department 2010b, RC-39, 40, 49, 50; Tulare County 2008; Kern County Planning Department 2007a, 214–215; Kern County Planning Department 2007b, 16–27). The facility and service standards called for in these goals and policies are typically achieved and maintained through the use of equitable development funding methods. The general plans and municipal codes for the cities of Fresno, Hanford, Corcoran, Wasco, Shafter, and Bakersfield provide policies and regulations to ensure the development and funding of adequate water services, sewer services, storm drainage services, and solid waste disposal services (City of Fresno Planning and Development Department 2002b, 147–148; City of Fresno Planning and Development Department 2002a, 86–91, 97; City of Fresno 2008a, 2008b, 2009a, 2009b; City of Hanford 2002, PF-3, PF-9 to PF-15; City of Hanford 2006; City of Corcoran 2007, 8-2 to 8-3; City of Corcoran 2009; City of Wasco 2010; City of Shafter 2005, 4-1 to 4-3, 4-7, 4-8; City of Bakersfield and Kern County 2007, X-1 to X-20.

The counties crossed by the Fresno to Bakersfield Section of the HST System have developed and implemented integrated waste management plans in coordination with the cities in each county. These plans include the following components: waste characterization, source reduction, recycling, composting, solid waste facility capacity, education and public information, funding, special waste (e.g., asbestos, sewage sludge), and household hazardous waste.

In the Resource Conservation Element of the *2025 Fresno General Plan,* the City of Fresno provides goals and policies aimed at reducing the consumption of nonrenewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources (City of Fresno Planning and Development Department 2002b). The Energy Element of the *Kern County General Plan* defines the critical energy-related issues facing the county and sets forth goals, policies, and implementation measures to protect the energy resources of the county; encourage orderly energy development; and afford the maximum protection for the public's health and safety, and the environment (Kern County Planning Department 2007a).

Table 3.6-1 lists county and city policies, plans, and codes that were identified and considered in the preparation of this analysis. Regional plans for the management of utilities or energy have not been prepared.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Fresno County	
Fresno County General Plan, "Public Facilities and Services Element," Goals PF-A through PF-F, Policies PF-A.1 through PF-F.11, Goal PF-J, Policies PF-J.1 through PF-J.4 (County of Fresno 2000, 4-1 to 4-16, 4-21, 4-22)	The "Public Facilities and Services Element" of the *Fresno County General Plan* outlines goals and policies associated with the development, availability, and adequate service of public facilities. Goals in this element ensure the timely development of public facilities, maintenance of an adequate level of service, and the availability of such facilities to serve new development; that facility and service standards are achieved and maintained through the use of equitable development funding methods; the availability of an adequate and safe water supply; adequate wastewater collection and treatment systems; adequate storm drainage and flood control facilities; an adequate system for disposal or recycling of solid waste; and the development of efficient and cost-effective utilities that serve the existing and future needs of people in the unincorporated areas of the county.
Fresno County Code of Ordinances, Title 8 and Title 14	To promote the general health, safety, and welfare of Fresno County citizens, bans the disposal of construction and demolition debris at the American Avenue and Coalinga landfills. Sets well construction, pump installation, and well destruction standards. Establishes regulations governing the discharge of wastewater into wastewater treatment facilities operated by the county. Prohibits the commencement, conduct, or continuance of illicit discharges to the storm drain system within the county.
City of Fresno	
2025 Fresno General Plan, "Public Facilities Element," Objective E-18, E-20 to E-23, and E-30; Policies E-18-a through E-18-e, E-20-a through E-23-i, and E-30-a through E-30-e (City of Fresno Planning and Development Department 2002a, 86–91, 97, 147–148)	The "Public Facilities Element" of the City of Fresno *2025 General Plan* provides goals and policies for sewer service, wastewater treatment, water supply and related facilities, stormwater, and solid waste. Objective E-18 is associated with the provision of adequate trunk sewer and collector main capacities to serve both existing and planned urban development. Objective E-20 deals with the provision of adequate sewage treatment and disposal. Objective E-21 promotes the reduction in wastewater flows and the development of facilities for the reuse of reclaimed water and biosolids. Objective E-22 ensures the management and development of city water facilities to ensure a safe, economical and reliable water supply for existing and planned urban development. Objective E-23 ensures adequate facilities for stormwater runoff. Objective E-30 ensures adequate solid waste facilities and services for collection, transfer, recycling, and disposal of refuse.
2025 Fresno General Plan, "Resource Conservation Element," Objective G-9 and Policies G-9-a through G-9-c (City of Fresno Planning and Development Department 2002b)	The "Resource Conservation Element" of the City of Fresno *2025 General Plan* provides goals and policies associated with energy conservation. Objective G-9 and Policy G-9-c are aimed at reducing the consumption of nonrenewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Fresno Code of Ordinances, Chapter 6, "Municipal Services and Utilities"; and Chapter 10, Article 4, "Solid Waste and Recycling Facilities Ordinance"	These sections of the *Municipal Code of the City of Fresno* provide regulations for municipal services and utilities, inclusive of solid waste collection and disposal, sewage and water disposal, wells and water regulations, urban stormwater quality management and discharge control, and cross-connection control.
City of Fresno Urban Water Management Plan (City of Fresno 2008a)	The *City of Fresno 2008 Urban Water Management* Plan addresses current and projected future water supply availability and reliability, and provides a comparison with current and projected future water demands through 2030.
City of Fresno Sewer System Management Plan (City of Fresno 2009c)	The *City of Fresno Sewer System Management* Plan provides a mechanism to properly manage, operate, and maintain all parts of the sanitary sewer system, with the ultimate goals of reducing and preventing sanitary sewer overflows, as well as mitigating any sanitary sewer overflows that do occur.
City of Fresno: Zero Waste Strategic Action Plan (City of Fresno 2008b)	The City of Fresno has adopted a *Zero Waste Strategic Plan* to achieve 75% diversion to landfills by 2012 and zero waste to landfills by 2025. The plan promotes policies that foster the reduction and gradual elimination of problem waste for individuals, businesses, and governments.
Kings County	
2035 Kings County General Plan, "Land Use Element," Goal D1, Objective D1.6, Policies D1.6.1 through D1.6.8 (Kings County Planning Department 2010a, LU 40, LU 43–44)	The "Land Use Element" of the *2035 Kings County General Plan* provides regulations that ensure funding from public facility impact fees, directs new urban growth to community districts where municipal services can be provided, promotes the orderly extension of services, and enhances the planning of urban growth through coordinated County and City General Plan Development policies and infrastructure improvement standards.
2035 Kings County General Plan, "Resource Conservation Element," RC Goal A1, Objectives A1.1 through A1.2, and Policies A1.1.1 through A1.2.6, RC Goal G1, RC Objective G1.2, RC Policy G1.2.1 to G1.2.7 (Kings County Planning Department 2010b, RC-39, 40, 49, 50)	The "Resource Conservation Element" of the *2035 Kings County General Plan* provides regulation for the use, conservation, and protection of water supplies, and encourages development of sustainable and renewable energy sources.
Kings County Code of Ordinances, Chapter 13, Article II, "Waste Management Regulations"	This section of the code establishes standards for the storage, collection, and transportation of solid waste.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Kings County Integrated Waste Management Plan (Kings County 1995)	Policies pertaining to solid waste, source reduction, and recycling are identified in the "Source Reduction and Recycling Element" and the "Household Hazardous Waste Element" of the *Kings County Integrated Waste Management Plan*, and are incorporated in the County of Kings 2035 General Plan Land Use Element by reference.
County of Kings Improvement Standards (Kings County Public Works 2003)	This document sets standards for design of stormwater and other drainage, and connections to water supply and sanitary sewerage systems.
City of Hanford	
City of Hanford General Plan Update 2002, "Public Facilities and Services Element," Objective PF 1 to PF 11, Policies PF 1.1 to PF 11.2 (City of Hanford 2002, PF-8 to PF-15)	The "Public Facilities and Services Element" of the *City of Hanford General Plan* provides goals and policies for the development of facilities and services in relation to planned development, collection of development impact fees, maintenance of existing public facilities and services, water supply and infrastructure, provision of sufficient wastewater collection and treatment facilities, provision and maintenance of stormwater drainage systems, and provision of adequate solid waste disposal capacity.
Hanford Municipal Code, Title 13, Chapter 13.04, "Water Service System"; Chapter 13.08, "Sewer Service System"; Chapter 13.10, "Storm Water Quality Management and Discharge Control"; and Chapter 13.12, "Solid Waste Collection and Disposal"	This section of the code describes regulations regarding the water service system, sewer service system, stormwater quality management and discharge control, and solid waste collection and disposal.
2005 Urban Water Management Plan (City of Hanford 2006)	The City of Hanford *2005 Urban Water Management Plan* provides a plan for maintaining efficient use of urban water supplies, promoting conservation programs and policies, ensuring that sufficient water supplies are available for future beneficial use, and providing a mechanism for response during drought conditions.
City of Corcoran	
Corcoran General Plan 2025 Policies Statement, "Public Services and Facilities Element," Public Facilities Improvement Objectives A through C, Local Government Facilities and Services Objective A, Policies 8.1 through 8.16 (City of Corcoran 2007)	The "Public Services and Facilities Element" of the *Corcoran General Plan* provides objectives and policies associated with the development of adequate public facilities to meet the demands of future growth and development.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Corcoran City Code, Title 8, Chapter 1, "Water Use and Service"; and Chapter 2, "Wastewater System"	The Water Use and Service regulations provide measures to minimize outdoor water use and to control unnecessary consumption of the available potable water supply of the city. The Wastewater System regulations set uniform requirements for the use of the city's sanitary sewer, regulates use and construction of the wastewater collection system, regulates the quality and quantity of the wastewater discharged to the system, and regulates the issuance of permits prior to connection to the system.
Tulare County	
Tulare County General Plan 2030 Update, Public Facilities and Services, Goals PFS-2 through PFS-5, Policies PFS-2.1 through PFS-5.9, Goal PFS-9, Policies PSF-9.1 through PSF-9.4 (Tulare County 2010, [Part I] 14-6 to 14-9, 14-13 to 14-14)	The *Tulare County General Plan* provides regulations for public facilities in the plan's infrastructure component. This plan component outlines principles and policies for provision of adequate water supply; provision of adequate wastewater collection, treatment and disposal; provision of adequate storm drainage facilities and management of storm water; provision of safe and efficient disposal and recycling of solid and hazardous waste; and provision of gas and electric services throughout the county.
Tulare County Code, Part IV, Chapter 3, Article 10, "Recycling and Diversion of Construction and Demolition Debris"	The Construction and Demolition Ordinance establishes regulations for the recycling and diversion of construction and demolition debris in the unincorporated area of the County. This ordinance assists Tulare County in reaching the 50% waste diversion mandate required by the California Integrated Waste Management Board.
Tulare County Code, Part IV, Chapter 3, "Management of Solid Waste"; Chapter 13, "Wells"; Part VIII, Chapter 1, "Sewer Service"; Chapter 3, "Sewer Service"; Chapter 5, "Water Service"; and Chapter 7, "Water Conservation Program"	These sections of the *Tulare County Code* include regulations for solid waste and wells, and provisions for water and sewer service in county service areas and water conservation programs in county service areas.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Kern County	
Kern County General Plan, "Land Use, Open Space and Conservation Element," Public Facilities and Services Goals 1 through 13, Policies 1 through 17, and Implementation Measures A through II; General Provisions Goal 1, Policies 9–17, and Implementation Measures D and E (Kern County Planning Department 2007b, 19, 21–27, 61, 63–64)	The *Kern County General Plan* "Land Use, Open Space and Conservation Element" provides goals and policies associated with the development of public service infrastructure; the distribution of facility costs for new development; the collection, treatment, and disposal of sewage and refuse; the maintenance of water supply and quality; and the provision of adequate landfill capacity.
Kern County Municipal Code, Title 14, Utilities	This section of the *Kern County Municipal Code* provides regulations for water supply and sewer systems, private sewer disposal and drainage systems, and stormwater.
Kern County Planning Department, "Energy Element," in *Kern County General Plan,* 214–215 (Kern County Planning Department 2007a)	The "Energy Element" of the *Kern County General Plan* contains policies relating to development of energy resources (e.g., petroleum products, electricity generation (including renewable sources).
Kern County and Incorporated Cities Integrated Waste Management Plan	The Kern County and Incorporated Cities Integrated Waste Management Plan addresses issues pertaining to nonhazardous waste disposal and other waste facilities.
City of Wasco	
City of Wasco General Plan, "Conservation and Open Space Element," "Safety Element (City of Wasco 2010)	The *City of Wasco General Plan* sets policies and standards relating to stormwater control, water conservation, sewer system, storm drainage facilities, and water supply systems.
Wasco Municipal Code, Title 12, Chapter 12.16, "Excavations"	Chapter 12.16 of the *Wasco Municipal Code* outlines the permitting process for excavations and provides regulations for the relocation and protection of utilities during excavation.
Wasco Municipal Code, Title 13, Public Services	Title 13 of the *Wasco Municipal Code* regulates water service, water rates, water system impact fees, water conservation measures, sewer system service, sewer service charges, sewer connection charges, underground utility districts, and sanitation impact fees.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
City of Shafter	
City of Shafter General Plan, Public Services and Facilities Program, Water Facilities Policies 1 through 6, Sewer Facilities Policies 1 through 8, Solid Waste Policies 1 through 5, Drainage and Flooding Policies 1 through 4, Public Services and Facilities Policies 1 through 6 (City of Shafter 2005, 4-1 to 4-3, 4-7, 4-8)	The Public Services and Facilities Program of the *City of Shafter General Plan* establishes objectives and policies associated with the provision of a water system with adequate capacity; the timely development of infrastructure to meet the demands of new development; the provision of an adequate wastewater collection, treatment, and disposal system; the provision of sewer systems with adequate capacity; the encouragement of water conservation and solid waste reduction; the provision of stormwater detention, retention, and conveyance facilities; and funding for the expansion of public facilities in areas of new development.
Shafter Code of Ordinances, Title 13, Public Services	This section of the *City of Shafter Code of Ordinances* provides regulations for water and sewer services.
City of Bakersfield	
Metropolitan Bakersfield General Plan, "Public Services and Facilities Element," General Utility Services Goals 1 through 4, Policies 1 through 6; Water Distribution Goal 1, Policies 1 through 3; Sewer Service Goals 1 through 3, Policies 1 through 3; Storm Drainage Goals 1 and 2, Policies 1 through 3; Solid Waste Goals 1 and 2, Policies 1 and 2 (City of Bakersfield and Kern County 2007, X-1 to X-14, X-18 to X-20)	The "Public Services and Facilities Element" of the *Metropolitan Bakersfield General Plan* provides goals and policies associated with funding new services and facilities in areas of new development; the provision of adequate water service, sewer service, trunk sewer availability, storm drainage facilities, and solid waste disposal services; and the development of resource recovery and recycling systems.
Bakersfield Municipal Code, Title 14, Water and Sewers	This section of the *Bakersfield Municipal Code* provides regulations for water and sewer services.

3.6.3 Methods of Evaluation of Impacts

A. PUBLIC UTILITIES AND ENERGY DATA COLLECTION AND ANALYSIS

Utilities

Data provided by local utilities service providers within the study area describe the type, size, and location of existing and proposed utility infrastructure. Field survey information gathered in 2009 and 2010 augments the information provided by utility service providers. The locations of aboveground and underground utilities (e.g., natural gas lines, petroleum pipelines, fiber optic cables, and telecommunication infrastructure) were verified or corrected based on field observations and were mapped by recording the GIS coordinates of their aboveground signage.

The impact evaluation considers all utilities but focuses on major utilities. For the purpose of this analysis, major utilities include the following:

- High-voltage electrical lines (50 kilovolts [kV] or greater).
- High-pressure natural gas lines.
- Petroleum and fuel lines.
- Water, wastewater, irrigation and stormwater canals, conduits, and pipes (outside diameter of 16 inches or larger).
- Fiber optic lines and communication infrastructure (i.e., towers and antennas).

This analysis considers high-voltage, underground and aboveground electrical lines, underground high-pressure natural gas lines, and petroleum lines and facilities “high-risk” utilities (Caltrans 1997). In addition, this analysis considers electrical substations to be high risk. The remaining utilities, such as water and wastewater lines, have a lower safety risk.

Estimates for water demand, wastewater, stormwater, and waste removal services for HST stations are based on typical rates, such as gallons per minute, acre-feet per acre per year, or ridership and employment projections The analysis compares these estimated quantities with anticipated supply and capacity, as reported by the service providers in the Fresno to Bakersfield Section of the HST corridor.

Water demand estimates for construction are based on an estimated 5-year time period in which earthmoving and construction activities requiring water use would occur within a longer overall construction period concluding in 2020. Annual operational water use estimates are based on full build-out of the project in 2035. Estimates of existing water use were generated by applying region-specific water use rates for the known land uses in the project footprint (see Section 3.13, Station Planning, Land Use, and Development). Wastewater generation would be approximately 45% to 55% of total water demand during operation. Additional detail regarding water supply, stormwater, and hydrology can be found in Section 3.8, Hydrology and Water Resources.

Waste generated by C&D activities is based on estimates by project engineers using the existing character of the study area and the requirements of various project attributes. Operational waste generation is based on the anticipated ridership and number of employees, and estimates of waste generation and recycling in California.

Energy

The proposed HST System would obtain electricity from the statewide grid. Although the Authority adopted a goal to power the system with clean, renewable electricity, any potential impacts on electrical production that may result from the proposed HST System would affect statewide electricity reserves and, to a lesser degree, transmission capacity. To identify the projected energy demand of the Fresno to Bakersfield Section of the HST System, estimated energy impact for the entire HST System was prorated based on the proportion of the length of HST guideway within the Fresno to Bakersfield Section study area.

Transportation energy is generally discussed in terms of direct and indirect energy. Direct energy involves all energy consumed by vehicle propulsion. This energy is a function of traffic characteristics such as volume, speed, distance traveled, vehicle mix, and thermal value of the fuel being used. This energy also includes the electrical power requirements of the high-speed train (HST) project as well as aircraft fuel. Indirect energy consumption involves the non-recoverable, one-time energy expenditure involved in constructing the physical infrastructure associated with the project.

Energy is commonly measured in terms of British thermal units, or Btus. A Btu is defined as the amount of heat required to raise the temperature of one pound of water by 1°Fahrenheit. For transportation projects, energy usage is predominantly influenced by the amount of fuel used. The average Btu content of fuels is the heat value (or energy content) per quantity of fuel as determined from tests of fuel samples. A gallon of gasoline produces approximately 114,000 Btu (EPA 2010); 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 effects expected to result from construction and operation of the HST.

