CALIFORNIA HIGH-SPEED TRAIN

Program Environmental Impact Report/Environmental Impact Statement

Sacramento to Bakersfield

PUBLIC UTILITIES TECHNICAL EVALUATION

January 2004

Prepared for:

California High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

CALIFORNIA HIGH SPEED RAIL AUTHORITY

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CALIFORNIA HIGH-SPEED TRAIN PROGRAM EIR/EIS

Sacramento to Bakersfield Public Utilities Technical Evaluation

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ACRONYMS

AUTHORITY	CALIFORNIA HIGH-SPEED RAIL
BNSF	BURLINGTON NORTHERN AND SANTA FE RAILWAY
CCT	CENTRAL CALIFORNIA TRACTION
CEC	CALIFORNIA ENERGY COMMISSION
CEQA	CALIFORNIA ENVIRONMENTAL QUALITY ACT
CFR	CODE OF FEDERAL REGULATIONS
COG	COUNCIL OF GOVERNMENTS
CPUC	CALIFORNIA PUBLIC UTILITIES COMMISSION
EIR	ENVIRONMENTAL IMPACT REPORT
EIS	ENVIRONMENTAL IMPACT STATEMENT
EPA	ENVIRONMENTAL PROTECTION AGENCY
FAA	FEDERAL AVIATION ADMINISTRATION
FERC	FEDERAL ENERGY REGULATORY COMMISSION
FHWA	FEDERAL HIGHWAY ADMINISTRATION
FRA	FEDERAL RAILROAD ADMINISTRATION
FTA	FEDERAL TRANSIT ADMINISTRATION
GIS	GEOGRAPHIC INFORMATION SYSTEM
HST	HIGH-SPEED TRAIN
kV	KILOVOLT
MTA	METROPOLITAN TRANSPORTATION AUTHORITY
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NGA	NATIONAL GAS ACT
NPDES	NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
OSFM	OFFICE OF THE STATE FIRE MARSHAL
RTP	REGIONAL TRANSPORTATION PLAN
RWQCB	REGIONAL WATER QUALITY CONTROL BOARD
SR	STATE ROUTE
UP, UPRR	UNION PACIFIC RAILROAD
USACE	UNITED STATES ARMY CORPS OF ENGINEERS
USFWS	UNITE STATES FISH AND WILDLIFE SERVICE

1.0 INTRODUCTION

The California High-Speed Rail Authority (Authority) was created by the Legislature in 1996 to develop a plan for the construction, operation, and financing of a statewide, intercity high-speed passenger train system.[1] After completing a number of initial studies over the past six years to assess the feasibility of a high-speed train system in California and to evaluate the potential ridership for a variety of alternative corridors and station areas, the Authority recommended the evaluation of a proposed high-speed train system as the logical next step in the development of California's transportation infrastructure. The Authority does not have responsibility for other intercity transportation systems or facilities, such as expanded highways, or improvements to airports or passenger rail or transit used for intercity trips.

The Authority adopted a *Final Business Plan* in June 2000, which reviewed the economic feasibility of a 1,127-kilometer-long (700-mile-long) high-speed train system. This system would be capable of speeds in excess of 321.8 kilometers per hour (200 miles per hour [mph]) on a dedicated, fully grade-separated track with state-of-the-art safety, signaling, and automated train control systems. The system described would connect and serve the major metropolitan areas of California, extending from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego. The high-speed train system is projected to carry a minimum of 42 million passengers annually (32 million intercity trips and 10 million commuter trips) by the year 2020.

Following the adoption of the Business Plan, the appropriate next step for the Authority to take in the pursuit of a high-speed train system is to satisfy the environmental review process required by federal and state laws which will in turn enable public agencies to select and approve a high speed rail system, define mitigation strategies, obtain necessary approvals, and obtain financial assistance necessary to implement a high speed rail system. For example, the Federal Railroad Administration (FRA) may be requested by the Authority to issue a *Rule of Particular Applicability*, which establishes safety standards for the high-speed train system for speeds over 200 mph, and for the potential shared use of rail corridors.

The Authority is both the project sponsor and the lead agency for purposes of the California Environmental Quality Act (CEQA) requirements. The Authority has determined that a Program Environmental Impact Report (EIR) is the appropriate CEQA document for the project at this conceptual stage of planning and decision-making, which would include selecting a preferred corridor and station locations for future right-of-way preservation and identifying potential phasing options. No permits are being sought for this phase of environmental review. Later stages of project development would include project-specific detailed environmental documents to assess the impacts of the alternative alignments and stations in those segments of the system that are ready for implementation.

The decisions of federal agencies, particularly the Federal Railroad Administration (FRA) related to high-speed train systems, would constitute major federal actions regarding environmental review under the National Environmental Policy Act (NEPA). NEPA requires federal agencies to prepare an Environmental Impact Statement (EIS) if the proposed action has the potential to cause significant environmental impacts. The proposed action in California warrants the preparation of a Tier 1 Program-level EIS under NEPA, due to the nature and scope of the comprehensive high-speed train system proposed by the Authority, the need to narrow the range of alternatives, and the need to protect/preserve right-of-way in the future. FRA is the federal lead agency for the preparation of the Program EIS, and the Federal Highway Administration (FHWA), the U.S. Environmental Protection Agency (EPA), the U.S. Corps of Engineers (USACE), the Federal Aviation Administration (FAA), the U.S. Fish and Wildlife Service (USFWS), and the Federal Transit Administration (FTA) are cooperating federal agencies for the EIS.

[1] Chapter 796 of the Statutes of 1996; SB 1420, Kopp and Costa

A combined Program EIR/EIS is to be prepared under the supervision and direction of the FRA and the Authority in conjunction with the federal cooperating agencies. It is intended that other federal, state, regional, and local agencies will use the Program EIR/EIS in reviewing the proposed program and developing feasible and practicable programmatic mitigation strategies and analysis expectations for the Tier 2 detailed environmental review process which would be expected to follow any approval of a high speed train system.

The statewide high-speed train system has been divided into five regions for study: Bay Area-Merced, Sacramento-Bakersfield, Bakersfield-Los Angeles, Los Angeles-San Diego via the Inland Empire, and Los Angeles-Orange County-San Diego. This Public Utilities Technical Evaluation for the Sacramento to Bakersfield region is one of five such reports being prepared for each of the regions on the topic, and it is one of fifteen technical reports for this region. This report will be summarized in the Program EIR/EIS and it will be part of the administrative record supporting the environmental review of alternatives.

1.1 ALTERNATIVES (NO-PROJECT, MODAL, HIGH SPEED TRAIN)

1.1.1 No-Project Alternative

The No-Project Alternative serves as the baseline for the comparison of Modal and High-Speed Train alternatives (Figure 1). The No-Project Alternative represents the state's transportation system (highway, air, and conventional rail) as it existed in 1999-2000 and as it would be after implementation of programs or projects currently programmed for implementation and projects that are expected to be funded by 2020. The No-Project Alternative addresses the geographic area serving the same intercity travel market as the proposed high-speed train (generally from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego). The No-Project Alternative satisfies the statutory requirements under CEQA and NEPA for an alternative that does not include any new action or project beyond what is already committed.

The No-Project Alternative defines the existing and future statewide intercity transportation system based on programmed and funded (already in funded programs/financially constrained plans) improvements to the intercity transportation system through 2020, according to the following sources of information:

- State Transportation Improvement Program (STIP)
- Regional Transportation Plans (RTPs) for all modes of travel
- Airport plans
- Intercity passenger rail plans (California Rail Plan 2001-2010, Amtrak Five- and Twenty-year Plans)

As with all of the alternatives, the No-Project Alternative will be assessed against the purpose and need topics/objectives for congestion, safety, air pollution, reliability, and travel times.

