3.11 Safety and Security

3.11.1 Introduction

As described in the Program EIR/EIS documents, safe operation of the HST is of highest priority (Authority 2012; Authority and FRA 2005, 2008). To achieve this, the HST System would be fully grade-separated and fully access-controlled with intrusion monitoring systems. This means that the HST infrastructure (e.g., mainline tracks and maintenance and storage facilities) would be designed to prevent access by unauthorized vehicles, people, animals, and objects. The system would also include appropriate barriers (fences and walls) and state-of-the-art communication, access-control, and monitoring and detection systems. In addition, all aspects of the HST System would conform to the latest federal requirements regarding transportation security.

Overall safety and reliability of the California HST System would be achieved by the application of proven technical standards commensurate with the desired level of performance. Based on the long-term operating success of European and Asian systems, and because the United States has no specific or current guidelines for the development of a high-speed rail system capable of 220-mph travel, the HST System design considers and adapts the existing European and Asian processes and standards.

Given its complex and high-speed operating environment, high-speed railways must be developed from the beginning as a system, integrating all elements to work together in a safe, efficient, and reliable manner. An HST System-design approach considers the physical and operational relationships among the various subsystems (infrastructure, rolling stock, train controls, electrification, and operations and maintenance) and optimizes the physical design requirements with operational and maintenance activities to deliver a high level of safety and reliability. As a result, the Authority's technical standards address and integrate an overall set of guiding principles or system requirements consistent with European and Asian high-speed rail systems to ensure the safety and reliability aspects of the California HST System.

This section of the Fresno to Bakersfield HST Project EIR/EIS provides details on safety issues related to construction and operation of the HST alternatives, including the measures and regulations currently in place, or that would be implemented to keep employees, passengers, pedestrians, bicyclists, and motorists safe from HST-related activities. This section also considers security issues that could result from criminal acts that could affect HST operation and the ability for emergency responders to respond to incidents.

Safety concerns associated with other hazardous conditions are described and evaluated elsewhere in this EIR/EIS, as follows:

- Section 3.3, Air Quality and Global Climate Change, covers safety hazards from air emissions such as air toxics.
- Section 3.9, Geology, Soils, and Seismicity, addresses seismic and geotechnical hazards.
- Section 3.10, Hazardous Materials and Waste, addresses safety issues related to hazardous materials and waste from use or exposure to soil and groundwater contamination.

The automobile is by far the most used and dangerous transportation mode when comparing automobile, air, and rail modes of transportation. In 2008 alone, there were over 3,400 fatalities and approximately 242,000 nonfatal injuries on California highways (California Highway Patrol 2008a, 2008b). The National Highway Traffic Safety Administration (NHTSA) estimates that deaths and injuries resulting from motor vehicle crashes are the leading cause of death for persons between the ages of 3 and 34 in the United States (NHTSA 2010). The potential for automobile accidents increases with the appearance of more and more vehicles on state highways.

By contrast, conventional passenger rail service is extremely safe when compared with other modes of transportation. Sophisticated train control, communications and signaling systems, and protected grade crossings, for example, have made conventional passenger rail service in the United States a safe way to travel. Figures 3.11-1 and 3.11-2 present a fatality comparison among modes.

International experience operating HST systems has surpassed the passenger rail safety record achieved in the United States. Since 1964 and the inauguration of the first HST service in Japan, Japanese HST trains (the *Shinkansen*) have maintained a record of no passenger fatalities or injuries due to train accidents, including derailments or collisions (Central Japan Railway Company 2011). In France, HSTs (the *TGV*) have been operating for 27 years, and currently carry more than 100 million passengers a year. Like Japan, the French HST system has not had a single HST-related passenger fatality on its dedicated HST trackway, which is similar to the dedicated trackway proposed for the California HST System (TGVweb 2011). Unlike France and Japan, Germany's HST, the InterCity Express (ICE) does not use an entirely dedicated track system, but shares track with freight and conventional passenger rail. An HST accident in the late 1990s prompted design changes to the wheels of German ICE trains to remedy a design flaw (National Aeronautics and Space Administration 2007; North East Wales Institute of Higher Education 2004). German ICE trains carry more than 66 million passengers a year.