Energy impacts caused by the project might include the additional consumption of electricity to power the HSTs (direct use) and consumption of resources to construct the proposed HST facilities (indirect use). Energy used for vehicle propulsion is a function of traffic characteristics and the thermal value of the fuel used. Petroleum consumption rates for vehicle travel were derived from the travel demand forecast for the HST and growth projections performed by the California Energy Commission (CEC). These consumption rates were used to determine the amount of petroleum used for transportation under the No Project Alternative and HST alternatives. Current electricity consumption rates from the CEC are compared with the projected energy consumption of the HST System.

The entire HST System would be approximately 800 miles long. The length of the Fresno to Bakersfield Section alignment alternatives is approximately 115 miles or less, depending on the design options selected. This is approximately 14% of the length of the entire HST System. Therefore, the anticipated electricity use would be approximately 14% of the total HST System power use or 1.1gigawatt-hours (GWh) per day.

Indirect energy consumption involves the nonrecoverable, one-time energy expenditure required to construct the physical infrastructure associated with the project. Indirect energy impacts are evaluated quantitatively. This analysis uses construction energy data from other sources or existing HST systems. Construction energy information for comparable HST systems is not readily available. Therefore, construction-related energy consumption factors identified for the proposed HST System are derived from data gathered for typical heavy-rail systems and the San Francisco Bay Area Rapid Transit District (BART) heavy-rail commuter system. This data was used to estimate the projected construction-related energy consumption for the HST alternatives in the Fresno to Bakersfield Section presented in Table 3.6-2.

Actual energy consumption may differ from these estimates, depending on the final design. The estimated energy consumed to construct an elevated guideway is approximately 300% more than for an at-grade guideway. The BNSF Alternative Alignment and each of the five alternative bypass and alignment options represent different lengths and ratios of at-grade and elevated guideway. To compare the HST alternatives, Table 3.6-2 shows the estimated construction-related energy consumption in millions of British thermal units (Btus) for the BNSF Alternative and each of the other alternatives based on the length of their anticipated at-grade or elevated construction elements.

Specific profile data are not available for all of the HMF alternatives. The Fresno HMF would require the greatest length of total guideway at approximately 3.5 miles. The remaining four HMF station alternative would each require between 1.5 and 2.5 miles of guideway. Because these HMF sites would only require a limited length of elevated track, energy consumption is calculated using the at-grade factor for preliminary estimates. In any event, using an elevated factor for this limited length would not change the conclusions in this section.

The construction energy payback period is the number of years required to pay back the energy used in construction with operational energy consumption savings of the HST alternative prorated to statewide energy savings. The payback period is calculated for the Fresno to Bakersfield

Section by dividing the estimated HST System construction energy by the amount of energy that would later be saved by the full operation of the HST System (based on the prorated statewide value). The calculations assume that the amount of energy saved in the study year (2035) would remain constant throughout the payback period.

Table 3.6-2
Construction-Related Energy Consumption Assumptions for the Fresno to Bakersfield Section

HST Alignment Alternative	At-Grade Design (guideway miles)[b]	Elevated Design (guideway miles)[b]	HST Stations	HMF (guideway miles)[b]	Btu (million)
Energy Consumption Factor [a]	**19.11 billion Btu/one-way guideway miles**	**55.63 billion Btu/one-way guideway miles**	**78 per station**	**19.11 billion Btu/one-way guideway miles**	**--**
BNSF Alternative	61	54	3	8	4,556.61
Optional Bypass and Other Alternative Alignments					
Corcoran Elevated	0	3.5	0	0	194.71
Corcoran Bypass	9.4	3.6	0	0	379.90
Allensworth Bypass	19.5	2.5	0	0	511.72
Wasco-Shafter Bypass	14.4	3.6	0	0	475.45
Bakersfield South	0	10.5	0	0	584.12

Assumed HMF Guideway Miles: Fresno Works HMF, assume 4 guideway miles; Kings County, Kern COG–Wasco, and Kern COG–Shafter alternatives, assume 2 guideway miles each.

[a] Factors for energy consumption for BART system construction (as surrogate for HST construction through urban areas) and a freight terminal (as a surrogate for a passenger train station), as identified in Table 3.5-2 of the *Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report/ Environmental Impact Statement (EIR/EIS) Bay Area to Central Valley HST Program EIR/EIS* (Authority and FRA 2008).

[b] Data for number of guideway miles and stations based on estimates by URS Corporation. The values for "guideway miles" for each alternative accounts for a "one-way" guideway. The number of stations assumes construction of three HST stations and four HMFs that would each require additional HST guideway.

B. METHODS FOR EVALUATING EFFECTS UNDER NEPA

Pursuant to NEPA regulations (40 CFR 1500-1508), project effects are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. Intensity refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the effect, duration of the effect (short- or long-term), and other consideration of context. Beneficial effects are identified and described. When there is no measurable effect, impact is found not to occur. Intensity of adverse effects are summarized as the degree or magnitude of a potential adverse effect where the adverse effect is thus determined to be negligible, moderate, or substantial. It is possible that a significant adverse effect may still exist when on balance the impact is negligible or even beneficial.

Negligible energy impacts are those that would result in a slight measurable increased use of energy but are very close to the existing conditions. Moderate impacts are defined as a measurable change in energy consumption, but can be met through existing generating facilities or new power plant facilities already approved by state and federal regulatory agencies and scheduled to be built and operational by 2035. Substantial impacts are those that would require construction and operation of new electrical generating facilities or significant additional capacity in response to increased peak and base period demands for electricity and other forms of energy.

C. CEQA SIGNIFICANCE CRITERIA

Public Utilities

According to Appendix G of the CEQA Guidelines, a significant impact on utilities and service systems would occur if the project results in or requires any of the following:

- Construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- New or expanded entitlements to supply water to the project.
- A determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the projected project demand in addition to its existing commitments.
- Construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Insufficient permitted capacity at the landfill serving the project to accommodate solid waste disposal needs.
- Noncompliance with federal, state, and local statutes and regulations related to solid waste.
- Conflict with a fixed facility such as an electrical substation or wastewater treatment plant (WWTP).

Energy

According to Appendix F of the CEQA Guidelines, the means to achieve the goal of conserving energy include decreasing overall per capita energy consumption, decreasing reliance on natural gas and oil, and increasing reliance on renewable energy sources. The significance criteria discussed herein are used to determine whether the HST would have a potentially significant effect on energy use, including energy conservation.

Significant long-term operational or direct energy impacts would occur if the HST would place a substantial demand on regional energy supply or require significant additional capacity, or significantly increase peak and base period electricity demand.

D. STUDY AREA

This section considers two study areas in the analysis of public utility and energy resources. The study area for evaluating conflicts with public utilities is the construction footprint (see Section 3.1, Introduction) and includes surface, subsurface, and overhead utilities. The area studied to determine the potential impacts of the HST System on electricity generation and transmission includes the entire state of California (and western states that produce energy that is exported to California) because the HST 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 Affected Environment

This section describes the current conditions for public utilities and infrastructure as well as energy demand. There are no applicable regional plans or policies pertaining to public utilities and energy within the Fresno to Bakersfield Section study area.

A. PUBLIC UTILITIES

Major public utilities within the study area include facilities for electricity, natural gas and petroleum distribution; telecommunications; potable and irrigable water delivery; and stormwater, wastewater, and solid waste disposal. As summarized in Table 3.6-3 and discussed further in the following analysis, various service providers own or maintain utilities and associated easements within the study area.

Table 3.6-3
Study Area Utility and Energy Providers

Utility Type		Provider	County/City
Electrical		Pacific Gas and Electric Company (PG&E)	Fresno County, Kings County, Tulare County and western Kern County
		Southern California Edison	Northeast Fresno County, Kings County (Hanford), SE Tulare County; East Kern County
Natural Gas		PG&E	Fresno County (Fresno); SW Kings County; and western Kern County
		Sempra	Fresno County, Kings County (Hanford, Corcoran), Tulare County, Kern County (Wasco, Shafter, Bakersfield)
		Shell Oil Company	Kern County (Bakersfield)
Petroleum and Fuel Pipelines		ConocoPhillips	Kern County (Bakersfield)
		ExxonMobil Corporation	Kern County (Bakersfield)
		Shell Oil Company	Kern County (Bakersfield)
		British Petroleum	Kern County (Bakersfield)
		Chevron Corporation	Kern County (Bakersfield)
		Kinder Morgan, Inc.	Fresno County (Fresno), Tulare County and Kern County (Bakersfield)
		ConocoPhillips	Kern County (Bakersfield)
Communications	Telephone	AT&T	Fresno County, Kings County, Tulare County, and Kern County
	Cable/ Internet	Various	Fresno County, Kings County, Tulare County, and Kern County

Table 3.6-3
Study Area Utility and Energy Providers

Utility Type	Provider	County/City
Water Supply	Kaweah Delta WCD	Kings County and Tulare County
	Fresno ID	Fresno County
	Semitropic WSD	Kern County
	Consolidated ID	Fresno County and northern Kings County
	Kings County WD	Kings County
	Arvin-Edison WSD	Kern County
	Lower Tule River Irrigation District	Tulare County
	City of Fresno Service Area	City of Fresno
	North Kern WSD	Kern County
	Pond Poso Improvement District	Kern County
	Pixley ID	Tulare County
	Kern County Water Agency Improvement District No. 4	Kern County
	Southern San Joaquin MUD	Kern County
	Corcoran ID	Kings County (Corcoran)
	Rosedale–Rio Bravo WSD	Kern County
	Shafter-Wasco ID	Kern County (Shafter, Wasco)
	Laguna ID	Fresno County and Kings County
	Angiola WD	Kings County
	Lakeside Irrigation WD	Kings County
	California Water Service Company	Kern County (Bakersfield)
	Liberty WD	Fresno County
	Vaughn Water Company Service Area	Kern County
	Alpaugh ID	Tulare County
	Rosedale Ranch Improvement District	Kern County
	City of Hanford WSA	Kings (Hanford)
	Atwell Island WD	Kings County and Tulare County
	City of Corcoran WSA	Kings County (Corcoran)
	City of Wasco WSA	Kern County (Wasco)

Table 3.6-3
Study Area Utility and Energy Providers

Utility Type	Provider	County/City
Sewer/Wastewater	Fresno/Clovis Regional Wastewater Reclamation Facility	Fresno-Clovis Metropolitan Area
	City of Hanford	City of Hanford
	City of Corcoran	City of Corcoran
	City of Shafter; North of River Sanitary District (NORSD)	City of Shafter
	City of Bakersfield	City of Bakersfield
Stormwater	City of Fresno/Fresno Metropolitan Flood Control District	City of Fresno
	City of Hanford/Peoples Ditch Company	City of Hanford
	City of Corcoran	City of Corcoran
	City of Wasco	City of Wasco
	City of Shafter	City of Fresno
	City of Bakersfield	City of Bakersfield
Solid Waste	American Avenue Disposal and Coalinga Disposal Sites	Fresno County
	Chemical Waste Management Landfill	Kings County
	Visalia Disposal Site, Woodville Disposal Site (Tulare), and Teapot Dome Disposal Site (Porterville)	Tulare County
	Bena, Boron, Mojave-Rosamond, Ridgecrest, Shafter-Wasco, Taft, and Tehachapi Landfills	Kern County

Acronyms and Abbreviations:
CVP = Central Valley Project
ID = Irrigation District
MUD = Municipal Utility District
SWP = State Water Project
WCD = Water Conservation District
WD = Water District
WSA = Water Service Areas
WSD = Water Supply District

Electrical Transmission Lines

PG&E provides electricity to much of Northern California, from approximately Bakersfield to the Oregon border. The company's generation portfolio includes hydroelectric facilities, a nuclear power plant, and a natural-gas-fired power plant. PG&E provides electrical service to approximately 15 million people throughout a 70,000-square-mile service area in northern and central California (PG&E 2009). Within the study area, PG&E provides electricity to the majority of Fresno County, with the exception of the northeastern corner of the county; the majority of Kings County, with the exception of areas within and immediately surrounding the city of Hanford; the northern and southwestern areas of Tulare County; and western Kern County. Southern California Edison (SCE) provides electricity to those areas not served by PG&E. SCE serves more than 14 million people in a 50,000-square-mile area of central, coastal, and Southern California (SCE 2009).

Twenty-three transmission and power lines cross the BNSF Alternative Alignment corridor, and twenty-two of these are transmission lines owned by PG&E. Four additional transmission lines occur within proposed HST stations, three at the Bakersfield Station and one at the Kings/Tulare Regional Station alternatives.

High-Pressure Natural Gas Pipelines

PG&E, Sempra, Occidental Petroleum Corporation, Shell, and Kinder Morgan provide natural gas service and are responsible for maintaining the infrastructure for natural gas distribution in the study area. Twenty-two potentially affected high-pressure natural gas transmission pipelines are of varying sizes and age.

Petroleum and Fuel Pipelines

California is the third-largest oil-producing state in the United States, and many of the onshore oilfields are in the San Joaquin Valley between Fresno and the Tehachapi Mountains. All oil produced is processed into fuels and other petroleum products at refineries in the San Francisco Bay Area and Southern California. As a result, crude oil pipelines run throughout the study area; these pipelines are owned and operated by ConocoPhillips, ExxonMobil Corporation, Shell Oil Company, British Petroleum, Occidental Petroleum, and Chevron Corporation.

Kinder Morgan is the largest independent transporter of refined petroleum products in the United States. Kinder Morgan owns and operates many miles of fuel pipelines in California. Occidental Petroleum operates substantial pumping equipment for deep wells and an oil collection tank facility east of Wasco from which the product is transferred via pipeline to refineries.

Communication Facilities

Communication facilities in the study area are owned and operated by AT&T, Verizon Telecom, Sprint, Quest, Comcast Cable, and Charter Communication Cable companies. Other communication service providers may also own or lease cellular service or microwave towers and antennas, or telecommunication cable or overhead distribution lines. Underground or above-ground components of this infrastructure are located within the study area.

Water Supply Infrastructure

Surface water and groundwater are the basic sources of drinking water and irrigation in the region. Municipal service providers typically use groundwater sources; however, surface water sources may also supplement supplies. Many residents in rural and unincorporated areas rely on private groundwater wells for drinking water. Agricultural water users augment their groundwater supplies with surface water that is conveyed through a network of natural and constructed channels. Irrigation of agricultural land is the primary water use in the San Joaquin River region (DWR 2005). Numerous large- and small-scale districts provide municipal and irrigation water service to the communities in the study area. The predominant domestic water source in unincorporated portions of the study area is individual private well systems. Some 25 water companies and districts occur within the study area. The largest is the Kaweah Delta Water Conservation District, which serves 340,000 acres (about 285,000 acres involve agricultural activities and about 55,000 acres are urban or undeveloped lands). The smallest is the water service areas for the cities of Wasco and Corcoran, each of which serves about 5,000 acres. Table 3.6-4 lists the water source and uses, among other key features, of the water supply companies and districts potentially affected by the BNSF Alternative and other alternative HST alignments. Figure 3.6-1 shows the locations of these water supply companies and districts.

Table 3.6-4
Water Suppliers in the Fresno to Bakersfield Study Area

Water District	Water Sources*	Predominant Uses	Total Area (acres)	Approx. Area Irrigated (acres)	Data Sources
Kaweah Delta WCD	Conserves and stores water from Kaweah River	Groundwater recharge	340,000	330,000	(1)
Fresno ID	Kings River, CVP	Agricultural; municipal; groundwater recharge; environmental	245,000	150,000	(2)
Semitropic WSD	SWP and Poso Creek	Agricultural	224,000	140,000	(3)
Consolidated ID	Kings River	Agricultural; municipal; groundwater recharge	161,000	144,000	(4)
Kings County WD	Imports reservoir water; irrigation water from Kings and Kaweah rivers; and CVP and SWP water	Agricultural; groundwater recharge	143,000	135,000	(5)
Arvin-Edison WSD	Kern River; CVP; groundwater	Agricultural; groundwater recharge; other water agencies.	133,000	100,000	(6)
Lower Tule River Irrigation District	CVP water; Tule River water stored behind Success Dam	Agricultural; groundwater recharge	103,000	85,000	(7)
City of Fresno Service Area	Groundwater (88%); surface water (12%)	Municipal	90,000	0	(8)
North Kern WSD	Kern River and Poso Creek, CVP, and SWP	Agricultural	83,000	70,000	(9)
Pond Poso Improvement District	Kern County Water Agency	Agricultural	81,000	70,000	(10)
Pixley ID	CVP	Agricultural	70,000	62,000	(11)