1.1.2 Modal Alternative

There are currently only three main options for intercity travel between the major urban areas of San Diego, Los Angeles, the Central Valley, San Jose, Oakland/San Francisco, and Sacramento: vehicles on the interstate highway system and state highways, commercial airlines serving airports between San Diego and Sacramento and the Bay Area, and conventional passenger trains (Amtrak) on freight and/or

Figure 1
No-Project Alternative – California Transportation System

commuter rail tracks. The Modal/System Alternative consists of expansion of highways, airports, and intercity and commuter rail systems serving the markets identified for the High-Speed Train Alternative (Figures 2 and 3). The Modal Alternative uses the same inter-city travel demand (not capacity) assumed under the high-end sensitivity analysis completed for the high-speed train ridership in 2020. This same travel demand is assigned to the highways and airports and passenger rail described under the No-Project Alternative, and the additional improvements or expansion of facilities is assumed to meet the demand, regardless of funding potential and without high-speed train service as part of the system.

1.1.3 High-Speed Train Alternative

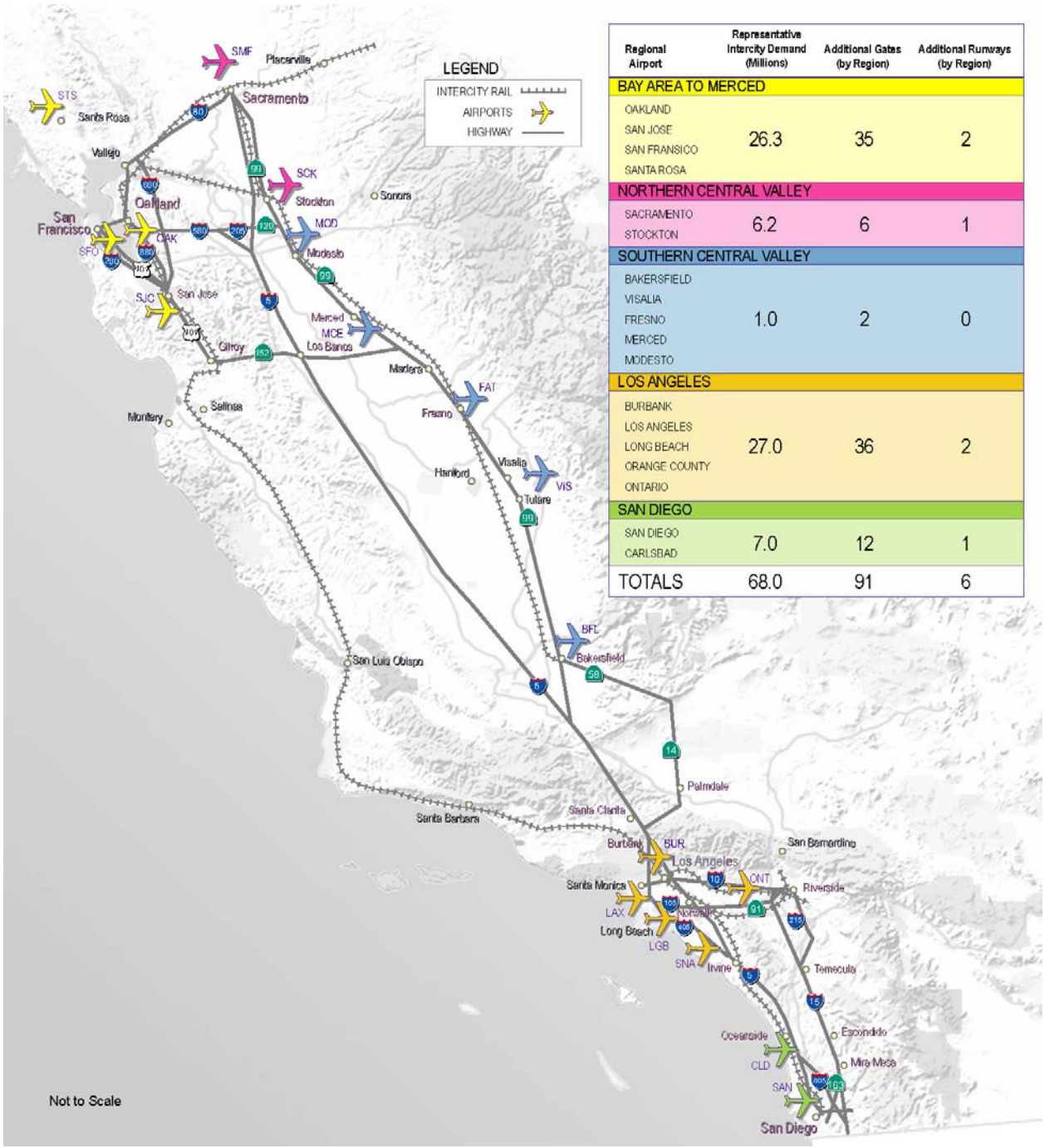
The Authority has defined a statewide high-speed train system capable of speeds in excess of 200 miles per hour (mph) (320 kilometers per hour [km/h]) on dedicated, fully grade-separated tracks, with state-of-the-art safety, signaling, and automated train control systems. State of the art high-speed steel-wheel-on-steel-rail technology is being considered for the system that would serve the major metropolitan centers of California, extending from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego (Figure 4).

The High-Speed Train Alternative includes several corridor and station options. A steel-wheel on steel-rail, electrified train, primarily on exclusive right-of-way with small portions of the route on shared track with other rail is planned. Conventional "non-electric" improvements are also being considered along the existing LOSSAN rail corridor from Los Angeles to San Diego. The train track would be either at-grade, in an open trench or tunnel, or on an elevated guideway, depending on terrain and physical constraints.

For purposes of comparative analysis, the HST corridors are described from station-to-station within each region, except where a by-pass option is considered when the point of departure from the corridor defines the end of the corridor segment. The Sacramento to Bakersfield region has been divided into six corridors: Corridor A runs generally from Sacramento to Stockton; Corridor B, from Stockton to Modesto; Corridor C, from Modesto to Merced; Corridor D, from Merced to Fresno; Corridor E, from Fresno to Tulare; and Corridor F, from Tulare to Bakersfield. Within any given corridor, various alignment options have been developed. Each alignment option is named with an alpha-numeric designation: the letter corresponds to the corridor, and the number refers to a specific route within that corridor. The corridors and alignment routes for HST for this region are defined and presented in Appendix A.

Figure 2
Modal Alternative-Highway Component

Figure 3
Modal Alternative-Aviation Component



Regional Airport	Representative Intercity Demand (Millions)	Additional Gates (by Region)	Additional Runways (by Region)
BAY AREA TO MERCED			
OAKLAND SAN JOSE SAN FRANSICO SANTA ROSA	26.3	35	2
NORTHERN CENTRAL VALLEY			
SACRAMENTO STOCKTON	6.2	6	1
SOUTHERN CENTRAL VALLEY			
BAKERSFIELD VISALIA FRESNO MERCED MODESTO	1.0	2	0
LOS ANGELES			
BURBANK LOS ANGELES LONG BEACH ORANGE COUNTY ONTARIO	27.0	36	2
SAN DIEGO			
SAN DIEGO CARLSBAD	7.0	12	1
TOTALS	68.0	91	6

Figure 4
HST Alternative – Corridors and Stations for Continued Investigation

2.0 BASELINE/AFFECTED ENVIRONMENT

2.1 STUDY AREA

The study area for public utilities is defined as 100 feet from the centerline and around facilities. This distance is considered to be a realistic distance to identify potential conflicts between utilities and the different alternatives.