Table 3.6-4
Water Suppliers in the Fresno to Bakersfield Study Area

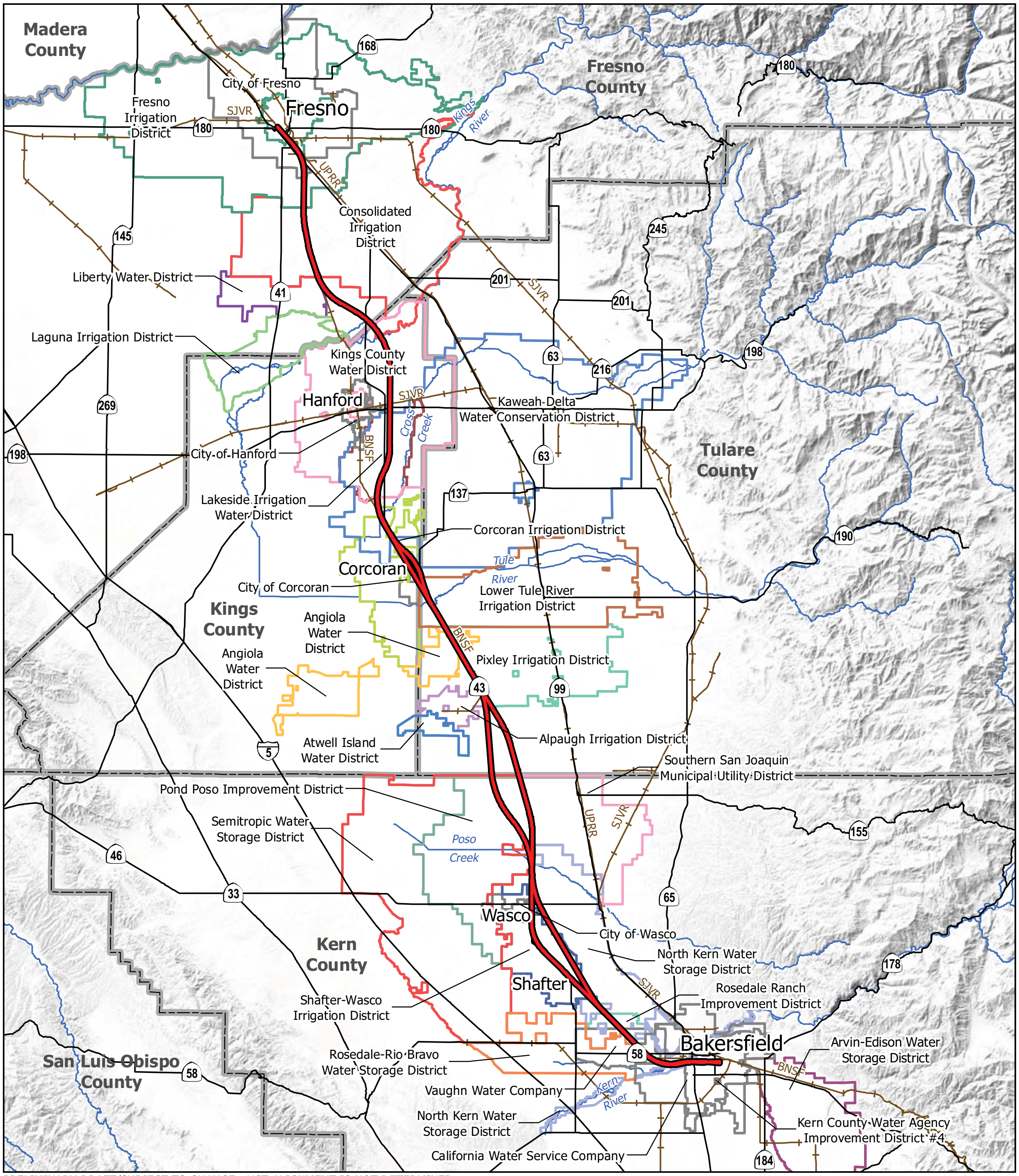
Water District	Water Sources*	Predominant Uses	Total Area (acres)	Approx. Area Irrigated (acres)	Data Sources
Kern County Water Agency Improvement District No. 4	Kern River; SWP	Municipal; groundwater recharge	66,000	3,000	(12)
Southern San Joaquin MUD	CVP	Agricultural	62,000	50,000	(13)
Corcoran ID	CVP via Kings River	Agricultural	48,000	45,000	(14)
Rosedale–Rio Bravo WSD	Kern River; CVP; SWP	Agricultural; groundwater recharge	44,000	33,400	(15)
Shafter-Wasco ID	CVP	Agricultural	39,000	31,000	(16)
Laguna ID	Kings River	Agricultural	37,000	35,000	(17)
Angiola WD	SWP from Tulare Lake Basin WSD	Agricultural	33,000	33,000	(18)
Lakeside Irrigation WD	Kaweah River, CVP	Agricultural; surface water supplies	32,000	27,000	(19)
California Water Service Company	Kern River, groundwater	Municipal	31,000	0	(20)
Liberty WD	Kings River	Agricultural	21,000	21,000	(21)
Vaughn Water Company Service Area	Groundwater	Municipal (Rosedale area of Bakersfield)	18,000	3,000	(22)
Alpaugh ID	Purchases CVP water from County of Tulare	Agricultural	11,000	6,000	(23)
Rosedale Ranch Improvement District	Kern River	Agricultural	9,000	9,000	(24)
City of Hanford WSA	Groundwater; surface water (groundwater recharge)	Municipal	8,000	0	(25)

Table 3.6-4
Water Suppliers in the Fresno to Bakersfield Study Area

Water District	Water Sources*	Predominant Uses	Total Area (acres)	Approx. Area Irrigated (acres)	Data Sources
Atwell Island WD	Purchases CVP water from County of Tulare	Agricultural; environmental: land retirement / habitat restoration	7,000	4,000	(26)
City of Corcoran WSA	Groundwater	Municipal	5,000	0	(27)
City of Wasco WSA	Groundwater	Municipal	5,000	0	(28)

* Although groundwater may not be listed as a major water source distributed by the districts, private groundwater wells are a major water supply source for the region.
1. City of Fresno 2007, 2010.
2. Fresno Irrigation District 2009.
3. U.S. Bureau of Reclamation (USBR) 2004, 2007.
4. USBR 2007.
5. KRCD and KRWA 2009.
6. USBR 2007.
7. City of Hanford 2006; City of Hanford Public Works Department 2010b.
8. USBR 2007.
9. USBR 2007; Nidever 2010; Madruga2010, personal communication.
10. NA
11. NA
12. Lower Tule River Irrigation District 2009; USBR 2009c.
13. MWH 2003.
14. USBR 2000a.
15. USBR 2009c.
16. Center for Irrigation Technology 2005.
17. NA
18. USBR 2007; Semitropic Water Storage District 2004; Boschman2010, personal communication.
19. USBR 2000b.
20. USBR 2007; Rizo 2010, personal communication.
21. USBR 2000a.
22. Allen 2010, personal communication.
23. USBR 2007; Rizo 2010, personal communication.
24. Vaughn Water Company 2009, 2010.
25. USBR 2007, 2009b.
26. USBR 2007; Kern County Water Agency 2010; Kern County Water Agency (n.d.).
27. California Water Service Company 2010.
28. USBR 2009a.

Acronyms and Abbreviations:
CVP = Central Valley Project
ID = Irrigation District
MUD = Municipal Utility District
SWP = State Water Project
WCD = Water Conservation District
WD = Water District
WSA = Water Service Areas
WSD = Water Supply District



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 18, 2011

Sources: For federal water district boundaries, U.S. Bureau of Reclamation, MPGIS Service Center, (February 24, 2009); for state water district boundaries, U.S. Bureau of Reclamation, MPGIS Service Center in coordination with the CDWR, (March 2003); for private water district boundaries, U.S. Bureau of Reclamation, MPGIS Service Center in coordination with the CDWR, (October 2003).

Alternative alignments — Highway — Railroad — River

Miles: 0 5 10

Kilometers: 0 10 20

Figure 3.6-1
Boundaries of agricultural water districts and community water service areas

Wastewater Infrastructure

Generally, onsite sewage systems (e.g., septic tanks) treat rural and low-density areas of the study area. Table 3.6-5 summarizes municipal wastewater systems for the urban areas of each county, which are discussed further in the following subsections.

Table 3.6-5
Wastewater Treatment Plant Existing Average Flow and Capacity Summary for Proposed HST Station and Maintenance Facility Locations in the Fresno to Bakersfield Section

Jurisdiction	Agency	WWTP Name	WWTP Address	Average/Capacity Flow (mgd)
Fresno-Clovis Metropolitan Area	City of Fresno	Fresno/Clovis Regional Wastewater Treatment and Reclamation Facility	5607 W. Jensen Street	68/80
City of Hanford	City of Hanford Public Works	City of Hanford Wastewater Treatment Facility	10555 Houston Avenue	5.5/8.0
City of Corcoran	City of Corcoran Wastewater Division	City of Corcoran Wastewater Treatment Plant	Pueblo and King avenues	1.5/2.0
City of Shafter	City of Shafter Public Works Department and North of River Sanitary District	7th Standard Road Wastewater Treatment Facility	28970 7th Standard Road	5.32/7.50
City of Bakersfield	City of Bakersfield Public Works	City of Bakersfield Wastewater Treatment Facility #2	Mt. Vernon Avenue and White Lane	16.5/25.0

Acronyms:
HST high-speed train
mgd million gallons per day
WWTP wastewater treatment plant

Fresno County

City of Fresno

Wastewater in the city of Fresno is treated at the Fresno/Clovis Regional Water Reclamation Facility. The City of Fresno operates this facility, which is situated at Jensen and Cornelia streets in southwest Fresno. The facility provides wastewater treatment services for the greater Fresno-Clovis Metropolitan Area. On an average day, the facility receives 68 million gallons of wastewater; the facility has the capacity to treat 80 million gallons per day (mgd) (City of Fresno 2009a).

The City of Fresno is the designated regional sewer agency for the Fresno-Clovis Metropolitan Area of Fresno County. A joint powers agreement between the City of Fresno and Fresno County provides sewer services to most areas within the county. Since 1968, the City of Fresno has enforced a mandatory sewer ordinance that requires an end to use of the onsite sewage systems. Developments must connect to the regional sewer system as connections become available within the city limits.

The Fresno-Clovis Regional Wastewater Treatment and Reclamation Facility provides trunk sewer lines and treatment services for the cities of Clovis and Fresno. Operation, maintenance, and long-term planning for the treatment facility are the responsibility of the City of Fresno. The treatment capacity is approximately 80 mgd for an average flow, including equipment redundancy for maintenance and equipment failures. The facility provides primary and secondary treatment processes, and a treatment process for solids removed at the facility (City of Fresno 2011).

The City of Fresno owns major sewer lines that cross the study area in Fresno north of West Bullard Avenue and north of West Shaw Avenue. The study area does not include any wastewater treatment plants (WWTPs) or sewer lift stations in the city of Fresno.

Kings County

Incorporated and unincorporated communities in Kings County provide wastewater services to their services areas. The incorporated areas potentially affected by the proposed HST facilities are in the cities of Hanford and Corcoran.

City of Hanford

The City of Hanford treats wastewater at a city-operated facility at 10555 Houston Avenue. The facility is permitted, and designed to treat 8.0 mgd (City of Hanford Public Works Department 2010a). The plant currently treats approximately 5.5 mgd of wastewater.

City of Corcoran

The City of Corcoran operates a wastewater treatment plant at the corner of Pueblo Avenue and King Avenue. The facility has a capacity of 2.0 mgd; the average treatment rate is 1.2 to 1.5 mgd (City of Corcoran 2010). The effluent from this plant is disposed of on 338 acres to the south of the corner of Plymouth and King avenues.

Tulare County

The Fresno to Bakersfield Section of the proposed HST System would not require the use of wastewater services in Tulare County.

Kern County

The Kern County Waste Management Department provides management of wastewater at the Kern Sanitation Authority Sewer Plant, the Taft Wastewater Treatment Plant, the treatment plant at the Kern County Sheriff Office's Lerdo Detention Facility, the plant at the Buena Vista Aquatic Recreation Area, and the Reeder Sewer Plant. The Kern Sanitation Authority Sewer Plant treats 4.5 mgd of industrial, commercial, and domestic wastewater from East Bakersfield. All of the plant effluent is used to irrigate 2 square miles of adjacent farmland owned by the Kern Sanitation Authority. The City of Taft and Kern County jointly own the Taft Wastewater Treatment Plant. The Lerdo plant treats approximately 350,000 gallons per day of wastewater generated by the inmates and offices at the Lerdo Detention Facility. The plant at the Buena Vista Aquatic Recreation Area treats a maximum of 200,000 gallons per day of wastewater generated by the visitors and staff of the recreation area. The Reeder Sewer Plant treats a maximum of 40,000 gallons per day of domestic wastewater from the Reeder Tract area adjacent to Isabella Lake; the Reeder Tract area consists specifically of residential communities between Lake Isabella and Bodfish (Kern County Waste Management Department 2006).

City of Shafter

The City of Shafter Department of Public Works is responsible for the operation and maintenance of the city's public sewer system. Wastewater is treated at a plant in Shafter at 28970 7th Standard Road; the City of Shafter and the North of River Sanitary District (NORSD) jointly own the plant; NORSD owns two-thirds of the plant and the city owns one-third. The plant has a permitted treatment capacity of 7.5 mgd, of which the city is allowed to treat up to 2.0 mgd and the NORSD is allowed to treat 5.5 mgd (LaMar 2010, personal communication). Currently, the City of Shafter treats an average of 1.20 mgd, and the NORSD treats an average of 4.12 mgd. The service area boundary for the two entities is along 7th Standard Road.

City of Bakersfield

The City of Bakersfield Department of Public Works, Water Treatment Division, operates Plant 2, which serves the area east of SR 99 and would support either HST Station alternative, and Plant 3, which serves the area west of SR 99. The treated wastewater is used for restricted agricultural purposes. On average, Plant 2 processes approximately 16.5 mgd; it has a design capacity of 25 mgd. Plant 3 processes approximately 14 mgd; it is currently designed to treat 32 mgd per day (City of Bakersfield Public Works Department 2011).

Storm Drains

Storm drain systems are more prominent in developed urban areas. In the rural areas, roadside ditches, irrigation canals, and natural drainages convey stormwater runoff. The storm drainage systems for the counties and cities in the vicinity of the alternative alignments for the Fresno to Bakersfield Section reflect the limited annual rainfall and relatively flat topography of the region. The systems typically transport stormwater runoff to retention or detention basins, typically for groundwater recharge.

The Fresno Metropolitan Flood Control District (FMFCD) is responsible for planning and managing flood control areas. The FMFCD prepared a stormwater drainage and flood control master plan (FMFCD 2004) to coordinate the activities of FMFCD, Fresno County, and individual cities. Runoff is routed to detention basins throughout the Fresno-Clovis Metropolitan Area and eventually recharges the groundwater basin, the primary source of potable water for the metropolitan area. The system captures an average of 90% of all urban runoff (FMFCD [n.d.]). The City of Hanford discharges a limited amount of stormwater into the central branch canal of the Peoples Ditch Company. Table 3.6-6 identifies the number of drainage infrastructure conflicts within the study area for the BNSF Alternative Alignment and HMFs, every other alternative alignment, and proposed HST stations.

Table 3.6-6
Number of Storm Drain Facility Conflicts within Study Area

Utility Type	Owner Name	Alternative Alignments						Station Areas		
		BNSF	Corcoran Elevated	Corcoran Bypass	Allensworth Bypass	Wasco-Shafter Bypass	Bakersfield South	Fresno	Kings/ Tulare	Bakersfield
Storm pipes	Fresno Metropolitan Flood Control District	61	----	----	----	----	----	36	----	----
Storm pipes	City of Corcoran	3	----	-3	----	----	----	----	----	----
Storm drain manhole	Fresno Metropolitan Flood Control District	16	--------	----	----	----	----	11	----	----
Storm drain manhole	Other than Fresno Metropolitan Flood Control District	----	----	----	----	----	----	1	----	----
Storm drain manhole	City of Corcoran	1	----	-1	----	----	----	----	----	----
Storm drain manhole	City of Wasco	----	----	----	----	----	----	----	----	----
Storm drains	City of Wasco	3	----	----	----	-3	----	----	----	----

Table 3.6-6
Number of Storm Drain Facility Conflicts within Study Area

Utility Type	Owner Name	Alternative Alignments						Station Areas		
		BNSF	Corcoran Elevated	Corcoran Bypass	Allensworth Bypass	Wasco-Shafter Bypass	Bakersfield South	Fresno	Kings/ Tulare	Bakersfield
Infiltration pond	Fresno Metropolitan Flood Control District	1	----	----	----	----	----	----	----	----
Future storm pipes	Fresno Metropolitan Flood Control District	4	----	----	----	----	----	----	----	----
Total conflicts (net)		89	+0	-4	+0	-3	+0	48	+0	+0

+/- denotes number of conflicts greater or less than the BNSF Alternative
Note: The at-grade and elevated

Solid Waste Facilities

The following sections discuss solid waste facilities that may serve the project. The project would not directly affect active solid waste disposal facilities (i.e., landfills) or recycling facilities.

Fresno County

Fresno County operates two active solid waste disposal facilities/landfills: the American Avenue Landfill and the Coalinga Landfill. These landfills have a service area of 6,000 square miles. Parts of the unincorporated areas of the county also use the Clovis Landfill and until recently the Orange Avenue Landfill. Only a small part of the unincorporated county's solid waste is taken to these facilities, because the Clovis Landfill serves mainly the city of Clovis, and the Orange Avenue Landfill serves mainly the city of Fresno. Table 3.6-7 lists the permitted daily disposal capacities of these Fresno County facilities, their remaining capacity, and their estimated closure dates.

Table 3.6-7
Landfill Facility Summary for Fresno County

Facility Name	Activity	Location	Permitted Daily Disposal Capacity (tons/day)	Remaining Capacity (million cubic yards)	Permitted Disposal Area (acres)	Estimated Closure Date
American Avenue Disposal Site	Solid waste landfill	18950 W. American Ave., Kerman, CA	2,200	32.70	No permit restriction	2031
Coalinga Disposal Site	Solid waste landfill	30825 Lost Hills Road, Coalinga, CA 93210	200	2.29	52	2029
City of Clovis Landfill	Solid waste landfill	15679 Auberry Road, Fresno CA,	600	2.12	77	2047
Orange Avenue Disposal Inc.	Solid waste landfill	3280 South Orange Ave., Fresno, CA	Permitted	Inactive	—	—
Source: CalRecycle 2010b.						

Kings County

The solid waste landfills serving Kings County in the vicinity of the Fresno to Bakersfield Section have been closed since the late 1990s. The Kings Waste Recycling Authority transports solid waste from the Hanford area to its materials recovery facility (MRF) at 7803 Hanford-Armona Road in Hanford and then to the Chemical Waste Management Landfill in Kettleman Hills, approximately 45 miles west of the MRF. The Kings Waste Recycling Authority MRF has a maximum capacity of 800 tons/day. The Chemical Waste Management Landfill in Kettleman Hills has a disposal capacity of 8,000 tons/day and a maximum capacity of 10.7 million cubic yards.

Tulare County

Tulare County generates approximately 300,000 tons of waste per year in three landfills. All of these landfills are to the east of the study area in the vicinity of Visalia (Visalia Disposal Site), Tulare (Woodville Disposal Site), and Porterville (Teapot Dome Disposal Site). Table 3.6-8 lists the permitted daily disposal capacities of these facilities, their remaining capacities, and their estimated closure dates.

Table 3.6-8
Landfill Facility Summary for Tulare County

Facility Name	Activity	Location	Permitted Daily Disposal Capacity (tons/day)	Remaining Capacity (million cubic yards)	Permitted Disposal Area (acres)	Estimated Closure Date
Visalia Disposal Site	Solid waste landfill	Road 80 at Avenue 332, Visalia, CA	2,000	16.14	247	2024
Woodville Disposal Site	Solid waste landfill	Road 152 at Avenue 198; 10 miles SE of Tulare, CA	1,078	6.97	152	2026
Teapot Dome Disposal Site	Solid waste landfill	Avenue 128 and Road 208, Porterville, CA	600	1.14	71	2012
Source: CalRecycle 2010b.						

Kern County

The Kern County Waste Management Department operates landfills in Bena, Boron, Mojave-Rosamond, Ridgecrest, Shafter-Wasco, Taft, and Tehachapi; transfer stations in Buttonwillow, Glennville, Kern Valley, Lebec, and McFarland-Delano; and bin sites in Caliente, Keene, Loraine–Twin Oaks, and Randsburg (Kern County Waste Management Department 2005). Table 3.6-9 lists the permitted daily disposal capacities, remaining capacities, and estimated closure dates for the Kern County landfills in the project vicinity.

The City of Shafter owns collection equipment and operates residential, commercial, and industrial trash pickup services within the core community. Two franchise haulers, American Refuse and Varner Brothers, serve newly annexed territories in the city. The Shafter/Wasco Landfill is the city’s primary landfill, though the Bena Landfill accepts some refuse from industrial uses in the city.

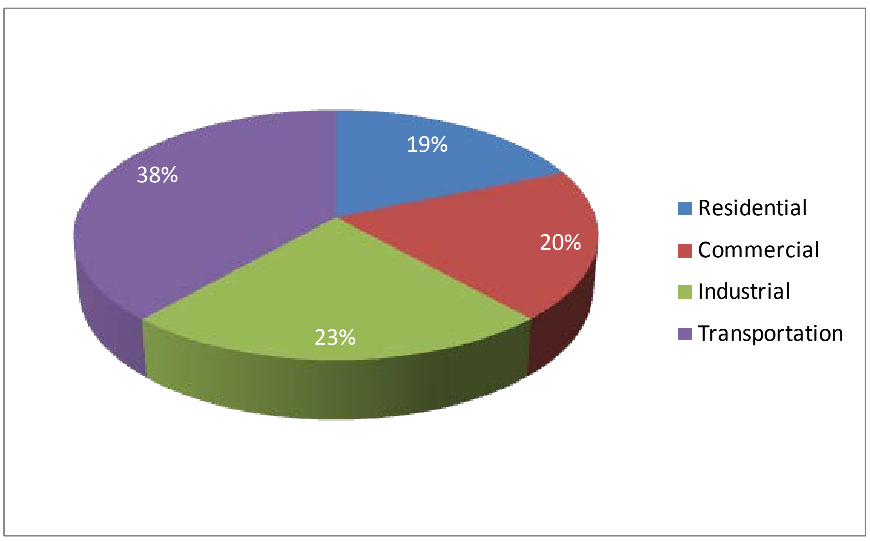
The City of Bakersfield Sanitation Division and contracted private haulers provide solid waste collection services (residential and commercial) in Bakersfield. A county franchise hauler provides services in the unincorporated area around Bakersfield. All solid waste generated in the area is disposed of in county-operated landfills, primarily the Bena Landfill.

Table 3.6-9
Landfill Facility Summary for Kern County

Facility Name	Activity	Location	Permitted Daily Disposal Capacity (tons/day)	Remaining Capacity (million cubic yards)	Permitted Disposal Area (acres)	Estimated Closure Date
Shafter-Wasco Sanitary Landfill	Solid waste landfill	17621 Scofield Avenue, Shafter, CA	888	7.90	135	2027
Bakersfield Metropolitan (Bena) Sanitary Landfill	Solid waste landfill	2951 Neumarkel Road, Caliente, CA	4,500	34.99	229	2038
Source: CalRecycle 2010b.						

B. ENERGY

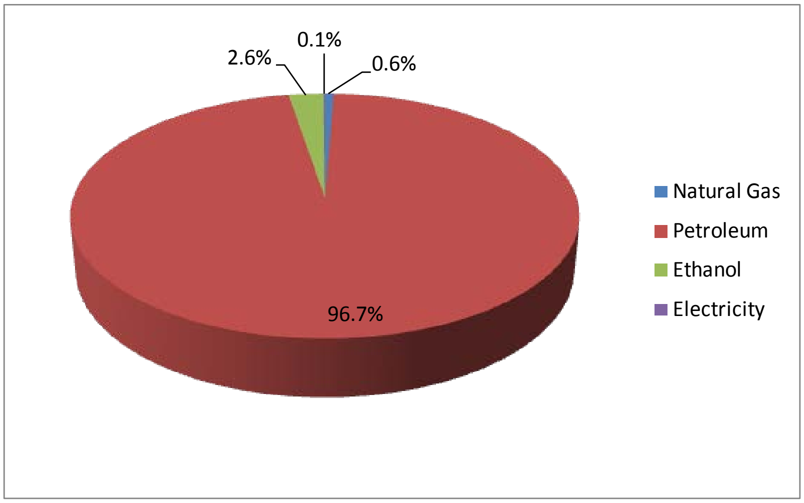
California is the tenth largest energy consumer in the world. The transportation sector consumes 38% of California's energy, the industrial sector consumes 23%, the residential sector consumes 22%, and the commercial sector consumes 19% (U.S. Energy Information System 2008). Figure 3.6-2 illustrates California's energy consumption by sector in 2008.



Source: U.S. Energy Information Administration 2008.

Figure 3.6-2
California energy consumption by sector, 2008

In California, electricity and natural gas are nearly synonymous with stationary energy usage, and petroleum is similarly synonymous with transportation energy (CEC 2000). Figure 3.6-3 depicts the sources of energy used for transportation in California in 2008.



Source: U.S. Energy Information Administration 2008.

Figure 3.6-3
California transportation energy consumption by source, 2008

Energy Resources

Electricity

Demand

There are two ways to measure electricity demand: consumption and peak demand. Electricity consumption is the amount of electricity used by consumers in the state. According to the CEC, total statewide electricity consumption grew from 166,979 GWh in 1980 to 272,000 GWh in 2005 (CEC 2010a). Electricity consumption growth rates fell from an estimated rate of 3.2% in the 1980s to a rate of 0.9% between 1990 and 1998. This reduction in consumption is attributed to the economic recession in the early part of the decade (Authority and FRA 2005).

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. In the San Joaquin Valley, high air-conditioning loads and irrigation pumping contribute to this summer peak demand. Table 3.6-10 summarizes electricity consumption in Fresno, Kings, Tulare, and Kern counties in 2009.

Table 3.6-10
2009 Electricity Consumption in Fresno, Kings, Tulare, and Kern Counties

County	2009 Usage (million kilowatt hours)
Fresno	7,222.12
Kings	14,308.64
Tulare	1,573.65
Kern	3,879.54
Source: CEC 2010a.	

Generation

The electric power sector is the fastest- growing share of the energy economy in California (U.S. Department of Energy 2008). The projected net power supply within the grid controlled by the California Independent System Operator for summer 2009 was 58,098 megawatts (MW) (ISO 2009). Table 3.6-11 summarizes fuel sources for electric power in California for 2005.

Table 3.6-11
Fuel Sources for Electric Power in California in 2005

Fuel Source	Quantity Used (trillion Btu)	Percentage of Fuel Mix
Coal	20.7	1
Petroleum	49.4	3
Nuclear	376.8	19
Hydroelectric	396.2	20
Renewable	398.3	20
Natural Gas	709.3	36
Source: U.S. Department of Energy 2008.		

In-state electricity generation accounted for 73% of the total electricity supply for California in 2008. Existing power plants near the study area use biomass, municipal solid waste, solar, hydro, oil, and gas energy resources to generate electricity. Power plants in the study area include steam turbine and internal combustion plants fueled by natural gas and hydroelectric plants. An estimated 23% of the generating capacity near the study area comes from clean, renewable sources; natural gas fuels the remaining 77% (CEC 2008).

Electricity Demand and Generation Capacity Outlook

Statewide, the projected average summer power supply in 2010 was forecast at 76,968 MW. Assuming 1-in-2 summer temperatures,[1] demand was approximately 57,253 MW. The result is an average planning reserve margin[1] of 36% (CEC 2010b). California's population will exceed 49 million by 2025 and more than 53 million by 2030, requiring an additional 92,000 MW of peak summer capacity in 2030[1] to meet demand and have an adequate reserve margin (Electric Power Group, LLC 2004).

Projections of in-state generation capacity for 2035 are not possible because generation infrastructure decisions typically are not made more than 2 to 3 years in advance of construction. The Western Electricity Coordinating Council (WECC) 2008 power supply assessment projects system deficits within the forecast period (2017). These values factor in the loss of generating capacity from decommissioned sources and the addition of programmed capacity. Most of the planned generating resources are renewable (e.g., wind, gas, hydroelectric, and solar) (WECC 2008).

Projected deficits indicate the need for additional generation capacity. Historically, new generation has been in step with demand. Where supply insufficiencies have occurred, they have been the result of a number of interrelated factors, including faulty market design and regulatory issues (Weare 2003).

Transmission

California's electricity transmission system comprises more than 31,000 miles of bulk electric transmission lines rated at 69 kV or more, towers, and substations (Authority and FRA 2008a). The system links generation to distribution in a complex electrical network that balances supply and demand on a nearly instantaneous basis. The California Independent System Operator, a nonprofit entity responsible for the system's reliability and non-discriminatory transmission of energy, operates California's transmission system.

In addition to the in-state transmission connections, there is a system of transmission interconnections that connect California's electricity grid with out-of-state electricity utilities. The Western Interconnection connects California to electricity generation facilities in 10 other western states, western Canada, and northwestern Mexico. With a total importing capacity of 18,170 MW, these interconnections serve a critical role in satisfying California's electricity consumption (Authority and FRA 2008a). As electricity consumption grows, the addition of transmission capacity may facilitate energy transfers from subregions where there is surplus generating capacity to subregions that require additional energy. However, when the overall energy market is in a deficit; additional transmission capacity alone cannot relieve the subregional deficits.

Natural Gas

California is the second largest consumer of natural gas in the nation, with consumption at 71,567 million cubic feet (MMcf) per day in 2007. Natural gas is the most used fuel for electricity generation in California, and approximately 44% of the 2006 daily consumption of natural gas was for electricity generation (CEC 2007). In 2007, California produced 12.9% of the natural gas consumed in the state. Most of the natural gas consumed comes from the southwestern United States (40.8%), the Rocky Mountain area (24.2%), and Canada (22.1%) (CEC 2009).

The CEC predicts that overall natural gas demand will grow slightly more than 1% annually through 2017, with demand volumes of 89,720 MMcf daily by 2017 (CEC 2007). Within the

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[1] Based on the 2007 national average fuel economy for passenger and other two-axle, four-tire vehicles.

contiguous United States, the projected natural gas reserves recoverable with today's technology are expected to permit current levels of production for the next 50 years (Authority 2005). Natural gas supplies are not considered to limit California's projected demand.

Petroleum

Automobile travel is the predominant mode of passenger transportation within the study area. Historically, demand for transportation services (and petroleum consumption) in California has mirrored the growth of the state's population and economic output. The *Base Case Forecast of California Transportation Energy Demand* (CEC 2001) indicates that vehicle miles traveled (VMT) are currently growing at an average rate of 1.8% annually, which is greater than the population growth rate. The report projects that between 2000 and 2020, on-road gasoline demand will increase an average of 1.6% annually, and diesel demand will increase by an average of 2.4% annually.

Automobiles are most efficient when operating at steady speeds of 35 to 45 mph with no stops (U.S. Department of Energy 2006). Fuel consumption by conventional automobile engines increases by approximately 30% when average speeds drop from 30 to 20 mph; a drop from 30 to 10 mph results in a 100% increase in fuel consumption. The CEC estimates that approximately 10% of all on-road fuel consumed is a result of traffic congestion (CEC 1990). Fuel consumption increases at speeds above 45 mph since the power to overcome air resistance increases roughly with the cube of the speed, and the energy required per unit distance is roughly proportional to the square of speed. For this reason, driving at 45 rather than 65 mph requires about one-third the power to overcome wind resistance, or about one-half the energy per unit distance.

3.6.5 Environmental Consequences

This section provides the impact analysis relating to public utilities and energy for the project. The Statewide Program EIR/EIS addressed consultation with each utility provider and owner to avoid or reduce potential impacts on existing and planned utilities.

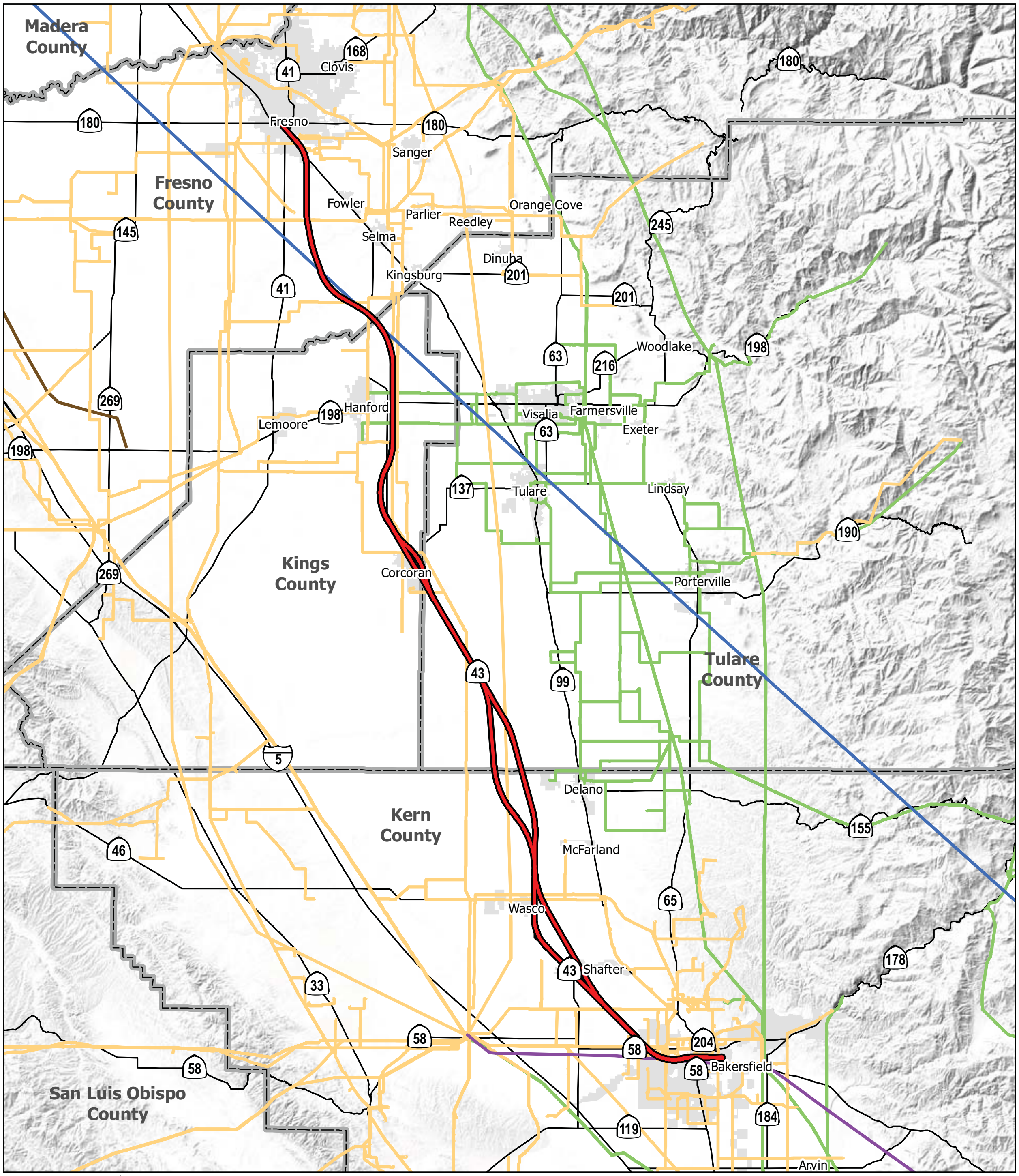
A. OVERVIEW

Utilities

Constructing the Fresno to Bakersfield Section of the California HST System could result in scheduled and accidental interruptions of utility services, and it would generate construction and demolition (C&D) material. Letters and newspaper notices would inform utility customers of scheduled outages. Probing for existing utilities prior to the start of construction would reduce the risk of accidental service interruptions. Where feasible, C&D material would be recycled or repurposed to divert it from landfills.

The permanent project footprint in some places would be located where current utility lines exist (i.e., a potential "utility conflict"). Utilities within the permanent project footprint would be either relocated outside the restricted access areas of the HST right-of-way, or they would be modified (i.e., encased in a pipe sturdy enough to withstand the weight of HST System elements) to avoid the conflict. It would be standard practice that agreements related to utility relocation or encasement require utility owners and operators to notify the Authority in advance of monitoring or maintenance of their facilities that remain in the HST right-of-way after construction of the guideway.

The following sections analyze utility conflicts by alternative for high-risk utilities and low-risk utilities, respectively. Figures 3.6-4 through 3.6-7 identify various high-risk and low-risk utility conflicts along the Fresno to Bakersfield Section.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 18, 2011

Source: Platts, "Electric Transmission Lines," metadata (Platts, Division of MacGraw-Hill Companies, Inc., 2009), http://www.platts.com/ (accessed August 9, 2010).