2.2 REGULATORY SETTING

2.2.1 California Public Utilities Commission

Utilities within California are primarily regulated by the California Public Utilities Commission (CPUC), which regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. The CPUC is responsible for assuring that California utility customers have safe, reliable, utility services at reasonable rates, protecting utility customers from fraud, and promoting the health of California's economy. The CPUC does not issue permits for utility line crossings. The CPUC does, however, regulate at-grade rail crossings. Thus, any at-grade rail crossing for the HST Alternative will require CPUC approval (CPUC, 2003a and 2003c).

Regarding electricity, Assembly Bill (AB) 970 requires the CPUC to identify constraints in California's transmission and distribution system and to take actions to remove them. In 2001, the CPUC prepared a report that identified 51 constraints on California's transmission and distribution systems that would exist by summer 2001. This report also identified an additional 107 constraints that would affect the system's reliability from 2002 to 2005. The report recommended that utilities complete various projects to increase system capacity to allow more energy to flow to consumers, improve system reliability by making the system more stable, and/or allow access to a wider range of generation sources, some of which may supply cheaper power (CPUC, 2001a). Since these projects have not yet been defined, future HST conflicts could occur that are not noted in this report.

Regarding natural gas facilities, the CPUC regulates the rates and services of California's natural gas utilities, including backbone gas transmission systems, local gas transmission, storage, gas distribution, and gas procurement (CPUC, 2001b). The CPUC does not issue permits for utility crossings.

2.2.2 California Energy Commission

The California Energy Commission (CEC) is the state's primary energy policy and planning agency. Created by the Legislature in 1974 and located in Sacramento, the Commission's five major responsibilities are listed below (CEC, 2003a):

- Forecasting future energy needs and keeping historical energy data
- Licensing thermal power plants of 50 megawatts or larger
- Promoting energy efficiency through appliance and building standards
- Developing energy technologies and supporting renewable energy
- Planning for and directing state response to energy emergency

The CEC does not directly permit utility conflicts; rather, the utility companies must comply with CEQA as part of any utility line relocation efforts undertaken resulting from implementation of the project alternatives. In addition, the utility companies would have to obtain local jurisdiction permits if easements are required as part of utility line relocations (CEC, 2003b).

2.2.3 Federal Energy Regulatory Commission

In addition to the CPUC and CEC, the Federal Energy Regulatory Commission (FERC) approves rates for wholesale electric sales of electricity and transmission in interstate commerce for private utilities, power marketers, power pools, power exchanges, and independent system operators. FERC acts under the legal authority of the Federal Power Act of 1935, the Public Utility Regulatory Policies Act, and the Energy Policy Act (FERC, 2003a).

FERC also administers the Natural Gas Act (NGA) of 1938, the Natural Gas Policy Act of 1978, the Outer Continental Shelf Lands Act of 1953, the Natural Gas Wellhead Decontrol Act of 1989, and the Energy Policy Act of 1992. These are the primary laws that FERC administers to oversee America's natural gas pipeline industry. Under the NGA, FERC regulates both the construction of pipeline facilities and the transportation of natural gas in interstate commerce. Companies providing services and constructing and operating interstate pipelines must first obtain certificates of public convenience and necessity from FERC. If a project alternative requires the relocation of a certificated interstate pipeline, the utility company will have to obtain approval from FERC for the relocation. If the relocation also requires new easements, local approval will be required (FERC, 2003c).

2.2.4 Office of the State Fire Marshal

The Office of the State Fire Marshal (OSFM), Pipeline Safety Division, regulates the safety of approximately 5,500 miles of intrastate hazardous liquid transportation pipelines and acts as an agent of the Federal Office of Pipeline Safety concerning the inspection of more than 2,000 miles of interstate pipelines. Pipeline Safety staff inspect, test, and investigate to ensure compliance with all federal and state pipeline safety laws and regulations. All spills, ruptures, fires, or similar incidents are responded to immediately; all such accidents are investigated for cause.

Under existing law, the Elder California Pipeline Safety Act of 1981, the State Fire Marshal administers provisions regulating the inspection of intrastate pipelines that transport hazardous liquids. Other regulations implemented by the State Fire Marshal include the Hazardous Liquids Pipeline Safety Act, Code of Federal Regulations (CFR) Title 49 Part 186-199, AB 592, and Section 51010 of the California Government Code. If a project alternative requires the relocation of a hazardous liquid pipeline, the State Fire Marshal will have to inspect and test the relocated pipeline. If the relocation also requires new easements, local approval will be required (OSFM, 2003a).

2.2.5 Wastewater Regulatory Setting

Numerous regulatory agencies are involved in wastewater treatment oversight. These agencies include the U.S. Environmental Protection Agency (EPA), the California Water Resources Control Board, and Regional Water Quality Control Boards (RWQCB). Primary wastewater regulation occurs via water quality discharge standards that are implemented through National Pollutant Discharge Elimination System (NPDES) permits issued by the various RWQCBs.

Wastewater conveyance and treatment facilities in the study area are owned and/or operated by different agencies and jurisdictions. Any potential conflict with such facility would be coordinated with the respective agency. If the project alternatives encroach on wastewater facility easements, permits from the agency and/or local jurisdiction would be required.

2.3 SACRAMENTO TO BAKERSFIELD STUDY AREA SETTING

The Sacramento to Bakersfield region for this Program EIR/EIS is defined by the nine counties that extend from Sacramento in the north to Kern County in the south. Specifically, the region consists of Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern Counties. Occupying the central portion of the state, the Sacramento to Bakersfield region is a primary utility corridor for transport of natural gas, electricity, water, and crude oil in the southern portion of the region.

Most of the natural gas pipelines and transmission lines are owned and maintained by Pacific Gas & Electric Company.

Given its location, it is also noteworthy that many of the state's main water conveyance facilities that bring water from the Sierras to the coast and from northern California to southern California pass through the Sacramento to Bakersfield region. The facilities include:

- the east-west Mokelumne Aqueduct through Sacramento County;
- the east-west Hetch Hetchy Aqueduct, between the Stanislaus and Tuolumne Rivers in Stanislaus County;
- the north-south California Aqueduct along the west side of the region;
- the north-south Delta Mendota Canal along the west side of the region; and
- the north-south San Luis Canal.

During the conceptual engineering work to prepare the plans and profiles showing the HST alignment options, the project engineer for this region, DMJM+HARRIS adjusted the alignments to avoid major wastewater facilities. Accordingly, there are relatively few major infrastructure facilities within the study area for the Modal or HST Alternative. The facilities identified based on review of local area maps include the Ceres Water Reclamation Facility, the Atwater Wastewater Treatment Plant, and the Cross Valley Canal Treatment Plant in Bakersfield.

3.0 METHODOLOGY FOR PUBLIC UTILITIES

Setting information for the Sacramento to Bakersfield region was gathered through the following steps:

- Identify the major cities and counties in the study area;
- Review the general plans for potentially affected communities within the Sacramento to Bakersfield region, as well as maps from the Thomas Brothers California Atlas and from the California State Automobile Association; and
- Review of project alignments/improvements against GIS information of electrical transmission lines and gas and oil pipelines compiled by MapSearch.