Electric transmission line ownership

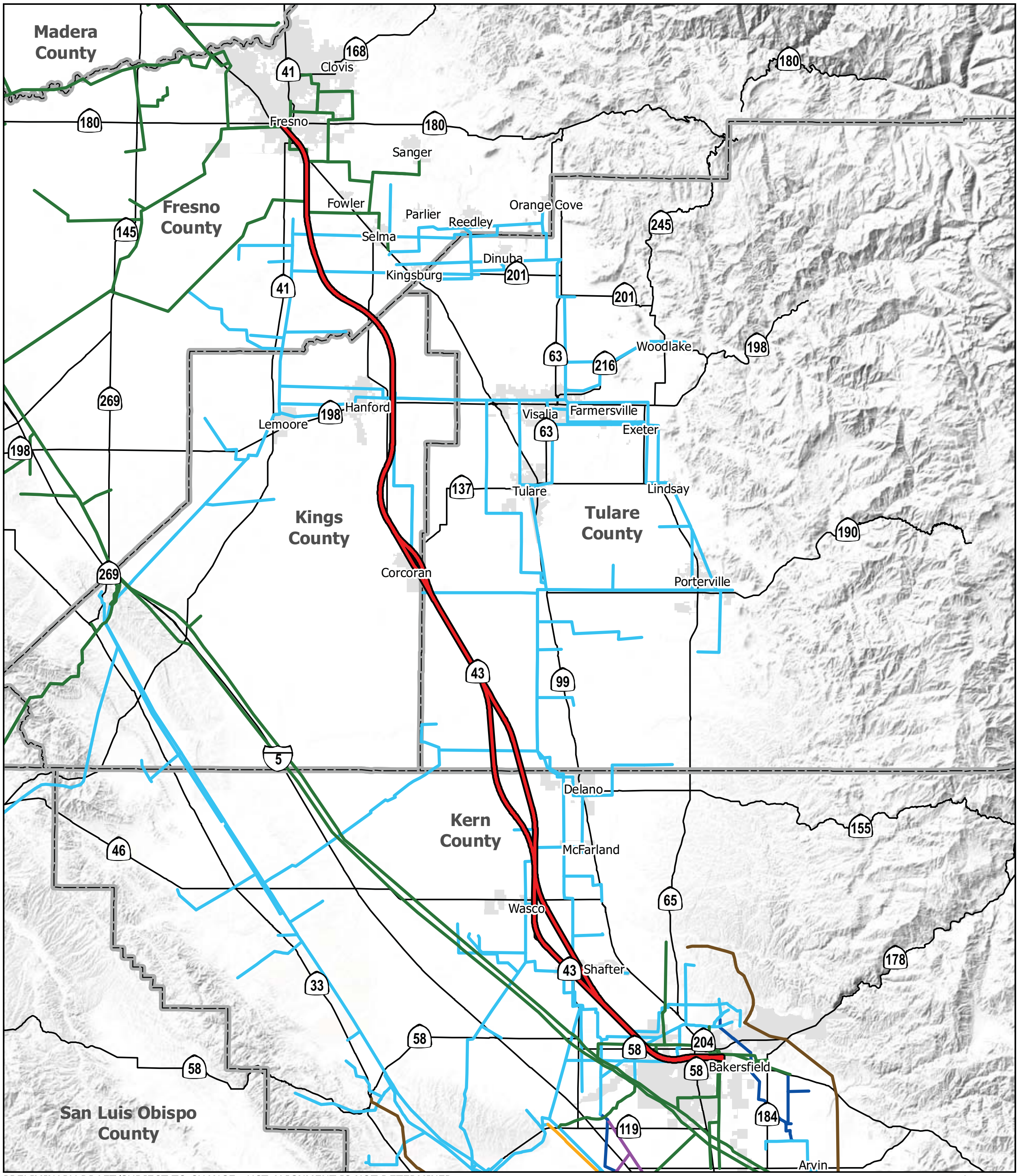
- AEP Texas Central Company
- Imperial Irrigation District
- Pacific Gas and Electric Company
- San Diego Gas & Electric Company
- Southern California Edison Company
- Alternative alignments
- Urban area
- Highway

N

0 5 10 Miles

0 10 20 Kilometers

Figure 3.6-4
Electric transmission lines



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 18, 2011

Source: Platts, "PowerMap" (Platts, Division of MacGraw-Hill Companies, Inc., 2010), http://www.platts.com/ (accessed August 3, 2010).

N

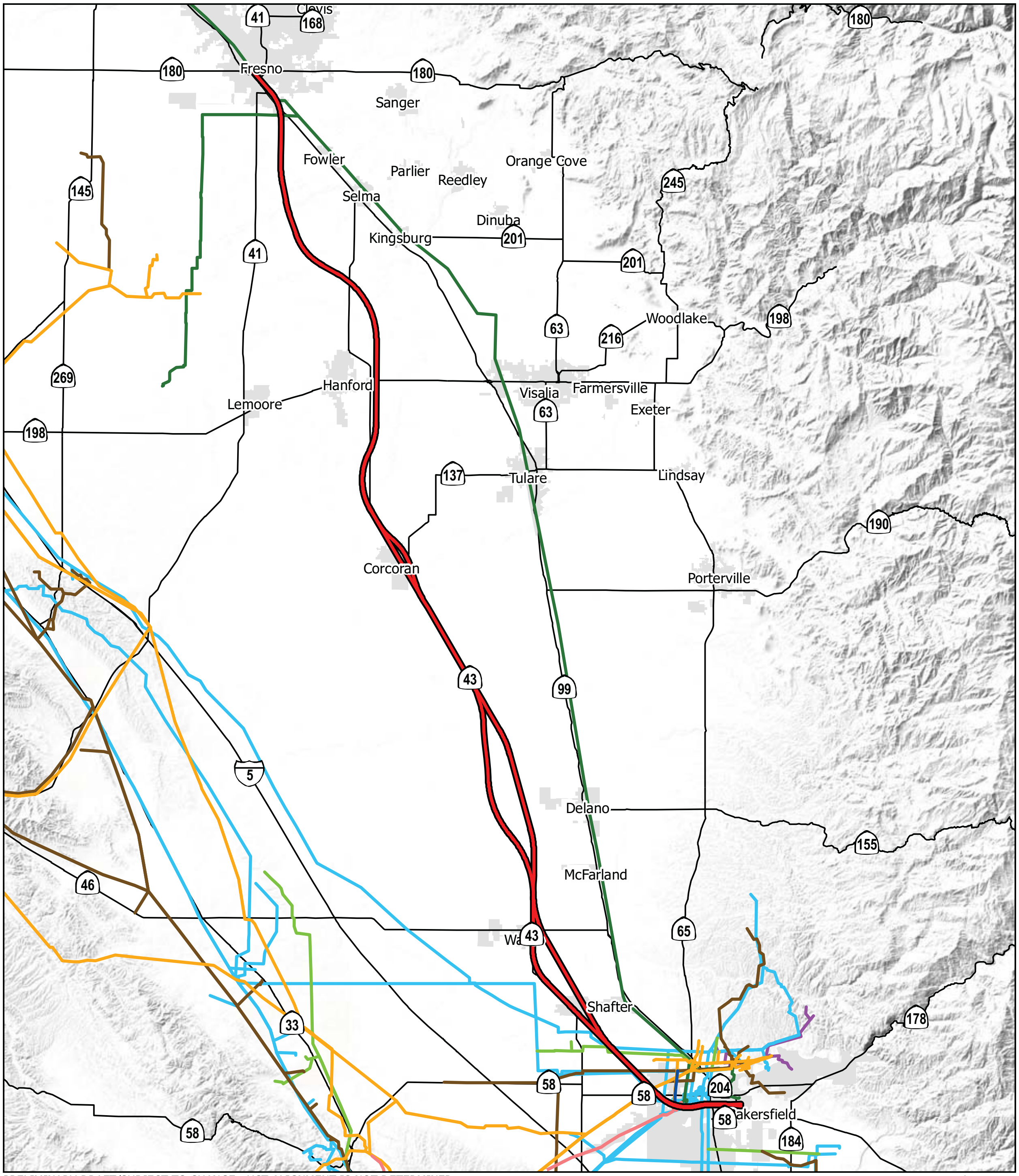
Miles: 0, 5, 10

Kilometers: 0, 10, 20

Natural gas pipeline ownership

- BP p.l.c. UK
- Mojave Pipeline Company
- Pacific Gas and Electric Company
- Sempra Energy
- Shell Oil Company
- West Gulf
- Alternative alignments
- Urban area
- Highway

Figure 3.6-5
Natural gas pipelines



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 18, 2011

Source: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, "National Pipeline Mapping System," metadata (Washington, D.C.: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, January 28, 2004), https://www.npms.phmsa.dot.gov/ (accessed August 2010).

N

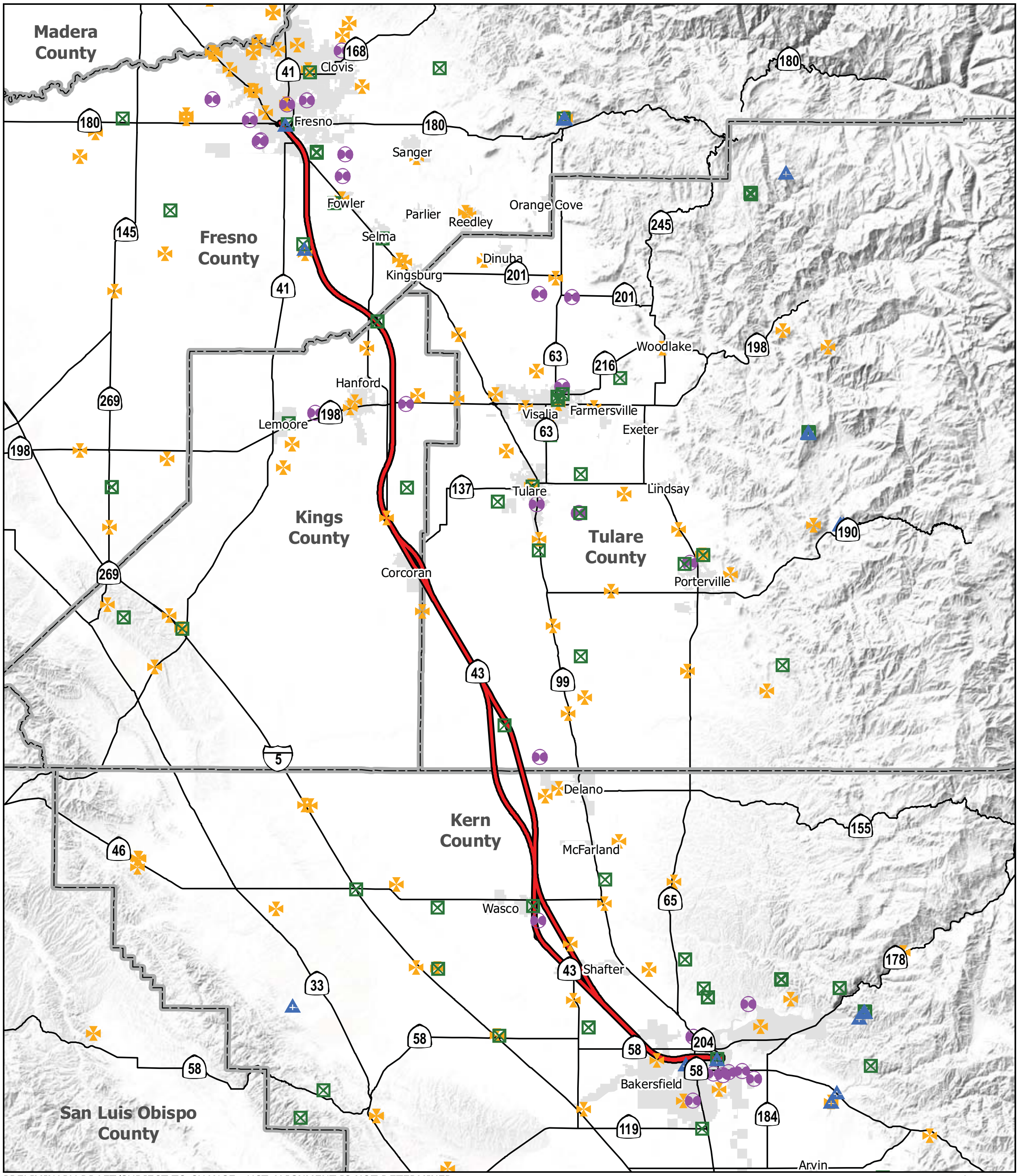
0 5 10 Miles

0 10 20 Kilometers

Petroleum and fuel pipeline ownership

- BP p.l.c. UK
- Chevron Corporation
- ConocoPhillips
- ExxonMobil Corporation
- Kinder Morgan Inc.
- Shell Oil Company
- Sunland Refining Corporation
- Tricor Refining LLC
- Alternative alignments
- Urban area
- Highway

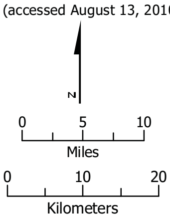
Figure 3.6-6
Petroleum and fuel pipelines



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 18, 2011

Source: Federal Communications Commission, Wireless Telecommunications Bureau, Spectrum and Competition Policy Division, "Antenna Structure Registration" (Washington, D.C.: Federal Communications Commission, last updated April 5, 2010), http://wireless.fcc.gov/geographic/index.htm (accessed August 13, 2010).



- Cellular service site
- AM radio broadcast facility
- FM radio broadcast facility
- Television broadcast facility
- Alternative alignments
- Urban area
- Highway

Figure 3.6-7
Communication facilities and sites

Based on anticipated reuse, recycling, and waste diversion to be implemented by the HST System to reduce solid waste, existing utility capacity is adequate to meet project demands. Potential impacts on these facilities and services would be less than significant under NEPA and under CEQA.

Energy

Per CEQA requirements, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project. Those conditions, in turn, "will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." (CEQA Guidelines Section 15125[a])

For a project such as the HST project that would not commence operation for almost 10 years and would not reach full operation for almost 25 years, use of only existing conditions as a baseline for energy impacts would be misleading. It is more likely that existing background traffic volumes (and, thus the intensity of energy use) would change due to planned traffic improvement projects) between today and 2020/2035 than it is that existing traffic conditions would remain unchanged over the next 10 to 25 years. For example, Regional Transportation Plans (RTP) include funded transportation projects that are programmed to be constructed by 2035. To ignore that these projects would be in place before the HST project reaches maturity (i.e., the point/year at which HST-related transportation (traffic and aircraft) generation reaches its maximum), and to evaluate the HST project's energy impacts ignoring that these improvements would change the underlying background conditions to which HST project effects would be added, would present a misleading hypothetical comparison.

Therefore, the energy analysis uses a dual baseline approach. That is, the HST project's energy impacts are evaluated both against existing conditions and against background (i.e., No Project) conditions as they are expected to be in 2035. Results for both baselines are presented in this section. The results comparing the project with the future expected baseline are presented in detail in this document. The results comparing the project with existing conditions are summarized in this document and details are presented in Appendix 3.6-A, Energy Analysis, to this document. This approach complies with CEQA (see *Woodwark Park Homeowners Assn v. City of Fresno* [2007], 150 Cal.App.4th 683, 707 and *Sunnyvale West Neighborhood Assn. v. City of Sunnyvale* [2010], 190 Cal.App.4th 1351) by informing the public of potential project impacts under both baselines, but focuses the analysis on the baseline analysis more likely to occur.

Electrical Requirements of the HST

The electrical demand for the propulsion of the trains, the operation of the trains at terminal stations, and in storage depots and maintenance facilities etc., has been conservatively estimated by the project's engineers to be 8 GWhs per day. Transmission losses, the percentage of energy lost due to transmission from the power plant to the project, have been estimated to be approximately 4%. Applying this factor to the 8 GWh per day electrical requirement of the HST System results in a total electrical requirement at the power plant to be approximately 8.32 GWhs, or 28,389 MMBtus, per day. This change is predicted to occur in both the existing conditions plus project scenario and the 2035 build scenario.

Table 3.6-12 summarizes the statewide energy changes that would result from the HST System. The analysis conducted for this project estimated the changes in energy use anticipated throughout the state with and without the HST System. The analysis estimated the energy changes from reduced on-road VMT, reduced intrastate airplane travel, and increased electrical demand. Although the HST System would result in an increase in electricity demand, it would reduce the energy demands from automobile and airplane travel, resulting in an overall beneficial effect on statewide energy use.

Table 3.6-12
2035 Estimated Change in Energy Consumption Due to the HST System

Projected Outcomes of the HST System	Change in Energy Usage due to HST versus Future Conditions (MMBtu/day)	Change in Energy Usage due to HST versus Current Conditions (MMBtu/day)
Reduced VMT	-150,240	-87,496
Reduced Airplane Travel	-16,985	-9,851
Increased Electricity Consumption	28,389	28,389
Net Change in Energy Use	-138,836	-68,958

Acronyms and Abbreviations:
HST high-speed train
MMBtu million Btu
VMT vehicle miles travelled

The Fresno to Bakersfield Section of the HST System would contribute approximately 14% to the statewide estimates of HST energy demand and savings, as compared with the energy use of conventional means of transportation. The payback period for energy used demand during HST construction would be less than a year.

B. NO PROJECT ALTERNATIVE

The population in Fresno, Kings, Tulare, and Kern counties is projected to grow, as discussed in Chapter 1, Project Purpose, Need, and Objectives, and in Section 3.18, Regional Growth. An increase in population would increase the demand for utility services. Section 3.19, Cumulative Impacts, discusses foreseeable future projects, which include shopping centers, industrial parks, road network improvements, and residential developments between the cities of Fresno and Bakersfield. These projects are planned or approved to accommodate the growth projections in the area. As discussed in Section 3.6.4, Affected Environment, local utilities have capital improvement plans to accommodate the anticipated population growth. These improvements include the expansion of the wastewater treatment plants and infrastructure additions and upgrades to provide services to growing populations.

Demand for energy would also 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.

Under the No Project Alternative, the daily VMT in Fresno, Kings, Tulare, and Kern counties would increase by 2035, as described in Section 3.2, Transportation. This increase would require an estimated 0.75-million gallons of additional petroleum in the Fresno to Bakersfield region alone (Bureau of Transportation Statistics 2010).[2] Potential increases in petroleum demand could be a concern under the No Project Alternative.

[2] Based on the 2007 national average fuel economy for passenger and other two-axle, four-tire vehicles.

C. HIGH-SPEED TRAIN ALTERNATIVES

The project design incorporates design elements that minimize electricity consumption (e.g., using regenerative breaking, and energy-saving equipment and facilities). The project will be constructed and operated in an energy-efficient manner. For example, the stations will qualify for the LEED Silver-Level Certification, and renewable energy will power the HSTs, to the extent feasible.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended guide Federal agencies on compensation for impacts on property owners and tenants who must relocate if they are displaced by a federally sponsored project. This act applies to all real property including the acquisition of land for relocation of utilities. The Authority would positively locate public utilities within the potential impact area (by probing, potholing, electronic detection, as-built designs, or through other means) prior to construction, in compliance with state law (i.e., California Government Code 4216). Where it is not possible to avoid utilities, they would be improved (e.g., steel pipe encasement) so that there is no damage or impairment to the operation of these utilities from the HST project.

Utilities

Construction Period Impacts—Common Utilities Impacts

The construction of any of the project alternatives and the HMF could result in planned temporary interruption of utility service, accidental disruption of services, increased water use, and an increase in waste generation.

Temporary Interruption of Utility Service

Construction could require the temporary shutdown of utility lines, such as water, electricity, or gas, to safely move or extend these lines. Shutdown could interrupt utility services to industrial, commercial, agricultural, and residential customers. This would result in a negligible effect under NEPA and a less-than-significant impact under CEQA.

Where necessary, project design and phasing of construction activities would minimize interruptions, including for upgrades of existing power lines to connect the HST System to existing PG&E substations. 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., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no fewer than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. Because of the short duration of the planned interruptions and the interruption notification procedures, this effect would be negligible under NEPA. Under CEQA, this impact would be less than significant.

Accidents and Disruption of Services

During construction, the potential for accidental disruption of utility systems, including overhead utility lines (e.g., telephone and cable television) and buried utility lines (e.g., water, wastewater, and natural gas lines) is low due to the established practices of utility identification. Such accidents could impair the health and safety of nearby workers and residents and could result in property damage. The potential effect would be negligible under NEPA. Under CEQA, the impact would be less than significant.

Water Demand

Construction activities would use water to prepare concrete, increase the water content of soil to optimize compaction for control dust, and to re-seed disturbed areas. Table 3.6-13 shows the estimated water usage among various alternative alignments and facilities.