To assess potential conflicts with the project alternatives, the following criteria were considered:

- The number of facilities within 100 feet of the project alternatives
- The length of the utility alignment occurring within the 100-foot study area.

Specifically, the characterization of potential impacts or conflicts for each region evaluated for the Program EIR/EIS is based on Table 2, below.

Table 2
Rankings for Potential for Public Utilities Impacts/Conflicts

	Electrical Facilities	Natural Gas Lines	Waste Treatment Facilities
Low	No 230 kV or greater facility within the study area	1 to 15 gas lines within study area	No wastewater pipelines of 36 inch diameter or greater or treatment facilities are in the study area.
Medium	None	16 to 30 gas lines within study area	None
High	One or more 230 kV or greater facility within study area	31 or more gas line within study area	Wastewater pipelines of 36 inch diameter or greater or treatment facilities are in the study area.

Because the map scales and the segment locations were such that detailed information could not be definitively determined in some cases, some of the facilities that were identified as potential conflicts may be determined to be nonexistent or easily resolved when a closer, more detailed analysis is conducted at the project level. In particular, for potential wastewater impacts, the proximity of a treatment facility was identified, rather than a major pipeline. In general, 36-inch diameter lines are likely to occur in the larger cities in the Sacramento to Bakersfield region, such as Sacramento, Stockton, Modesto, Fresno, and Bakersfield.

In addition to the above data, information was available regarding active electrical substations and other types of major pipelines within the study area. This information is also presented in Section 4.0 and provides additional understanding of potential impacts/conflicts with the electrical transmission and distribution facilities. For electrical substations, the same criterion as used for wastewater treatment facilities is used; for other pipelines (i.e., crude oil and refined products), the same criterion as for natural gas lines is used to rank the project alternatives.

The number of potential utility crossings or conflicts is presented on a segment-by-segment basis to allow comparisons among corridors and alternatives. As noted earlier, the Sacramento to Bakersfield region has been divided into six corridors: Sacramento to Stockton, Stockton to Modesto, Modesto to Merced, Merced to Fresno, Fresno to Tulare, and Tulare to Bakersfield. For the HST Alternative, a number of different routes exist within any given corridor. These different routes are defined in Appendix A.

It should be recognized that the roadway improvements under the Modal Alternative and the rail alignments, stations, and maintenance facilities under the HST Alternative in the Sacramento to Bakersfield region are predominantly at grade. Above-grade elements that could affect transmission lines are proposed at interchanges under the Modal Alternative and at major roadway, rail line, or waterway crossings under the HST Alternative. Thus, the likelihood of adverse conflicts with overhead transmission lines is not expected to be widespread, even though a number of transmission line occurrences are reported in this technical evaluation. Similarly, there are no extended stretches where the Modal or HST Alternative would be below grade in the Sacramento to Bakersfield region. Thus, the likelihood of disrupting underground pipelines is not anticipated. In the case of the No Build/No Action Alternative, a precise quantification of the local impacts of the widely dispersed projects that will supplement the existing transportation facilities in the region is not feasible at this level of analysis and would not be meaningful as a point of comparison to the overall evaluation of the Modal and HST Alternatives; therefore No Build/No Action values have not been calculated in the tables of this report.

4.0 PUBLIC UTILITY IMPACTS

4.1 NO-PROJECT ALTERNATIVE

The No Build/No Action Alternative involves only those transportation improvements that have been programmed and funded. They include localized changes to the transportation system – a new or improved interchange, installation of carpool or high occupancy lanes, selective highway widenings, expansions of airport passenger terminals and parking, and track and station upgrades on the conventional passenger rail system. Given the nature of these improvements, the impacts to utilities, if any, would be geographically and areally limited. Compared to the more extensive Modal and HST Alternatives, the No Build/No Action Alternative would trigger less environmental impact. Nonetheless, this statement is not intended to suggest that the No Build/No Action would not have adverse effects. In fact, it is anticipated that collectively the various improvements programmed and funded in the State Transportation Improvement Program, Regional Transportation Plans, Airport Master Plans, and intercity passenger rail plans would have impacts, many of which will require mitigation measures to reduce the effects.

Impacts of the No Build/No Action Alternative would be expected both during the construction period and during the long-term operational period. The effects would occur throughout the Sacramento to Bakersfield region, primarily along the highways where the majority of the funded and programmed improvements are proposed, and at two of the region's airports, Sacramento Metropolitan and Fresno Yosemite International. With respect to the roadway improvements, utility impacts would be greatest in those segments proposed for widening:

- SR 99 from I-5 to Elkhorn Boulevard in Sacramento (Sacramento County)
- I-5 from I-80 to North Market Boulevard (for auxiliary lanes in Sacramento County)
- I-5 from Del Paso Road to SR 99 (for auxiliary lanes in Sacramento County)
- I-5 from Monte Diablo to Country Club (for auxiliary lane in Stockton, San Joaquin County)
- I-5 from Monte Diablo undercrossing to Hammer Lane (Stockton, San Joaquin County)
- I-5 from I-205 to SR 120 northbound (San Joaquin County)
- I-5 from Hammer Lane to Eight Mile Road (Stockton, San Joaquin County)
- SR 99 from Hammer Lane to north of Crosstown Freeway (Stockton, San Joaquin County)
- I-580 from Patterson Pass to Alameda/San Joaquin county line (San Joaquin County)
- SR 99 from south of Jensen Avenue to Ventura Street (for auxiliary lane in Fresno County)
- SR 99 from south of South Pacific and Biola Junction Bridge to Fresno/Madera county line (Fresno County)
- SR 99 from Goshen to SR 201 (Fresno/Tulare County)
- SR 99 from SR 201 to Floral (Fresno County).

Impacts that could be expected include short-term interruption of utility service and possibly relocation of the utilities if the horizontal alignment of the transportation improvements cannot be adjusted out of the utility rights-of-way.

The above impacts are expected to occur whether or not the project build alternatives are constructed and implemented. Each of the proposed intercity travel demand improvements of the No Build/No Action

Alternative has been or will be subject to it own environmental clearance process and potential mitigation measures will be identified as part of those individual CEQA and/or NEPA reviews to address substantial impacts.

4.2 MODAL ALTERNATIVE

The Modal Alternative involves a wide range of highway improvements throughout the Sacramento to Bakersfield region and expansions at the Sacramento Metropolitan Airport and the Fresno Airport. The proposed changes to the transportation facilities would primarily occur at grade, with a low probability of interrupting service of an underground pipeline or interfering with an overhead transmission line. Nevertheless, the expansion of the roadways and airports could potentially encroach into the rights-of-way of the utilities, possibly requiring adjustments to the transportation improvements or relocation of the utilities. In each of the six corridors, the Modal Alternative improvements would potentially encroach into or cross electrical facilities at or greater than 230 kV resulting in high potential conflicts. Only the Sacramento to Stockton and the Tulare to Bakersfield corridors would have high potential to impact natural gas lines. In addition to natural gas lines, there are a number of crude oil lines that could pose potentially high conflicts in the Tulare to Bakersfield corridor.

Throughout the Sacramento to Bakersfield region, there are about 42,100 meters of natural gas, refined products, and crude oil pipelines and about 35,600 meters of transmission lines whose rights-of-way are along or traversed by the proposed transportation improvements of the Modal Alternative. Virtually, all potential utility impacts are related to the highway component of the Modal Alternative, as there are no pipelines near the proposed Sacramento Metropolitan Airport expansion and only 190 meters of transmission lines.