Table 3.6-13
Construction Phase Water Use Summary

Alignment Alterative	Work/Operation Requiring Water Use	Total Volume Water Use (MG)	Total Volume Water Use (ac-ft)	Annualized Water Use (ac-ft/yr)
BNSF Alternative				
114 miles	Concrete Work	47	144	29
	Earthwork	36	110	22
	Dust Control (tracks)	696	2137	427
	Irrigation (tracks)	158	484	97
	Total	937	2875	**575**
Corcoran Elevated				
4 miles	Concrete Work	8	23	5
	Earthwork	0	0	0
	Dust Control (tracks)	23	69	14
	Irrigation (tracks)	5	16	3
	Total	35	108	**22(18)**
Corcoran Bypass				
21 miles	Concrete Work	2	6	1
	Earthwork	8	24	5
	Dust Control (tracks)	128	394	79
	Irrigation (tracks)	29	89	18
	Total	167	513	**103 (103)**
Allensworth Bypass				
19 miles	Concrete Work	4	13	3
	Earthwork	7	21	4
	Dust Control (tracks)	116	356	71
	Irrigation (tracks)	26	81	16
	Total	153	470	**94 (95)**

Table 3.6-13
Construction Phase Water Use Summary

Alignment Alterative	Work/Operation Requiring Water Use	Total Volume Water Use (MG)	Total Volume Water Use (ac-ft)	Annualized Water Use (ac-ft/yr)
Wasco-Shafter Bypass				
23 miles	Concrete Work	8	25	5
	Earthwork	7	23	5
	Dust Control (tracks)	141	431	86
	Irrigation (tracks)	32	98	20
	Total	188	577	**115 (123)**
Bakersfield South				
9 miles	Concrete Work	14	44	9
	Earthwork	1	2	0.5
	Dust Control (tracks)	55	169	34
	Irrigation (tracks)	12	38	8
	Total	83	253	**51 (51)**
Heavy Maintenance Facility				
154 ac	Concrete Work	14	44	9
	Dust Control	197	603	121
	Irrigation	6	19	4
	Total	217	666	**133**
Fresno Station				
13 ac	Concrete Work	7	23	5
	Dust Control	64	197	39
	Irrigation	0.2	1	0.1
	Total	72	221	**44**
Kings/Tulare Station				
28 ac	Concrete Work	1	2	0.5
	Dust Control	138	425	85
	Irrigation	1	2	0
	Total	140	429	**86**

Table 3.6-13
Construction Phase Water Use Summary

Alignment Alterative	Work/Operation Requiring Water Use	Total Volume Water Use (MG)	Total Volume Water Use (ac-ft)	Annualized Water Use (ac-ft/yr)
Bakersfield Station				
20 ac	Concrete Work	9	29	6
	Dust Control	96	296	59
	Irrigation	1	2	0.4
	Total	106	326	**65**
Total				903

General Notes:
Annualized water use is for a 5-year construction period.
Equivalent numbers for the corresponding segment of the BNSF Alternative are presented in parenthesis. Concrete volume for stations was estimated by structure footprints and building characteristics.
Station option with the highest water use is presented.
MG is the abbreviation for million gallons.

The difference in water demand between the alignment alternatives is a function of the total guideway length; however, the guideway lengths vary only slightly between the BNSF Alternative and each of the five other alternative alignments for the Fresno to Bakersfield Section. A variety of sources would provide water, depending on the alternative constructed. Because HST construction would require neither construction nor expansion of a water treatment facility and would also not require new or expanded entitlements, and demand would be temporary, impacts resulting from water demand would be negligible under NEPA and less than significant under CEQA. Information regarding existing water use and anticipated project-related water demand is summarized in Appendix 3.6-B, *Technical Memorandum: Water Usage Analysis for CHST Fresno to Bakersfield Section.*

Existing water use within the project footprint is estimated to be 4,044 acre-feet/yr for the BNSF Alignment Alternative, and varies between 4 to 159 acre-feet/year depending on which of the five prospective alignment alternatives is selected. Existing water use at each of the prospective HMF sites varies between 1,500 and almost 2,000 acre-feet/year. Finally, existing water use at each HST Station in acre-feet/year is as follows: Fresno-Kern – 35; Fresno-Mariposa – 42; Kern-Tulare Regional (Hanford) Station – 70; and Bakersfield North – 42. Therefore, average annual water use over the construction period would be less than existing demand and could be supplied from existing surface or groundwater sources. For this reason, HST construction would require neither construction nor expansion of a water treatment facility and would also not require new or expanded entitlements. Impacts resulting from water demand would be negligible under NEPA and less than significant under CEQA.

Waste Generation

Clearing of vegetation, removal of existing asphalt and gravel, and demolition of existing structures during construction would generate waste. Construction of any of the HST alternatives would generate an estimated 2.6 million cubic yards of waste. The HMFs alone would each generate 750,000 to 1,000,000 cubic yards of waste during construction.

As standard construction practice, the contractor would divert construction and demolition waste from landfills by reusing or recycling to aid with implementing the Local Government Construction and Demolition (C&D) Guide [Senate Bill 1374] and meet solid waste diversion goals to the extent practicable. The contractor would either segregate and recycle the waste at a certified recycling facility or contract with an authorized agent to collect mixed (not segregated) waste and dispose of it at a certified recycling facility.

Reuse and recycling of C&D material could divert much of the waste from landfills. The landfills to which C&D material from the project would be sent have not been identified. Each landfill has specific requirements regarding the acceptance of hazardous wastes and C&D material that may influence the selection of disposal sites. Although there are three active landfills that accept C&D material, other regional facilities (such as those that serve the city of Fresno) may be used for waste disposal. It is estimated that the total volume of C&D material would be a maximum of 3.0 million cubic yards before recycling (approximately 8.1% of the total permitted capacity of the three active landfills that accept C&D material, which were previously identified in Table 3.6-7). Therefore, the Fresno to Bakersfield HST would have a negligible effect under NEPA on area landfills. Under CEQA, the impact on permitted landfills that would serve the project is less than significant.

As discussed in Section 3.10, Hazardous Materials and Wastes, construction would generate hazardous waste consisting of welding materials, fuel and lubricant containers, paint and solvent containers, 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. The Authority would handle, store, and dispose of all hazardous waste in accordance with applicable requirements, including the Resource Conservation and Recovery Act (see Section 3.10, Hazardous Materials and Wastes). A certified hazardous waste collection company would deliver the waste to an authorized hazardous waste management facility for recycling or disposal. Some in-state landfills, such as the Chemical Waste Management Kettleman Hills Landfill in Kings County, and permitted landfills in southern California, accept hazardous wastes (DTSC 2007). Because hazardous waste could be disposed of at permitted landfills that have sufficient capacity, potential effects are negligible under NEPA and less than significant under CEQA.

Project Impacts—Common Utilities Impacts

The operation and maintenance for each of the project alternatives and HMFs could result in permanent relocation and extensions of utilities; reduced access to existing utilities in the project footprint; and increased demand for water, wastewater, and waste disposal services. None of the project alternatives would physically encroach on the footprint of water or wastewater treatment facilities, water pump stations, or power plants.

Conflicts with Existing Utilities

There are many utilities within or crossing the study area for the proposed HST and associated facilities, as listed in Tables 3.6-14 and 3.6-15. The project would not be compatible with most of these existing utilities. The Authority would work with utility owners during final engineering design and construction of the project to relocate utilities or protect them in place. Where overhead transmission lines cross the HST alignment, the Authority and the utility owner may determine that it is best to place the line underground. In this case, the transmission line would be placed in a conduit so that future maintenance of the line could be accomplished outside the HST right-of-way. Where existing underground utilities such as gas, petroleum, and water pipelines cross the HST alignment, the utilities would be placed in a protective casing so that future maintenance could be accomplished outside of the HST right-of-way. The project construction contractor would coordinate schedules for utility relocations and protection-in-place with the utility owner to ensure the project would not result in prolonged disruption of services.

In compliance with state law (California Government Code Section 4216), the construction contractor would use a utility locator service and manually probe for buried utilities within the construction footprint prior to initiating ground disturbing activities. This would avoid accidental disruption of utility services. For these reasons, the effect of the project on utility providers and their customers would be negligible under NEPA and the impact would be less than significant under CEQA.

Reduced Access to Existing Utilities in the HST Right-of-Way

The HST right-of-way would be fenced and secured after construction and would limit maintenance access for utilities that remained within the right-of-way. Underground wet utilities, such as water, sewer, storm drains, gas, and petroleum lines, are conveyed inside a pipeline material with a service life typically of 50 years or more. Dry utilities, such as electrical, fiber optics, and telephone lines, are encased in a durable pipeline—for example, made of steel—that protects the dry utilities from deterioration and also has a long service life. Utilities that remained in the HST right-of-way would be placed in a casing pipe that is strong enough to carry the HST System facilities. This casing pipe is large enough to accommodate equipment for remote monitoring of the condition of the carrier pipe. If the utility conveyance pipeline were in need of repair or replacement, the casing pipe would stay in place so that HST operations could continue. It is common practice that utility districts coordinate and schedule in advance of any field visits to their facilities with the owner of the property within which their facilities lie. With implementation of these standard engineering and utility access practices, reduced access to existing utility lines would be a negligible effect under NEPA. Under CEQA, the impact would be less than significant.

High-Speed Train Alternatives Analysis

The BNSF Alternative and each alignment and bypass alternative are analyzed, along with proposed HST station and HMF facility site alternatives, for potential conflicts with existing utility infrastructure, such as utility transmission and service corridors or substations. Table 3.6-14 shows the number of high-risk utilities that could be affected by each alternative; similarly, Table 3.6-15 shows the number of low-risk utilities that could be affected. Further discussion of these impacts by each type of utility is also provided below for each alternative.

Table 3.6-14
Alternative Alignment Impacts—High-Risk Utilities

Design Option	Electrical Transmission and Power Lines	Natural Gas Distribution Lines	Petroleum and Fuel Pipelines	Substation
BNSF Alternative Alignment	23	22	19	0
Impacts for other alternative alignments[a]				
Corcoran Bypass	-1	+2	0	0
Corcoran Elevated	-4	0	0	0
Allensworth Bypass	0	0	0	0
Wasco-Shafter Bypass	0	+1	1	0
Bakersfield South	0	+1	-1	0
Range of Impacts[b]	22–23	22–26	19	0

Table 3.6-14
Alternative Alignment Impacts—High-Risk Utilities

Design Option	Electrical Transmission and Power Lines	Natural Gas Distribution Lines	Petroleum and Fuel Pipelines	Substation
Station Areas				
Fresno	0	1	1	0
Kings/Tulare Regional	1	2	0	0
Bakersfield	3	1	1	0
Range of Impacts for Station Areas[c]	3–4	2–4	2	0
HMF Sites				
Fresno	0	1	0	0
Kings	1	0	0	0
Kern-Shafter East	1	0	1	0
Kern-Wasco	0	0	0	0
Kern-Shafter West				
Total Impacts for HMF Sites	**2**	**1**	**1**	**0**

[a] The number of impacts for each of the other alternative alignments is expressed in terms of additional (+) or fewer (-) impacts compared with the BNSF Alternative Alignment.

[b] The total range of impacts for each utility was calculated by adding the number of impacts for the overall alignment option with the lowest and highest number of impacts respectively.

[c] The lower range of impacts for station areas was calculated by adding the number of impacts for the Fresno and Bakersfield stations; the higher range was calculated by adding the number of impacts for all three potential stations.

Table 3.6-15
Alternative Alignment Impacts—Low-Risk Utilities

Design Option	Communi-cations Facilities	Irrigation Canals	Water Lines	Sewer	Stormwater Retention Pond	Stormwater Pipeline
BNSF Alternative Alignment	0	13	73	68	2	87
Impacts for Other Alternative Alignments[a]						
Corcoran Bypass	0	0	-13	-4	0	-4
Corcoran Elevated	+1	0	-2	0	0	0
Allensworth Bypass	0	0	0	0	0	0
Wasco-Shafter Bypass	0	+1	-5	-1	0	-3
Bakersfield South	0	0	0	+6	0	0

Table 3.6-15
Alternative Alignment Impacts—Low-Risk Utilities

Design Option	Communi-cations Facilities	Irrigation Canals	Water Lines	Sewer	Stormwater Retention Pond	Stormwater Pipeline
Range of Impacts[b]	0	13–14	54–73	61–74	1–2	80–88
Station Areas						
Fresno	0	0	24	19	0	48
Kings/Tulare Regional	0	0	0	0	0	0
Bakersfield	0	0	0	16	0	0
Range of Impacts for Station Areas[c]	0	0	24	35	0	48
HMF Sites						
Fresno	0	0	3	0	0	1
Kings	0	0	0	0	0	0
Shafter East	0	0	0	0	0	0
Shafter West	0	0	0	0	0	0
Wasco	0	1	1	0	0	0
Total Impacts for HMF Sites	0	1	4	0	0	1

[a] The number of impacts for each of the other alternative alignments is expressed in terms of additional (+) or fewer (-) impacts compared with the BNSF Alternative Alignment.

[b] The total range of impacts for each utility was calculated by adding the number of impacts for the overall alignment options with the lowest and highest number of impacts respectively.

[c] The lower range of impacts for station areas was calculated by adding the number of impacts for the Fresno and Bakersfield stations; the higher range was calculated by adding the number of impacts for all three potential stations.

Electrical Facilities

BNSF Alternative Alignment. Table 3.6-14, above, identifies the number of potential conflicts between existing electrical facilities and the BNSF Alternative Alignment and associated station areas and HMFs. The BNSF Alternative would affect 23 transmission lines, 22 of which are owned by PG&E and 1 by SCE. Construction of the potential Kings/Tulare Regional Station would increase this conflict with one more PG&E transmission line. The Authority would work with PG&E and SCE during final engineering design and construction of the HST to relocate these transmission lines or protect them in place. Where transmission lines cross the HST alignment, the Authority and the utility owner may determine that it is best to place the line underground. In this case, the transmission line would be placed in a conduit so that future maintenance of the line could be accomplished outside of the HST right-of-way.

In the event that a transmission line must be relocated, the relocation would be done in coordination and cooperation with the utility owner so that the relocation would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. Transmission lines between the TPSS stations and the existing substations would be constructed aboveground and to industry standards, and would not conflict with existing infrastructure. For this reason, the impact would be negligible under NEPA and less than significant under CEQA.

Corcoran Bypass Alternative Alignment. The Corcoran Bypass Alternative would cross one less PG&E transmission line than the corresponding section of the BNSF Alternative. The impact would be less than significant.

Corcoran Elevated Alternative Alignment. The Corcoran Elevated Alternative would cross four less PG&E transmission lines than the corresponding section of the BNSF Alternative. The impact would be less than significant.

Allensworth Bypass Alternative Alignment. The Allensworth Bypass Alternative would have the same impact on electrical facilities as would the corresponding section of the BNSF Alternative. The impact would be less than significant.

Wasco-Shafter Bypass Alternative Alignment. The Wasco-Shafter Bypass Alternative would have the same impact on electrical facilities as would the corresponding section of the BNSF Alternative. The impact would be less than significant.

Bakersfield South Alternative Alignment. The Bakersfield South Alternative would have the same impact on electrical facilities as would the corresponding section of the BNSF Alternative. The impact would be less than significant.

HST Station Facilities. Three high-risk PG&E power transmission lines would be displaced due to either the proposed Bakersfield Station–North Alternative or the Bakersfield Station–South Alternative. One PG&E power transmission line would be displaced as a result of the Kings/Tulare Regional Station. No power plants or power substations would be directly affected by the proposed HST Station alternatives

***Heavy Maintenance Facility*.** An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing electrical transmission lines.

Natural Gas Lines (High Pressure)

BNSF Alternative Alignment. Table 3.6-14 identifies the number of potential conflicts between existing natural gas lines and the BNSF Alternative Alignment and associated station areas. As shown in the table, the BNSF Alternative would conflict with 22 natural gas lines. No fixed facilities or structures would be affected. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The impact would be less than significant.

Corcoran Elevated Alternative Alignment. The Corcoran Elevated Alternative would conflict with the same number of natural gas lines than would the corresponding section of the BNSF Alternative. The impact would be less than significant.

Corcoran Bypass Alternative Alignment. The Corcoran Bypass Alternative would conflict with two more natural gas lines than would the corresponding section of the BNSF Alternative. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The impact would be less than significant.

Allensworth Bypass Alternative Alignment. The Allensworth Bypass Alternative would have the same impact on natural gas pipelines as would the corresponding section of the BNSF Alternative. The impact would be less than significant.

Wasco-Shafter Bypass Alternative Alignment. The Wasco-Shafter Bypass Alternative would affect one more transmission trunk line than would the corresponding section of the BNSF Alternative. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

Bakersfield South Alternative Alignment. The Bakersfield South Alternative Alignment would affect one more distribution line than would the BNSF Alternative. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

HST Station Facilities. One potential conflict with a local PG&E high pressure natural gas distribution line would occur as a result of either the proposed Fresno Station—Mariposa Alternative or the Fresno Station-Kern Alternative. Conflict with two local Sempra natural gas distribution lines would occur as a result of the proposed Kings/Tulare Regional Station. One conflict with a PG&E interstate natural gas line would occur from either the proposed Bakersfield Station—North Alternative or Bakersfield Station—South Alternative.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

Heavy Maintenance Facility. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing natural gas pipelines.

Petroleum and Fuel Pipelines

BNSF Alternative Alignment. Table 3.6-14, above, identifies the number of potential conflicts between existing petroleum and fuel pipelines and the BNSF Alternative Alignment and associated station areas. The BNSF Alternative would conflict with 19 petroleum and fuel pipelines. The Fresno and Bakersfield stations would also conflict with Kinder Morgan refined oil pipelines. However, no fixed petroleum and fuel facilities or structures would be affected. The Authority would work with pipeline owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

Corcoran Elevated Alternative Alignment. The Corcoran Elevated Alternative would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The impact would be less than significant.

Corcoran Bypass Alternative Alignment. The Corcoran Bypass Alternative would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The impact would be less than significant.

Allensworth Bypass Alternative Alignment. The Allensworth Bypass Alternative would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The impact would be less than significant.

Wasco-Shafter Bypass Alternative Alignment. The Wasco-Shafter Bypass Alternative would have a greater impact on petroleum and fuel pipelines than would the corresponding section of the BNSF Alternative. There is an active oil field east of Wasco and an oil collection tank facility on a large adjacent land parcel. The Wasco-Shafter Bypass would avoid the oil storage tank facility; however, a number of oil wells would be displaced. The cost for well decommissioning and replacement would be borne by the Authority, and the effect upon the capacity or viability of the petroleum resource and industry extraction operations as a whole would be less than significant. The impact of this alternative would be less than significant.