A description of the potential effects by corridor is presented below and in Table 3.

4.2.1 Sacramento to Stockton Corridor

Transmission Lines

This segment has the greatest number of active transmission line occurrences at 85, involving over 12,200 meters, within the highway widening buffer area. Nearly 60 percent of the potential encroachment (in terms of transmission line length) would occur along SR 99, and another 32 percent of the potential effects could occur along I-5. Expansion of the Sacramento Metropolitan Airport would create potential effects for about 190 meters of transmission lines near the airport. Because of the magnitude of transmission lines in this corridor, compared to other corridors comprising the Sacramento to Bakersfield region, the Sacramento to Stockton Corridor is rated as having a *high* potential for encroachment effects.

Substations

In the Sacramento to Stockton Corridor, the proposed widening along SR 99 has the potential to affect two utility substations. Compared to other corridors in the Sacramento to Bakersfield region, this number of potential substation impacts would be rated *high*.

Table 3
Sacramento to Bakersfield Region
Public Utilities Impacts

	Active Transmission Line (occurrences)	Active Transmission Line (meters)	Active Substations (occurrences)	Pipelines (occurrences) Natural Gas	Crude Oil	Refined Products	Pipelines (meters) Natural Gas	Crude Oil	Refined Products
Modal									
Sacramento to Stockton	85	12,615	2	34	0	5	3,968	0	321
Stockton to Modesto	43	5,114	0	9	4	3	685	1,331	798
Modesto to Merced	22	2,600	1	13	3	3	2,751	1,813	3,057
Merced to Fresno	55	7,360	0	25	7	2	6,313	4,495	1,658
Fresno to Tulare	10	3,443	0	8	5	0	845	677	0
Tulare to Bakersfield	37	4,867	0	39	44	2	6,948	5,335	1,061
HST Corridor & Station Options (1)									
Sacramento to Stockton									
Alignments									
A1	86	10,972	1	24	0	5	2,239	0	5,816
A2	118	14,476	3	24	0	6	2,319	0	3,737
A3	78	8,903	1	21	0	5	1,670	0	2,870
A4	101	10,490	3	19	0	6	1,626	0	791
A5	72	9,084	2	21	0	3	2,015	0	5,561
A6	72	8,586	1	18	0	3	1,888	0	3,356
A7	64	7,015	2	18	0	3	1,446	0	2,615
A8	64	6,517	1	15	0	3	1,319	0	410
Stations									
Sacramento Downtown Depot	1	287	0	2	0	0	427	0	0
Power Inn Road Station (BNSF Option)	2	342	0	0	0	0	0	0	0
Power Inn Road Station (UPRR Option)	0	0	0	0	0	0	0	0	0
Stockton ACE Downtown Station	1	160	0	0	0	0	0	0	0
Maintenance Facilities									
Sacramento Maintenance Facility BNSF Alt	0	0	0	0	0	0	0	0	0
Sacramento Maintenance Facility UPRR Alt	5	765	1	0	0	0	0	0	0
Stockton to Modesto									
Alignments									
B1	20	2,061	0	8	0	2	891	0	2,263
B2	13	1,527	0	1	0	0	63	0	0
Stations									
Modesto Downtown Station	1	250	0	0	0	0	0	0	0
Modesto Briggsmore Station	0	0	0	0	0	0	0	0	0
Modesto to Merced									
Alignments									
C1	16	1,269	0	8	2	2	981	145	3,791
C2	19	1,484	0	10	2	3	1,224	145	3,880
C3	18	1,391	0	7	0	2	624	0	3,791
C4	22	1,701	0	9	0	3	867	0	3,880
C5	19	1,843	0	5	0	1	397	0	61
C6	22	2,058	0	7	0	3	640	0	287
C7	21	1,928	0	5	0	1	418	0	61
C8	25	2,238	0	7	0	3	660	0	287
C9	7	626	0	5	0	3	459	0	3,880
C10	8	721	0	5	0	3	459	0	3,880
C11	18	1,744	0	6	0	3	550	0	287
C12	19	1,839	0	6	0	3	549	0	287
C13	22	2,106	0	6	0	4	550	0	391
C14	23	2,206	0	5	0	2	397	0	166
C15	23	2,202	0	6	0	4	549	0	391
C16	25	2,290	0	5	0	2	418	0	166

	Active Transmission Line (occurrences)	Active Transmission Line (meters)	Active Substations (occurrences)	Pipelines (occurrences) Natural Gas	Crude Oil	Refined Products	Pipelines (meters) Natural Gas	Crude Oil	Refined Products
Stations									
Merced Downtown Station	0	0	0	0	0	0	0	0	0
Merced Municipal Airport Station	0	0	0	0	0	0	0	0	0
Castle Air Force Base Station	0	0	0	0	0	0	0	0	0
Merced to Fresno									
Alignments									
D1	20	2,176	0	9	0	3	947	0	2,684
D2	29	3,045	0	16	0	4	1,345	0	2,765
D3	16	1,929	0	8	0	3	689	0	2,696
D4	24	2,519	0	16	0	4	1,199	0	2,777
D5	12	1,382	0	9	0	5	860	0	4,357
D6	20	1,971	0	15	0	5	2,306	0	4,357
D7	16	1,629	0	10	0	5	1,118	0	4,345
D8	25	2,497	0	15	0	5	2,452	0	4,345
Stations									
Fresno Downtown Station	0	0	0	0	0	1	0	0	452
Fresno to Tulare									
Alignments									
E1	8	671	0	7	0	0	570	0	0
E2	4	255	0	7	0	0	452	0	0
Stations									
Visalia Airport Station	0	0	0	0	0	0	0	0	0
Hanford Station	0	0	0	0	0	0	0	0	0
Tulare to Bakersfield									
Alignments									
F1	14	1,022	1	18	16	3	3,420	1,361	1,012
F2	9	668	1	14	16	3	2,133	1,361	1,012
F3	14	1,020	1	17	16	3	3,165	1,361	1,012
F4	9	667	1	13	16	3	1,878	1,361	1,012
F5	15	1,622	0	13	16	3	2,569	1,361	508
F6	10	1,268	0	9	16	3	1,282	1,361	508
F7	14	1,022	1	18	16	3	3,420	1,361	1,012
F8	9	668	1	14	16	3	2,133	1,361	1,012
F9	14	1,020	1	17	16	3	3,165	1,361	1,012
F10	9	667	1	13	16	3	1,878	1,361	1,012
F11	15	1,622	0	13	16	3	2,569	1,361	508
F12	10	1,268	0	9	16	3	1,282	1,361	508
F13	11	791	1	15	16	3	2,615	1,361	903
F14	11	789	1	14	16	3	2,360	1,361	903
F15	19	1,873	1	22	24	2	3,074	3,510	123
F16	14	1,520	1	18	24	2	1,787	3,510	123
F17	19	1,872	1	21	24	2	2,819	3,510	123
F18	14	1,518	1	17	24	2	1,532	3,510	123
F19	16	1,189	1	22	28	4	3,874	2,455	1,086
F20	11	836	1	18	28	4	2,587	2,455	1,086
F21	16	1,187	1	21	28	4	3,619	2,455	1,086
F22	11	834	1	17	28	4	2,332	2,455	1,086
F23	19	2,407	0	15	22	2	2,102	3,365	123
F24	14	2,053	0	11	22	2	816	3,365	123
Stations									
Bakersfield Airport Station	0	0	0	0	0	0	0	0	0
Golden State Station	1	170	0	0	0	0	0	0	0
Truxtun (Union Avenue) Station	0	0	0	0	0	0	0	0	0
Truxtun (Amtrak) Station	0	0	0	0	0	0	0	0	0
Maintenance Facilities									
Main Maintenance Facility BNSF Alt	0	0	0	0	1	0	0	195	0
Main Maintenance Facility UPRR Alt	0	0	0	0	0	0	0	0	0

(1) The HST alignment options for each of the six corridors making up the Sacramento to Bakersfield region are described in Appendix A.