Bakersfield South Alternative Alignment. The Bakersfield South Alternative would conflict with one less Kinder Morgan pipeline than would the corresponding section of the BNSF Alternative. The impact would be less than significant.

HST Station Facilities. One potential conflict with a Kinder Morgan refined oil pipeline would occur due to either the proposed Fresno Station—Mariposa Alternative or the Fresno Station—Kern Alternative. And, one conflict with a Kinder Morgan refined oil line would occur due to either the proposed Bakersfield Station—North Alternative or the Bakersfield Station—South Alternative.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

Heavy Maintenance Facility. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing petroleum and fuel pipelines.

Water Facilities

BNSF Alternative Alignment. Table 3.6-15 identifies the number of potential conflicts between the BNSF Alternative Alignment and associated station areas and existing water facilities. The BNSF Alternative would cross at least 86 water lines, valves, pumps/hydrants, irrigation pipelines, and canals. The majority of these crossings would be in the city of Fresno and other urban areas where the HST would be on an elevated guideway. Because the guideway would be elevated in these areas, it is likely that disturbance to these water facilities would be avoided during final engineering design for the specific placement of columns. However, there may be some locations where it would be necessary to relocate these water facilities. The Authority would work with the appropriate city public works department to relocate affected lines and water facilities away from HST support columns. Therefore, the project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The impact would be less than significant.

In the rural portion of the Fresno to Bakersfield Section, the project would cross irrigation pipelines and canals. The Authority would work with irrigation districts and landowners to protect these irrigation systems. Canals may be bridged or placed in pipelines beneath the HST right-of-way. Irrigation pipelines crossing the alignment would be buried to an appropriate depth to sustain the weight of the HST and placed in protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The BNSF Alternative would not result in prolonged disruption of services because of the need for relocation of or improvements to irrigation systems. This impact would be less than significant.

Corcoran Elevated Alternative Alignment. The Corcoran Elevated Alternative would conflict with two fewer water lines than would the BNSF Alternative. The impact would be less than significant.

Corcoran Bypass Alternative Alignment. The Corcoran Bypass Alternative would conflict with 13 fewer City of Corcoran water lines and 1 less water valve than would the BNSF Alternative. The Authority would work with the City of Corcoran Public Works Department to relocate affected lines and water facilities away from HST support columns where these facilities cannot be avoided. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The impact would be less than significant.

Allensworth Bypass Alternative Alignment. The Allensworth Bypass Alternative would not conflict with known water facilities. There would be no impact.

Wasco-Shafter Bypass Alternative Alignment. The Wasco-Shafter Bypass Alternative would avoid conflicts with the City of Wasco water system but would conflict with one more irrigation pipeline (owned by the Shafter-Wasco Irrigation District) than would the BNSF Alternative. The Authority would work with the Shafter-Wasco Irrigation District, as well as any other irrigation districts affected by the project, to protect irrigation systems. Canals may be bridged or placed in pipelines beneath the HST right-of-way. Irrigation pipelines crossing the alignment would be buried to an appropriate depth to sustain the weight of the HST and placed in protective casing so they could be accessed from outside of the HST. Therefore, the Wasco-Shafter Bypass Alternative would not result in prolonged disruption of services because of the need for relocation of or improvements to irrigation systems. This impact would be less than significant.

Bakersfield South Alternative Alignment. The Bakersfield South Alternative would have the same impact on water facilities as would the BNSF Alternative. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The impact would be less than significant.

HST Station Facilities. Twenty-four potential conflicts with local City of Fresno water distribution lines would occur due to either of the two proposed Fresno HST Station alternatives. No conflicts with water facilities or infrastructure would occur due to the proposed Kings/Tulare Regional Station or either of the two proposed Bakersfield HST station alternatives.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

The estimated existing water use based on land use and anticipated project-related water demand are presented in Table 3.6-16 for each area proposed for a HST Station. The proposed Fresno and Bakersfield station locations are currently supplied with treated municipal water from the City of Fresno Water Division and the California Water Service Company, respectively. For the proposed Kings-Tulare Regional HST Station location, the majority of the affected area (99.9%) is within agricultural use and served by agricultural water districts.

To estimate the existing water use at the proposed Fresno and Bakersfield station locations, land use for each parcel was identified. The proposed station footprint on these parcels was overlain to identify affected land use classifications. Water use factors for each affected land use classification were applied to estimate current water usage for each station location, based on water use factors summarized in Appendix 3.6-B, *Technical Memorandum: Water Usage Analysis for CHST Fresno to Bakersfield Section.*

Table 3.6-16
Estimated Existing Water Use and Anticipated Project-Related Water Demand at Proposed HST Stations for the Fresno to Bakersfield Section

Proposed Station	Existing Water Use (gpd)	Project-Related Water Demand (gpd)*
Fresno	37,500	42,000
Kern/Tulare Regional	62,600	16,500
Bakersfield	41,135	46,000

gpd = gallons per day
Worst-case water demand estimates were used for station alternatives at Fresno and Bakersfield

The Fresno, Kings/Tulare Regional, and Bakersfield stations would use water from the municipal systems of Fresno, Hanford, and Bakersfield, respectively. The potential Kings/Tulare Regional Station is located on the edge of Hanford's sphere of influence. The Authority would seek to connect the station to the Hanford water system as part of this project.

The water supplies for the cities of Fresno, Hanford, and Bakersfield are adequate to meet projected demand during normal water years through 2030 (City of Fresno 2008a; City of Bakersfield 2007; City of Hanford 2006). Like many communities throughout California, increased conservation measures are encouraged by local agencies and service providers in Fresno and Bakersfield to reduce water demand, particularly during multiple drought years. Because Hanford uses only groundwater for its supply, the community does not project supply deficiencies through 2030 even in drought years (City of Hanford 2006). Because of the small volume of water that would be used, the proposed HST stations would not require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. New or expanded entitlements to supply water would not be needed to supply the project. The project impact on water supplies would be less than significant.

Heavy Maintenance Facility. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing water facilities, pipelines, and related infrastructure.

The water demand estimate for an HMF is based on water use data from a comparable facility operated by BART in Hayward, California, and considers water used for industrial operations, landscaping, and train washing. Wash water is assumed to be reused at a rate of approximately 60% with the implementation of an onsite recycling system. Daily water use is estimated at 30 gallons per employee. Assuming that an HMF employs 1,500 individuals, the annual water demand of the facility would be approximately 17 million gallons, or 52 acre-feet.

The HMF alternative sites are largely agricultural properties served by local water irrigation districts. A summary of existing water use and known sources is described below and discussed further in Appendix 3.6-B:

The Fresno Works HMF site is located within Fresno County. The site is mainly agricultural (51%), with substantial areas of industrial (21%) and institutional (12%) land uses. Single-family residential, commercial, roadways/right-of-way/no data and unknown land uses each comprise less than 10% of the HMF site area. The City of Fresno provides water to only two land parcels totaling around 10 acres. The remaining agricultural properties the potentially affected 586-acre area are served by the Fresno Irrigation District.

Over 98% of this potentially affected area for the Kings County–Hanford HMF site is used for agriculture. Industrial uses, roadways and other rights-of-way comprise the balance of the study area. Surface water for agricultural uses is largely provided by the Lakeside Irrigation Water District. Kings County Water District also provides water to numerous private ditch companies who then distribute water to connected landowners. These surface water sources are augmented by agricultural landowners by the use of unmetered groundwater withdrawals.

Nearly 98% of the prospective Kern Council of Governments–Wasco HMF site alternative is used for agriculture. The northern portion of the potentially affected area is within the Wasco-Shafter Irrigation District, and the southern portion is within the North Kern Water Storage District (NKWSD). Groundwater is also used by agricultural users to supplement these surface water suppliers. A small portion of the potentially affected HMF site area is served by the City of Wasco municipal water supply.

Over 97% of the prospective Kern Council of Governments–Shafter East HMF site alternative is used for agriculture, almost entirely as almond tree orchards. Approximately 4.0 ac-ft/ac/yr of water is used for almond orchards in this area, hence, total annual water use for the potentially affected 495-ac site is approximately 1955 ac-ft/yr. Surface water supplied by the NKWSD and SWID is used for approximately one-quarter of the overall agricultural demand with the remainder supplied by groundwater wells.

Over 97% of the prospective Kern Council of Governments–Shafter West HMF site is in agricultural use, entirely also as almond tree orchards. Approximately 4.0 ac-ft/ac/yr of water is used for almond orchards in this area, hence, total annual water use for the potentially affected 480-ac site is approximately 1895 ac-ft/yr. Surface water supplied by the NKWSD and SWID is used for approximately one-quarter of the overall agricultural demand with the remainder supplied by groundwater wells.

The projected water demand of 52 acre-feet per year would amount to a reduced water demand at all of the HMF sites. To the extent that 52 acre-feet per year is an increase in groundwater pumping compared to current levels, additional aquifer drawdown could occur. However, as discussed in Section 3.8, Hydrology and Water Resources, drawdown effects would be negligible. No entitlements are necessary to pump groundwater. Under NEPA, operation of the HMF would result in a negligible impact on water supply in the study area. The impact would be less than significant under CEQA.

Based on the capacity and existing use of water within each of the areas proposed for HMFs, operation of these facilities would result in a negligible impact on water supply in the study area. The impact would be less than significant under CEQA.

Wastewater Facilities

HST System operations would generate wastewater at the HST stations and the HMF. The following sections describe impacts on existing water treatment facilities and infrastructure. Overall, these effects are expected to be negligible under NEPA and less than significant under CEQA.

BNSF Alternative Alignment. Table 3.6-15 identifies the number of potential wastewater pipeline conflicts that would occur with the BNSF Alternative Alignment and project stations. These conflicts would be in the cities of Fresno, Corcoran, Wasco, and Bakersfield where portions of the HST would be on both an elevated guideway and at-grade. In areas where the HST route would be elevated, it is likely that disturbance to these pipelines would be avoided during final engineering design for the specific placement of columns. However, there may be some locations where it would be necessary to relocate wastewater pipelines. The Authority would work with the appropriate city public works department to relocate affected lines away from HST support columns. Therefore, the project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The impact would be less than significant.

Corcoran Elevated Alternative Alignment. The Corcoran Elevated Alternative Alignment would conflict with the same number of existing wastewater/sewer lines than would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative Alignment and thus would be less than significant.

Corcoran Bypass Alternative Alignment. The Corcoran Bypass Alternative Alignment would not conflict with existing wastewater/sewer lines. There would be no impact.

Allensworth Bypass Alternative Alignment. The Allensworth Bypass Alternative Alignment would not conflict with existing wastewater/sewer lines. There would be no impact.

Wasco-Shafter Bypass Alternative Alignment. The Wasco-Shafter Bypass Alternative would not conflict with existing wastewater/sewer lines. There would be no impact.

Bakersfield South Alternative Alignment. The Bakersfield South Alternative Alignment would affect six more wastewater/sewer lines than would the BNSF Alternative Alignment. The impacts of this alternative alignment would be similar to those of the BNSF Alternative Alignment and thus would be less than significant.

HST Station Facilities. Nineteen potential low-risk conflicts with a local City of Fresno sewer collection lines would occur due to the proposed Fresno HST station. Sixteen potential low-risk conflicts with a local City of Bakersfield sewer collection lines would occur due to the proposed Bakersfield HST station. No conflicts with water facilities or infrastructure would occur due to the proposed Kings/Tulare Regional HST Station.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

Wastewater generated at each HST Station is estimated in Table 3.6-17, below. These estimates are based on station uses defined for domestic water consumption (i.e., a mix of concourse, office, parking structure, outdoor car park, and platform). Sewage generation is assumed to be between 45% and 55% of the domestic water demand generated from uses in occupied areas, such as the concourse, offices, parking structure, outdoor car parking, and HST platform.

Table 3.6-17
Estimated Project-Related Wastewater (Sewage) Generated for Each HST Station

Station	Sewage Generation (gallons/day)
Fresno	5,000
Kern/Tulare Regional	3,000
Bakersfield	4,000

Wastewater treatment capacity in Fresno, Hanford, and Bakersfield exceeds the average daily volume of wastewater that is treated by the following amount:

- Fresno—12 mgd.
- Hanford—2.5 mgd.
- Bakersfield—10.5 mgd.

HST System operations would generate wastewater at the HST stations and the HMF. The volume of wastewater produced by the proposed HST stations represents 0.04% of the excess capacity of the Fresno and Bakersfield treatment facilities and 0.1% of the Hanford treatment capacity. The population in these communities is projected to grow over the next 20 years, and treatment capacity will need to be expanded to meet the needs of that growing population. However, the volume of wastewater generated at the proposed HST stations would be too small to result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to its existing commitments. Impacts on existing water treatment facilities are expected to be negligible under NEPA and less than significant under CEQA. The following sections describe wastewater demand for these facilities.

Heavy Maintenance Facility. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing wastewater infrastructure.

If the HMF contains an onsite wastewater treatment package plant for treatment of the wastewater, treated wastewater would be used for onsite irrigation. Sludge generated by the process would be tested and disposed of at an appropriate landfill disposal facility. The effect would be negligible under NEPA and the impact would be less than significant under CEQA.

Accordingly, an HMF would produce approximately 5.7 million gallons of wastewater annually (or approximately 15,600 gallons per day). This volume represents less than 1% of the capacity of any of the wastewater treatment facilities in Atwater, Chowchilla, and Madera. Therefore, wastewater generated at the HMF is within the capacity of the regional wastewater treatment facilities. Impacts would be negligible under NEPA and less than significant under CEQA.

Storm Drain Facilities

As discussed in Section 3.8, Hydrology and Water Resources, the project would result in increases in stormwater runoff. The project design would specifically address stormwater volumes and flow requirements. During final design, an evaluation of each receiving stormwater system's capacity to accommodate project runoff would be conducted. As necessary, onsite stormwater management measures, such as detention or selected upgrades to the receiving system, would be included in the design to provide adequate capacity. Project stormwater pipelines and ditches would be sized to convey runoff from the 25-year storm in rural areas and the 50-year storm in urban areas (Authority 2010). Measures such as onsite retention, infiltration basins, and detention ponds would be used to maintain offsite stormwater discharge in compliance with the General Construction Stormwater Permit issued by the State Water Resources Control Board. Where a local agency requires a higher level of stormwater runoff control, the more stringent requirement would be applied to the project. In addition, stormwater best management practices (BMPs) would be applied to treat stormwater from pollutant-generating surfaces such as project parking lots, access roads, and public roads relocated due to the project (note that runoff from the at-grade tracks and elevated guideways would have minimal pollutants and would not need treatment). BMPs could include bioretention swales, grass filter strips, infiltration and water quality ponds. More information on stormwater measures can be found in Section 3.8, Hydrology and Water Resources. The following sections describe impacts on existing storm drain facilities and infrastructure. Overall, these effects are expected to be negligible under NEPA and less than significant under CEQA.

BNSF Alternative Alignment. The BNSF Alternative Alignment would affect 89 storm drains, one infiltration pond, and one future storm pipe site in the Fresno Metropolitan Flood Control District. Where necessary, the Authority would work with utility owners to place affected storm drain lines underground in a protective casing so that they could be accessed without disturbance to the HST right-of-way. The BNSF Alternative Alignment would not affect their capacity or reliability. The impacts of this alternative alignment would be less than significant.

Corcoran Elevated Alternative Alignment. The Corcoran Elevated Alternative Alignment would affect the same number of storm drain facilities as the BNSF Alternative Alignment. The impacts of this alternative alignment would be similar to those of the BNSF Alternative Alignment and thus would be less than significant.

Corcoran Bypass Alternative Alignment. The Corcoran Bypass Alternative Alignment would affect four fewer storm drain facilities than the BNSF Alternative Alignment. The impacts of this alternative alignment would be similar to those of the BNSF Alternative Alignment and thus would be less than significant.

Allensworth Bypass Alternative Alignment. The Allensworth Bypass Alternative Alignment would not affect any additional storm drain facilities beyond those described in the BNSF Alternative Alignment. The impacts of this alternative alignment would be the same as those of the BNSF Alternative Alignment and thus would be less than significant.

Wasco-Shafter Bypass Alternative Alignment. The Wasco-Shafter Bypass Alternative Alignment would affect three fewer storm drain facilities than the BNSF Alternative Alignment. The impacts of this alternative alignment would be similar to those of the BNSF Alternative Alignment and thus would be less than significant.

Bakersfield South Alternative Alignment. The Bakersfield South Alternative Alignment would not affect any additional storm drain facilities beyond those described in the BNSF Alternative Alignment. The impacts of this alternative alignment would be the same as those of the BNSF Alternative Alignment and thus would be less than significant.

HST Station Facilities. Table 3.6-6, above, identifies the number of storm drain facility conflicts within the study area along the alternative alignments and station areas. Forty-seven potential low-risk conflicts with Fresno metropolitan Flood Control District storm pipes and manholes lines, and one manhole managed by another entity, would occur due to the proposed Fresno HST station. No conflicts with drainage facilities or infrastructure would occur due to the proposed Kings/Tulare Regional or the Bakersfield HST stations.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The impact would be less than significant.

Heavy Maintenance Facility. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing wastewater infrastructure.

As discussed in Section 3.8, Hydrology and Water Resources, stormwater runoff could increase and collect as a result of the project. The project design addresses stormwater volumes and flow requirements. During final design, engineering elements, such as project stormwater conveyance features and detention ponds, would be adequately sized and designed to meet the regulatory requirements, such as the General Construction Stormwater Permit issued by the State Water Resources Control Board, outlined in Section 3.8, Hydrology and Water Resources (e.g., the General Construction Stormwater Permit issued by the State Water Resources Control Board). Impacts would be negligible under NEPA and less than significant under CEQA.

Waste Generation

Project operation activities that would generate solid waste include passenger refuse disposal and materials used for HST maintenance. Maintenance of the HST guideway would generate small amounts of wastes that are included in the discussion of waste generation at the HMF. The following sections describe impacts on existing solid waste facilities and infrastructure. Overall, effects on solid waste facilities are expected to be negligible under NEPA and less than significant under CEQA.

BNSF Alternative Alignment. The BNSF Alternative Alignment would not conflict with existing solid waste disposal facilities. No existing or proposed expansion areas for solid waste disposal would be affected by this alternative alignment. Solid waste would be generated by the operation and use of each of the HST stations in the Fresno to Bakersfield Section. The existing solid waste disposal facilities would have adequate annual capacity on the date the project commences operation. The estimated closure dates for these facilities is within the service life of the proposed California HST System. It is anticipated that the jurisdictions required to provide solid waste disposal would provide these new or expanded services before the estimated closure dates of the existing facilities. The impacts of this alternative alignment would be less than significant.

Corcoran Elevated Alternative Alignment. The Corcoran Elevated Alternative Alignment would not have any conflicts beyond those anticipated under the BNSF Alternative Alignment. The impacts of this alternative alignment would be the same as those of the BNSF Alternative Alignment and thus would be less than significant.

Corcoran Bypass Alternative Alignment. The Corcoran Bypass Alternative Alignment would not have any conflicts beyond those anticipated under the BNSF Alternative Alignment. The impacts of this alternative alignment would be the same as those of the BNSF Alternative Alignment and thus would be less than significant.

Allensworth Bypass Alternative Alignment. The Allensworth Bypass Alternative Alignment would not have any conflicts beyond those anticipated under the BNSF Alternative Alignment. The impacts of this alternative alignment would be the same as those of the BNSF Alternative Alignment and thus would be less than significant.

Wasco-Shafter Bypass Alternative Alignment. The Wasco-Shafter Bypass Alternative Alignment would not have any conflicts beyond those anticipated under the BNSF Alternative Alignment. The impacts of this alternative alignment would be the same as those of the BNSF Alternative Alignment and thus would be less than significant.

Bakersfield South Alternative Alignment. The Bakersfield South Alternative Alignment would not have any conflicts beyond those anticipated under the BNSF Alternative Alignment. The impacts of this alternative alignment would be the same as those of the BNSF Alternative Alignment and thus would be less than significant.

HST Station Facilities. Nonhazardous solid waste from the HST System in Fresno County would be disposed of (after recycling collection and diversion) at either of two operating solid waste disposal landfills: the American Avenue Landfill or the Coalinga Landfill. Each landfill provides an adequate daily disposal capacity, with substantial remaining storage capacity in large permitted disposal areas. However, estimated closure dates for these two landfills are 2031 and 2029, respectively. After these dates, the City of Clovis Landfill will be used. The estimated closure date for the City of Clovis Landfill is 2047.

The anticipated amount of nonhazardous solid waste for each HST Station is 0.58 ton per day (Kings/Tulare Regional), 1.35 tons per day (Fresno), and 1.56 tons per day (Bakersfield).These amounts are based on the anticipated station ridership per day, the average daily per capita residential disposal rate in California (factored by 0.2) (CalRecycle 2010b), and a recycling diversion rate of 65% for Californians in 2009 (CalRecycle 2010a). The recycling diversion factor estimates that 65% of waste is recycled and 35% is sent to the landfill after processing.

The Kings Waste Recycling Authority would transport the solid waste from the HST System in the Hanford area about 45 miles from its materials recovery facility (MRF) to the Kettleman Hills Landfill. The MRF has a maximum capacity of 800 tons per day, a capacity sufficient to serve the solid waste needs of the proposed Kings/Tulare Regional Station. Similarly, delivery to the Chemical Waste Management Landfill, which has a disposal capacity of 8,000 tons/day and a maximum capacity of 10.7 million cubic yards, would be adequate to serve the anticipated nonhazardous solid waste requirements of the proposed station during the life of the project. The estimated closure dates for the two operating landfills serving Tulare County are on or before 2026. While the Woodville Landfill closure date is 2026, approval is pending for it to be expanded to a “full solid waste” capacity and the closure date to be extended for this major facility.

For Kern County, all nonhazardous solid waste generated in the area of the proposed Bakersfield Station would be disposed of in landfills operated by Kern County, primarily the Bena Sanitary Landfill or the Shafter-Wasco Sanitary Landfill. The combined permitted daily disposal capacity of these two landfills is 5,388 tons/day; this capacity is considered adequate to support the Bakersfield Station. The estimated closure date for the Bena Sanitary Landfill is 2038.

Heavy Maintenance Facility. Activities at the HMF, including administrative (office) work, packaging of materials and equipment used for maintenance of the HST, and incidental waste from HMF employees, would generate solid waste such as paper, cardboard, plastics, and other materials similar to household waste. Non-air-travel-related transportation businesses dispose of approximately 1.3 tons of waste per year (CalRecycle 2010a). Estimates indicate that the HMF, with up to 1,500 employees, would dispose of approximately 41,000 cubic yards of waste annually, representing less than 2% of estimated remaining landfill capacity at landfills in the area. Existing landfill capacity will either be adequate or sufficiently added to during the life of the project. Potential effects to solid waste capacity would be less than significant under NEPA and CEQA.

Hazardous Waste Generation

As discussed in Chapter 3.10, Hazardous Materials and Wastes, routine maintenance of the HST Station and HMF facilities would produce small quantities of hazardous waste. Operation of the HMF would involve the use, storage, and disposal of hazardous materials and petroleum products associated with maintenance of HST 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, and disposed of in accordance with applicable requirements, such as the Resource Conservation and Recovery Act (see Section 3.10, Hazardous Materials and Wastes). A certified hazardous waste collection company would deliver the waste to an authorized hazardous waste management facility for recycling or disposal. Landfills, such as Clean Harbors Westmorland Landfill in Imperial County, the Chemical Waste Management Kettleman Hills Landfill in Kings County, and permitted out-of-state landfills accept hazardous wastes. Because hazardous wastes could be disposed of at permitted landfills that have sufficient capacity, potential effects are negligible under NEPA and less than significant under CEQA.

Energy Construction Period Impacts—Common Energy Impacts

During project construction, energy would be consumed to produce and transport construction materials. Operating and maintaining construction equipment would also consume energy resources. Energy used for the construction of track work, guideways, maintenance yards, stations, support facilities, and other structures would be a one-time, non-recoverable energy cost.

Energy consumption during construction of the Fresno to Bakersfield portion of the HST System depends on the characteristics of the alternative, particularly the length of elevated and at-grade guideway work. The energy consumption estimate for constructing the Fresno to Bakersfield Section is 4,556 MMBtus for the BNSF Alternative. Construction of the various other alternatives would range from approximately 314 to 584 MMBtus. Because the Fresno to Bakersfield Section would contribute approximately 14% to the HST energy demand and to the energy savings (i.e., approximately 5,130 MMBtus), the payback period for energy consumed during construction would be less than a year of full project operations (i.e., because the project will remove more energy inefficient cars and planes from the system).

Energy efficiency is assumed for the offsite production of construction materials (Authority and FRA 2005). This assumption is based on the cost of nonrenewable resources and the economic incentive for efficiency. Standard best management practices would be implemented onsite so that non-renewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner. The indirect use of energy for construction of the Fresno to Bakersfield Section of the HST System would be negligible under NEPA and would be a less-than-significant impact under CEQA.

Project Impacts—Common Energy Impacts

The HST System would use an electrified line with traction power for electric vehicles. The HST System would connect to existing PG&E substations (see Chapter 2, Alternatives). For determining HST energy consumption, the analysis assumed use of a Siemens ICE-3 Velaro vehicle operating as two 8-car trainsets and traveling 43.1 million annual train miles by 2035. As shown in Table 3.6-18, the analysis conservatively does not include the use of regenerative braking, to cover the possibility that the braking energy cannot be reused by other trains in the system. The analysis does include transmission losses, which represent the percentage of energy lost due to transmission from the power plant to the project. The electrical demand for the propulsion of the HST and for the operation of the HST at terminal stations, storage depots, and maintenance facilities is conservatively estimated to be 10,367,643 MMBtus annually, or

28,404.48 MMBtus per day. This energy estimate, reflecting a refinement of the analysis conducted in the 2005 Bay Area to Central Valley Program EIR energy assessment, utilizes current conversion factors, ridership forecasts, trainsets, and vehicle miles traveled. This is an increase in energy consumption of approximately 28,404 MMBtus per day, or less than 1% of statewide consumption, which is equivalent to the consumption for a city of 200,000 people.

A comparison of the energy requirements calculated for the 2008 Program EIR/EIS and the current analysis is found in Appendix 3.6-C.

Table 3.6-18
Daily HST Energy Usage Calculations

	Methodology	HST System Energy Usage Values/Unit		Assumptions
	Trainset Definition			Assumed use of Siemens ICE-3 Velaro for calculation
1	Traction energy consumed per trainset-mile (8-car train)	60.00	kWh	Without generation, based on Traction Power Simulation Studies
2	Assume regeneration under braking	51.00	kWh	15% energy savings assumed
3	Traction energy consumed per train (16-car) mile	102.00	kWh	Multiply by two times the 8-car train value[a]
4	On-board services consumption	6.00	kWh	Per 16-car train-mile
5	Energy consumed	108.00	kWh	Per 16-car train mile
6	Annual Train-miles expected in the horizon year (2035)	43.10	Million	Business Plan 2009 (Table H, Page 79) 8-car trains
7	Traction energy consumed per year	2327.00	GWh	In 2035 (54 kWh per trainset x 43.1 million trainset miles)
8	Traction energy consumed per day	6.38	GWh/day	Divide by 365 days – with regeneration
9	Total traction energy	7.10	GWh/day	Without regeneration
10	Energy usage including stations, facilities, dwells, maintenance, empty moves, etc. in horizon year (2035)	8.00	GWh/day	Conservative figure which does not take into account regeneration
11	Transmission losses	0.04		Total of 4% - includes 3% transmission line loss and 1% (2 x 0.5) transformer losses
12	Total energy usage (2035)	8.32	GWh	Per day (8 GWh/day x 1.04) = 8.32 including losses
13	Total energy usage per day, including losses[b]	28,404.48	MMBtu/day	1 kWh = 3,414 Btu
14	Total energy usage energy per year, including losses	10,367,643	MMBtu/year	Multiply by 365

Table 3.6-18
Daily HST Energy Usage Calculations

Methodology	HST System Energy Usage Values/Unit	Assumptions
Notes: [a] A conservative figure of 2 times the 8-car train value has been used because the Davis Formula for resistance to motion for a 16-car train was not available from the Trainset manufacturer. [b] The current analysis reflects operational, design and analysis requirements that have occurred since the Bay Area to Central Valley Program EIR/EIS was published in 2008. For the Program EIR/EIS, an incorrect application of generation and conversion loss factors resulted in an overstated daily energy usage of 108,879 MMBtus compared to 28,404.5 MMBtus calculated for the current analysis. As a result, the 2011 estimates show that the HST System will use less energy than previously predicted. A comparison of the energy requirements calculated for the 2008 Program EIR/EIS and the current analysis is found in Appendix 3.6-C of this document.		

The HST would decrease automobile VMT and reduce energy consumption per passenger mile. This would result in an overall reduction in energy use for intercity and commuter travel. Current estimates indicate that HSTs would require approximately one-third of the energy required by an airplane and approximately one-fifth of the energy required by a commuter automobile trip when comparing the energy required by each mode to transport a passenger 1 mile. Table 3.6-19 shows the estimated daily VMT with and without the HST System. When compared to future conditions, analysis of the projected effects of the HST on VMT in the Fresno to Bakersfield region indicates that the HST would reduce daily VMT in Fresno, Kings, Tulare, and Kern counties by nearly 7.3 million miles a day, or 10%, due to travelers choosing to use the HST rather than drive. When compared to existing conditions, the reduction in VMT is estimated to be approximately 1,152,000 miles. These values, together with associated average daily speed estimates, were used to develop predictions of the change in energy use for counties within the HST Fresno to Bakersfield Section.

As shown in Table 3.6-20, the number of plane flights statewide (intrastate) would decrease with the California HST System when analyzed against both the future conditions and existing conditions baselines because travelers would choose to use the HST rather than fly to their destination. The average fuel consumption rate for aircraft is based on the profile of aircraft currently servicing the San Francisco to Los Angeles airline corridor. The number of air trips removed due to the HST System was estimated by using the travel demand modeling analysis conducted for the project.

Table 3.6-19
On-Road Vehicle Energy Changes for Counties within the Fresno to Bakersfield Section

County	No Project Future Conditions				Existing Conditions			
	VMT With HST	VMT Without HST	Change in VMT with HST	Change in Energy Consumption with HST (MMBtu/Day)	VMT With HST	VMT Without HST	Change in VMT with HST	Change in Energy Consumption with HST (MMBtu/Day)
Fresno	24,364,285	27,367,949	-3,003,664	-13,493	22,050,000	22,500,000	-450,000	-2,194
Kings	2,663,113	3,136,720	-473,607	-2,177	3,626,000	3,700,000	-74,000	-407
Tulare	9,648,380	10,112,011	-463,631	-2,090	9,702,000	9,900,000	-198,000	-949
Kern	35,149,202	39,240,101	-4,090,900	-18,546	21,070,000	21,500,000	-430,000	-2,355
Total	71,824,980	79,856,781	-8,031,802	-36,306	56,448,000	57,600,000	-1,152,000	-5,905

Table 3.6-20
Aircraft Energy Changes Due to HST System

Origin	No Project Future Conditions		Existing Conditions	
	No. of Flights Removed	Change in Energy due to HST (MMBtu/Day)	No. of Flights Removed	Change in Energy due to HST (MMBtu/Day)
Central Coast	-1	-44	-1	-25
Far North	-16	-702	-9	-407
Fresno/Madera	0	0	0	0
Kern	-16	-702	-9	-407
Los Angeles Basin – North	-43	-1,887	-25	-1095
Los Angeles Basin – South	-88	-3,862	-51	-2240
Merced	-1	-44	-1	-25
Monterey Bay	-16	-702	-9	-407
Sacramento Region	-16	-702	-9	-407
San Diego Region	-47	-2,063	-27	-1196
San Joaquin	-7	-307	-4	-178

Table 3.6-20
Aircraft Energy Changes Due to HST System

Origin	No Project Future Conditions		Existing Conditions	
	No. of Flights Removed	**Change in Energy due to HST (MMBtu/Day)**	**No. of Flights Removed**	**Change in Energy due to HST (MMBtu/Day)**
SF Bay Area	-130	-5,706	-75	-3309
South SJ Valley	0	0	0	0
Stanislaus	-5	-219	-3	-127
Western Sierra Nevada	-1	-44	-1	-25
Statewide Total	**-387**	**-16,985**	**-224**	**-9,851**

The Authority is part of the EPA Collaborative for Sustainable Transportation and Infrastructure Construction. The HST System would be an energy-efficient mode of transportation and would serve to decrease overall per- capita energy consumption by providing a travel alternative that is less energy- intensive than the personal vehicles and commercial air flights that would be used under the No Project Alternative; energy consumption would increase at a slower rate than under No Project Alternative conditions. The Statewide Program EIR/EIS indicates that the California HST Project could result in a total energy savings of 25% over conditions without the project.

To enhance the benefits of the HST, the Authority would purchase up to 100% clean, renewable electricity to provide power for HST operations. HST project buildings would conform to U.S. Green Building Council Leadership in Energy and Environmental Design (i.e., LEED) rating standards for environmentally sustainable new construction. HST facilities, including HST stations and an HMF, would be certified at the Silver Level. Achieving the Authority's policy goal of using up to 100% renewable energy sources for the HST System would result in a total estimated reduction in fossil- fuel energy resources for the HST System of up to 12.7 million barrels of oil annually by 2030 (Navigant Consulting 2008). Due to the net benefit of the HST on the overall energy demand, operational energy consumption impacts would be less than significant under CEQA.

The Statewide Program EIR/EIS (Authority and FRA 2005) predicted that the HST System would increase overall direct electric energy consumption by 10% over current conditions, increasing projected electricity demand statewide by approximately 0.96% in 2030. 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 p.m. to 6 p.m.). According to the Statewide Program EIR/EIS (Authority and FRA 2005), the HST would increase peak electricity demand on the state's generation and transmission infrastructure by an estimated 480 MW in 2020. Based on the assumption that this peak demand would be evenly spread throughout the system, the Fresno to Bakersfield Section would require approximately 78 MW of additional peak capacity.

Summer 2010 electricity reserves were estimated to be between 27,708 MW for 1-in-2 summer temperatures and 18,472 MW for 1-in-10 summer temperatures (Pryor et al. 2010). The projected peak demand of the HST is not anticipated to exceed these existing reserve amounts.

Although it is not possible to predict supplies for 2035, provided the planning period available and the known demand from the project, energy providers have sufficient information to include the HST in their demand forecasts. The project's impact on peak electricity demand would be less than significant.

Energy consumption would increase at a slower rate under the Project than under No Project Alternative conditions. The Statewide Program EIR/EIS indicates that the California HST Project could result in a total energy savings of 25% over conditions without the Project. Achieving of the Authority's policy goal of using up to 100% renewable energy sources for the HST System would result in a total estimated reduction in fossil fuel energy resources for the HST System of up to12.7 million barrels of oil annually by 2030 (Navigant Consulting 2008).

The HST System would be an energy efficient mode of transportation, reducing total energy consumption in the state under projected future conditions. The Authority is part of the EPA Collaborative for Sustainable Transportation and Infrastructure Construction. To offset the increased energy demand resulting from HST operations, the Project would purchase up to 100% clean, renewable energy to provide power for HST operations. The HST would conform to U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) rating standards for environmentally sustainable new construction; HST facilities including HST stations and an HMF would be certified at the Silver Level.

3.6.6 NEPA Impacts Summary

The No Project Alternative represents changes in local conditions that would occur over time without implementation of the project, including an increasing demand for utility services and energy supply as a result of population growth.

Project construction could result in scheduled service interruptions. With advance notices, utility customers would experience negligible effects. Implementation of mitigation measures would reduce the effect from accidental interruptions to a negligible level.

Project construction would require water. Because various sources would supply water during construction, the effect is negligible.

Construction of the project would require removal of existing facilities, including roads and buildings. These activities would generate demolition waste, including hazardous waste (e.g., asbestos-containing materials). Because regional solid waste and hazardous waste landfills have adequate capacity, the effect would be negligible.

The project would conflict with existing underground and aboveground utilities, including up to two substations. Mitigation measures would protect linear utilities by moving or encasing them, resulting in a negligible effect. The effects on the substations would be avoided by redesigning portions of the HST alignment.

Operation of the HST stations and HMF would increase the demand for water supply, wastewater treatment, and solid waste disposal. Impacts would be negligible because all utility service providers have or will have sufficient capacity.

Operation of the HST System would increase the demand for electricity but reduce the overall demand for energy as a result of the decreased number of road vehicle and airplane trips. Operation of the Fresno to Bakersfield Section of the HST System would contribute approximately 14% to the increase in demand for electricity and to the overall reduction of energy consumption in California.

3.6.7 CEQA Significance Conclusions

Table 3.6-21 provides a summary of impacts, associated mitigation measures, and the level of significance after mitigation.

Table 3.6-21
Summary of Potentially Significant Utility Impacts and Mitigation Measures

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Construction Period Impacts			
None	Not applicable	None	Not applicable
Project Impacts			
None	Not applicable	None	Not applicable