Pipelines

In the Sacramento to Stockton Corridor, there is a *high* potential for encroachment into the natural gas pipeline rights-of-way, as about 34 occurrences of such facilities, involving nearly 4,000 meters, lie within the buffer area established for potential utility impacts. The majority of the potential encroachment would occur along I-5 and SR 99 (3,200 meters), with the balance along I-80.

4.2.2 Stockton to Modesto Corridor

Transmission Lines

The Stockton to Modesto Corridor would also be rated as having a *high* potential for encroachment effects on transmission lines. This segment includes about 43 occurrences, involving about 5,100 meters of transmission lines within the highway widening buffer area. About 20 percent of this length is found along I-5 and a similar amount along SR 99. The majority, amounting to over 3,050 meters of transmission lines, occurs along I-580.

Substations

There are no utility substations in the vicinity of the proposed roadway improvements in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the Modal Alternative in this corridor would be *low*.

Pipelines

In the Stockton to Modesto Corridor, there is a *low* potential for encroachment into natural gas pipeline rights-of-way. Less than ten occurrences, involving about 800 meters of natural gas pipelines lie within the buffer areas of I-5, SR 99, and I-580. Crude oil and refine product gas line occurrences are low as well in this corridor. Of the total meters of pipelines, 15 percent occurs along I-5 and 25 percent occurs along SR 99; the balance would occur alongside or across I–580.

4.2.3 Modesto to Merced Corridor

Transmission Lines

The Modesto to Merced Corridor has the least amount of transmission right-of-way near the proposed roadway improvements. Nevertheless, there are still about 20 occurrences, involving 2,600 meters of transmission, so that this corridor would be rated as having a *high* potential for encroachment effects, based on the criterion set forth in Table 2. Most of the potential disturbance (67 percent, based on length of nearby transmission lines) could occur along I-5.

Substations

In the Modesto to Merced Corridor, the proposed widening along SR 99 has the potential to affect one utility substation. Compared to other corridors in the Sacramento to Bakersfield region, this number of potential substation impacts would be rated *high*.

Pipelines

In the Modesto to Merced Corridor, there is a *low* potential to affect natural gas lines and other pipeline rights-of-way. The number of natural gas pipeline occurrences is 13 and involves about 2,800 meters along or across I-5 and SR 99. Impacts to crude oil lines would all occur along I-5 (1,800 meters); and similar lengths of natural gas 2,800 meters) and refined products (3,100 meters) each could be affected by widening of SR 99 under the Modal Alternative.

Other Facilities

In this corridor, the Atwater Wastewater Treatment Plant lies adjacent to SR 99. Widening of the roadway could encroach into this facility.

4.2.4 Merced to Fresno Corridor

Transmission Lines

There is a *high* potential for encroachment into transmission lines by Modal Alternative highway widenings, compared to other corridors in the Sacramento to Bakersfield region. Nearly 7,400 meters of transmission lines run near or across the proposed expansions of I-5, SR 99, SR 152, SR 33, and State Highway 101.

Substations

There are no utility substations in the vicinity of the proposed roadway improvements in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the Modal Alternative in this corridor would be *low*.

Pipelines

The Merced to Fresno Corridor has a *medium* potential for encroachment into natural gas pipeline rights-of-way and a *low* potential to affect other types of pipelines. There are about 25 occurrences, involving about 12,500 meters of natural gas pipelines along or across US Highway 101, I-5, and SR 99, 152, and 33. Over 80 percent of the pipelines occur along I-5 and SR 99 – about 6,100 meters are proximate to I-5 and about 4,200 are near SR 99. The pipelines along I-5 that could be affected primarily transport crude oil, whereas the pipelines along SR 99 predominantly convey natural gas. The other 20 percent of the potentially affected pipelines include primarily crude oil lines along SR 33 and natural gas lines along SR 152 and US Highway 101.

4.2.5 Fresno to Tulare Corridor

Transmission Lines

With about ten occurrences involving 3,400 meters of transmission lines running along or across the proposed widening of I-5 and SR 99, the Fresno to Tulare Corridor is rated as having a *high* potential for encroachment effects. Most of the disturbance could occur along I-5, where 80 percent of the transmission lines within the buffer area is located.

Substations

There are no utility substations in the vicinity of the proposed roadway improvements in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the Modal Alternative in this corridor would be *low*.

Pipelines

In the Fresno to Tulare Corridor, there are about eight occurrences involving less than 900 meters of natural gas pipelines that could be disturbed by the roadway widenings along I-5 and SR 99. Given the relatively few occurrences and amount of linear feet of potentially conflicting utilities, the potential for encroachment into the utility right-of-way is *low*. Pipelines along I-5 that could be affected include crude oil (nearly 700 meters) and natural gas (nearly 400 meters). The only pipeline along SR 99 that could be affected by the Modal Alternative transports natural gas and the potentially affected stretch is less than 500 meters.

4.2.6 Tulare to Bakersfield Corridor

Transmission Lines

In the Tulare to Bakersfield Corridor, the highway component of the Modal Alternative proposes improvements to I-5, SR 99, and SR 58. The nearly 4,900 meters of transmission lines running near or across these transportation facilities in nearly 40 locations results in a *high* potential for encroachment effects. Nearly 80 percent of the potential effect would occur along I-5.

Substations

There are no utility substations in the vicinity of the proposed roadway improvements in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the Modal Alternative in this corridor would be *low*.

Pipelines

The Tulare to Bakersfield Corridor has the *highest* potential to affect natural gas and other pipelines of all corridors in the Sacramento to Bakersfield region, with about 13,400 meters along or crossing the proposed widenings of I-5, SR 99, and SR 58. This length of potential pipeline encroachment represents about one-third of all pipelines in the Sacramento to Bakersfield region that could be disturbed by the Modal Alternative. About 40 percent of these lines convey crude oil, 50 percent transport natural gas, and the balance are used for refined products and other miscellaneous products. More than half of the potential encroachment into pipelines would occur along SR 99, with I-5 close behind with 45 percent of the total.

4.3 HIGH-SPEED TRAIN ALTERNATIVE

In contrast to the Modal Alternative, which has the potential to encroach into about 42,100 meters of pipelines and 35,600 meters of transmission lines, the HST Alternative could affect about 30,000 meters of pipelines and about 22,900 meters of transmission lines. All corridors rate high in terms of potential conflicts with transmission lines. The majority of the pipelines along the HST corridors convey refined products, followed by natural gas. Compared to the Modal Alternative, the number of natural gas lines in the vicinity of the HST alignments generally tends to be lower.

4.3.1 Sacramento to Stockton Corridor

Alignments

Transmission Lines: Of the eight alignment options in the Sacramento to Stockton Corridor, all rate high in terms of the number of occurrences of high voltage transmission lines. Nevertheless, A1, A2, and A3 each would be near over 10,000 meters of transmission lines. In contrast, the other alignment options have between 6,500 and 9,100 meters of nearby transmission lines. There is no difference between the UP and the CCT route, in terms of potential transmission line effects.

Substations: In the Sacramento to Stockton Corridor, all of the alignment options have the potential to affect an utility substation, resulting in high potential conflicts. A2 and A4 would encounter three substations along their routes; A5 and A6 would encounter two substations along their routes; and the remaining alignment options (A1, A3, A6, and A8) each has the potential to affect one substation.

Pipelines: In the Sacramento to Stockton Corridor, seven of the alignment options all range between 18 and 24 occurrences of natural gas pipelines along or across the HST right-of-way. Each of these would rate a medium potential for conflict and involve 1,400 and 2,300 meters within the study area. The eighth alignment option in this corridor, A8, would rate a low potential for natural gas pipeline conflict

based on the impact criteria. Other pipelines in the corridor would encroach into the HST alignment study areas fewer times than the gas lines, but would affect substantially more linear feet.

Stations

Transmission Lines: The Sacramento Downtown, Power Inn (along the BNSF), and Stockton ACE Downtown station options would have similar high potential encroachment effects on transmission lines in the vicinity of the station areas, based on the number of occurrences of high voltage lines within the station area. By contrast, the Power Inn Station option along the UP would not encounter any high voltage transmission lines.

Pipelines: Only the Sacramento Downtown Station has the potential to affect utilities in the Sacramento to Stockton Corridor. A natural gas line runs about 430 meters along side or through the Downtown Station area. None of the other station options in Sacramento (at Power Inn) or in Stockton would encounter any pipelines.

Maintenance Facility

The maintenance facility option along the UP right-of-way has no pipelines in its vicinity; however, there are 765 meters of transmission lines within the buffer area, based on five occurrences within the study area. Compared to other station or maintenance facilities in the Sacramento to Bakersfield region and the impact ranking criterion, this magnitude of transmission lines around the facility translates into a high potential for encroachment considerations. There is also one utility substation in the vicinity of the maintenance facility. The proximity of this substation near the maintenance facility along the UP route results in a potentially high impact to the substation.

The maintenance facility option along the BNSF right-of-way has no utilities in its vicinity; therefore, potential utility impacts would be low.

4.3.2 Stockton to Modesto Corridor

Alignments

Transmission Lines: Neither B1 (along the UP) or B2 (along the BNSF) have significant amounts of transmission lines near the HST routes in terms of linear feet within the study area. Nevertheless, both alignment options are rated as having a high potential for encroachment effects on transmission lines, based on the impact criterion.

Substations: There are no utility substations in the vicinity of the HST routes in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the HST Alternative in this corridor would be low.

Pipelines: In the Stockton to Modesto Corridor, there are two alignment options: the UP or the BNSF. Both alignment options would be considered to have low natural gas pipeline conflicts. The UP route (alignment option B1) would potentially have greater encroachment effects than the BNSF route, based on eight occurrences of natural gas pipelines involving nearly 900 meters of pipelines lying near or across the proposed HST routes. By contrast, the BNSF route (alignment option B2) has less than 100 meters of natural gas pipelines and no length of refined products pipelines within the buffer area of the HST Alternative.

Stations

Transmission Lines: Of the station options in this corridor, only the Modesto Downtown Station option has the potential to disturb nearby transmission lines. With one occurrence involving about 250 meters of transmission lines along or traversing the Modesto Downtown Station area, the potential encroachment effect is rated high.

Pipelines: There are no pipelines near any of the stations proposed in the Stockton to Modesto Corridor. Consequently, the potential for encroachment effects on pipelines is low.

4.3.3 Modesto to Merced Corridor

Alignments

Transmission Lines: In the Modesto to Merced Corridor, the number of occurrences and the lengths of transmission lines near the HST routes are relatively minimal, compared to other corridors in the Sacramento to Bakersfield region. Nevertheless, each of the 16 routes would potentially affect more than one high voltage line and therefore all are rated as having potentially high impacts to electrical transmission lines. In terms of affected lengths of transmission lines, the range is between 600 meters and 2,300 meters. In general, the potential for disturbance along transmission lines is greater along the BNSF route than along the UP route.

Substations: There are no utility substations in the vicinity of the HST routes in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the HST Alternative in this corridor would be low.

Pipelines: In the Modesto to Merced Corridor, there are 16 alignment options and all are rated low in terms of potential conflicts with natural gas pipelines. Although most of the pipeline occurrences in this corridor are natural gas, the linear feet of other pipelines along the HST routes is substantially greater than gas lines. Those options following the UP right-of way (C1 through C4, C9, and C10) would potentially have greater encroachment effects, because of the higher number of meters of pipelines along or across the HST Alternative.

Other Facilities: The proposed high-speed loop around Modesto, which is part of alignment option B1, may affect the Ceres Water Reclamation Facility.

Stations

None of the stations in this segment of the Sacramento to Bakersfield region are located near pipelines, transmission lines, or utility substations. Accordingly, the potential effect to utilities in the Modesto to Merced Corridor from stations is low.

4.3.4 Merced to Fresno Corridor

Alignments

Transmission Lines: All of the alignments would be considered to have potentially high conflicts with electrical lines, as the number of occurrences within the study area varies between 12 and 29. The range of lengths of transmission lines along the Merced to Fresno Corridor options is fairly narrow, between about 1,900 meters and 3,000 meters. Only D2, which follows the BNSF north and south of the Fresno Downtown Station and includes a high-speed loop, is along or crosses more than 3,000 meters.

Substations: There are no utility substations in the vicinity of the HST routes in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the HST Alternative in this corridor would be low.

Pipelines: In the Merced to Fresno Corridor, there are eight alignment options. As with the transmission lines, the number of occurrences of natural gas pipelines is fairly narrow, between 9 and 16. D2 and D4, both of which follow the BNSF corridor and include a high-speed loop, would encounter 16 natural gas rights-of-way and thus rate a medium potential impact. All other options would rate a low potential encroachment/conflict with natural gas lines.

Stations

The Fresno Downtown Station is not located near pipelines, transmission lines, or utility substations. Accordingly, the potential effect to utilities is low.

4.3.5 Fresno to Tulare Corridor

Alignments

Transmission Lines: Neither E1 (along the UP) or E2 (along the BNSF) have significant amounts of transmission lines near the HST routes, compared to other corridors in the Sacramento to Bakersfield region. Nevertheless, both alignment options are rated as having a high potential for encroachment effects on transmission lines based on the impact criterion.

Substations: There are no utility substations in the vicinity of the HST routes in this corridor. Accordingly, no impacts would be expected and the potential for encroachment into utility substations by the HST Alternative in this corridor would be low.

Pipelines: In the Fresno to Tulare Corridor, there are two alignment options. Both E1 which follows the UP right-of-way and E2 which follows the BNSF right-of-way would be rated as having a low potential to disturb natural gas pipelines. Neither option has more than ten occurrences within the defined study area.

Stations

Neither of the two stations in this segment of the Sacramento to Bakersfield region (Visalia Airport or Hanford) are located near pipelines, transmission lines, or utility substations. Accordingly, the potential effect to utilities in the Fresno to Tulare Corridor from stations is low.

4.3.6 Tulare to Bakersfield Corridor

Alignments

Transmission Lines: Compared to other corridors comprising the Sacramento to Bakersfield region, the potential transmission line conflicts in the vicinity of the HST routes is less; however, based on the impact criterion, all 24 routes in this corridor would be rated as having a high potential for transmission line encroachment effects. The range of lengths of transmission lines along the Tulare to Bakersfield Corridor options is fairly narrow, between about 700 meters and 2,400 meters. Although the rating for all alignment options is high, the BNSF routes generally include more meters of transmission lines than the UP routes.

Substations: In the Tulare to Bakersfield Corridor, 18 of the 24 alignment options have the potential to affect an utility substation. These alignments (F1 through F4, F7 through F10, and F13 through F22) would be rated as having a high substation impact. The remaining alignment options have no substations in their vicinity, resulting in a low impact rating.

Pipelines: In the Tulare to Bakersfield Corridor, there are 24 alignment options. Unlike the other corridors, where only natural gas or refined product lines are found, the Tulare to Bakersfield Corridor also has pipelines that carry crude oil. In terms of natural gas pipelines, the number of occurrences would result in a low to medium impact ranking for all alignment options. Taking into account the other pipelines, this corridor would rate medium to high in terms of potential pipeline conflicts.

Other Facilities: The UP alignment where it crosses the Kern River is adjacent to the Cross Valley Canal Treatment Plant. Depending on the precise alignment for this segment as it approaches the Golden State Station option, there could be conflicts with this water treatment facility.

Stations

Transmission Lines: Of the four station options in Bakersfield, only the Golden State Station has any nearby transmission lines. With one occurrence involving about 170 meters of transmission line within the station area, there is a high potential encroachment effect, compared to the low rating for the other station options in the Bakersfield area.

Pipelines: None of the stations in this segment of the Sacramento to Bakersfield region are located near pipelines. Accordingly, the potential effect to these utilities in the Tulare to Bakersfield Corridor is low.

Maintenance Facilities

Neither of the maintenance facility options in the Bakersfield area would be near transmission lines or an utility substation. As a result, the potential for encroachment effects from maintenance facilities in this corridor is considered to be low.

The Main Maintenance Facility area along the BNSF route would not affect any natural gas lines but could encounter one crude oil line involving nearly 200 meters. Overall, potential pipeline impacts would be rated low and is identical to the rating assigned to the Sacramento maintenance facility options.

5.0 REFERENCES

California State Automobile Association maps for:
- Sacramento Northern Area
- Sacramento Southern Area
- San Joaquin and Stanislaus Counties
- Stockton
- Oakdale-Riverbank-Escalon
- Modesto-Ceres
- Turlock and Vicinity
- Merced and Vicinity
- Merced/Atwater and Merced County
- Madera, Mariposa, and Merced Counties
- Fresno and Kings Counties
- Fresno-Clovis
- Tulare County
- Bakersfield Area

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APPENDICES

APPENDIX – A

Corridor and Design Options for High-Speed Train Alternative

CORRIDOR AND DESIGN OPTIONS FOR HIGH-SPEED TRAIN ALTERNATIVE

SACRAMENTO TO BAKERSFIELD

Corridor Definition

The Central Valley region has been divided into six discrete corridors:

Corridor A, Sacramento to Stockton

Corridor B, Stockton to Modesto

Corridor C, Modesto to Merced

Corridor D, Merced to Fresno

Corridor E, Fresno to Tulare

Corridor F, Tulare to Bakersfield

Design Options

There are two or more HST alignment alternatives within each Corridor, distinguished by parallel route (UPRR or BNSF), station site served, route connection (UPRR or BNSF) to the south, and station configuration (off-line "loop" or standard). HST alternatives are shown on the alignment exhibits in this Appendix.

Within the Sacramento to Bakersfield region, the HST project would be built primarily at-grade. With the exception of specific and localized grade separations, which may include structures to carry the HST alignment over existing roadway or railroad facilities, proposed aerial structures within the Central Valley would include those listed below. The specific location, number, and length of structures will be determined during the next phase of design.

Aerial Structure Locations			
HST Alignment Option(s)	**Aerial Structure Location**	**Approximate Limits**	**Length (ft)**
Corridor A			
Sacramento Depot alignments: A1 thru A4	Sacramento	Sacramento Downtown Depot to the Elvas Wye	17,000
Sacramento Depot alignments parallel to UPRR north of Stockton: A1, A3	Sacramento	Folsom Blvd to 14th Avenue	6,000
All alignments: A1 thru A8	Stockton	Harding Way to Mormon Slough	7,000
Corridor B			
Modesto Downtown Station alignment: B1	Modesto	Kansas Avenue to Tuolumne River	9,000
Modesto Briggsmore Station alignment: B2	Escalon	Yosemite Avenue to St. John Road	5,000
Modesto Briggsmore Station alignment: B2	Riverbank	South of Patterson Road to Claribel Road	7,000
Corridor C			
All alignments parallel to UPRR north of Merced: C1, C2, C3, C4, C9, C10	Turlock	Broadway to Berkeley Avenue	12,000

Aerial Structure Locations			
HST Alignment Option(s)	**Aerial Structure Location**	**Approximate Limits**	**Length (ft)**
All alignments parallel to UPRR north of Merced: C1, C2, C3, C4, C9, C10	South of Delhi	High Fine Canal to Merced River	8,000
All alignments parallel to UPRR north of Merced: C1, C2, C3, C4, C9, C10	Atwater	Atwater Canal/Jordan Canal to SR99 Overpass	13,000
Corridor D			
All alignments parallel to UPRR north of Fresno: D5, D6, D7, D8	Madera	Fresno River to Olive Avenue	8,000
All alignments: D1 thru D8	Fresno	Ashlan Avenue to Clinton Avenue	12,000
All alignments: D1 thru D8	Fresno	Belmont Avenue to SR180 Overpass	4,000
Corridor E			
Visalia Airport Station alignment: E1	Selma	Floral Avenue to Nebraska Avenue	8,000
Hanford Station alignment: E2	Hanford	11th Avenue to south of 3rd Street	6,000
Corridor F			
All alignments thru Tulare: F1, F2, F7, F8, F13, F15, F16, F19, F20	Tulare	Prosperity Avenue/Avenue 240 to Bardsley Avenue	11,000
All alignments parallel to UPRR north of Bakersfield: F1 thru F4, F7 thru F10, F13 thru F22	Delano	Cecil Avenue to High Street	8,000
All alignments parallel to BNSF north of Bakersfield: F5, F6, F11, F12, F23, F24	Corcoran	Orange Avenue to Pickerell Avenue	6,000
All alignments parallel to BNSF north of Bakersfield: F5, F6, F11, F12, F23, F24	Shafter	Tulare Avenue to Lerdo Highway	4,000
Truxtun (Amtrak) Station (without loop) alignments parallel to UPRR north of Bakersfield: F15 thru F18	Famoso	North of Poso Creek to south of SR99	16,000
Bakersfield Airport Station, Golden State Station, Truxtun (Union Avenue) Station, and Truxtun (Amtrak) Station (with high-speed loop) alignments: F1 thru F6, F7 thru F12 F13, F14, F19 thru F22	Bakersfield	North of Norris Road to Olive Drive	6,000
Bakersfield Airport Station, Golden State Station, Truxtun (Union Avenue) Station, and Truxtun (Amtrak) Station (with high-speed loop) alignments: F1 thru F6, F7 thru F12 F13, F14, F19 thru F22	Bakersfield	Beale Avenue to Mount Vernon Avenue	7,000
Truxtun (Amtrak) Station alignments: F15 thru F24	Bakersfield	North of Mohawk Street to Carrier Canal	8,000
Truxtun (Amtrak) Station alignments: F15 thru F24	Bakersfield	F Street to Truxtun Avenue	14,000