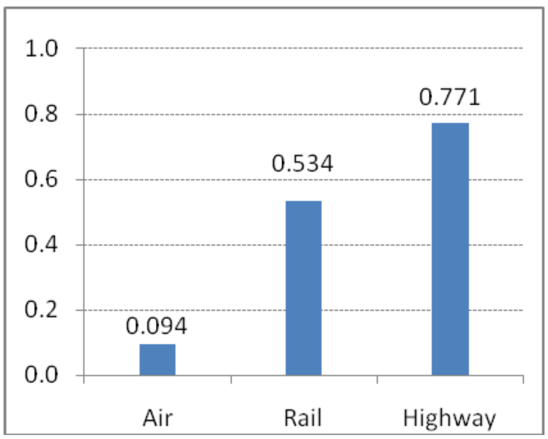

Figure 3.11-1
Fatalities (per 100 million passenger miles in 2008)

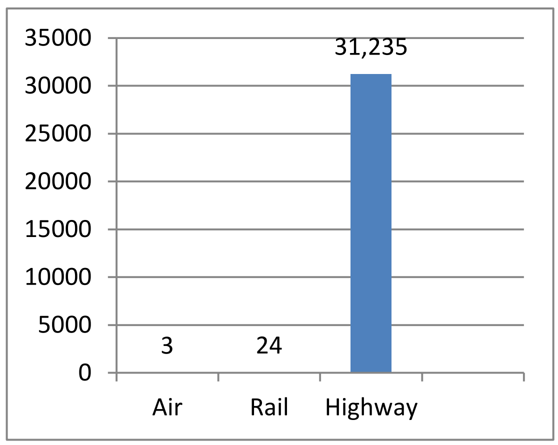

Figure 3.11-2
Total passenger fatalities in 2008

Note: The U.S. Department of Transportation's Federal Motor Carrier Safety Administration monitors heavy truck safety in terms of fatalities per 100 million miles traveled. In 2008, the heavy truck fatality rate was 0.143 fatality per 100 million miles traveled. Passenger rail fatalities were skewed in 2008 as a result of a Metrolink commuter rail accident in Chatsworth, California. Passenger rail fatalities in 2007 and 2009 were zero.

Source: FRA 2010a.

High-speed train service was introduced in China in 2007, and that country now has 6,012 miles of high-speed rail lines, the most of any country in the world (Railway-Technology.com). On July 23, 2011, a high-speed train rear-ended another high-speed train on a viaduct in Wenzhou, killing 40 people and injuring 72. The crash was caused by the failure of signaling equipment. This equipment was determined to have a flawed design that was not properly identified during its development. The official investigation found that the accident was symptomatic of a lack of emphasis on safety by the management of China's rapidly growing high-speed train industry (Areddy 2011).

On July 24, 2013, a high-speed train operated by the Spanish railway network RENFE derailed as it entered the city of Galicia. The derailed train struck an adjacent concrete retaining wall, causing several cars to crumple and break apart. The result was 79 passengers killed, and hundreds more injured. The speed at the time of the derailment was approximately 95 mph, almost twice the allowable speed for that stretch of track. An initial finding in the investigation is that the engineer may have been distracted by a cell phone call just before the time of derailment. Final results of the investigation are pending.

The California HST System will incorporate a positive train control system to protect against over-speed derailment, as required by the Railway Safety Improvement Act of 2008 through regulations enforced by the FRA. The system will enforce all speed restrictions, including slower speed restrictions for curves, such as was the case in Galicia, Spain. If the engineer does not voluntarily slow the train, the system will slow or stop the train, as appropriate.

In addition to the safe operation of most HST systems around the world, international rail operators also have given high priority to security issues, including the protection of people from intentional acts that could injure or harm them, and the protection of property from deliberate acts. Each of the 12 HST systems now in operation around the world has implemented measures to reduce or minimize criminal and terrorist activities (Taylor et al. 2005). Maintaining a safe and secure traveling environment is important to passenger confidence in using these rail systems.

As discussed in Section 3.1.5 and the Executive Summary, the analysis in this chapter includes revisions based on design refinements and analytical refinements. Gray shading is used as a guide to help the reader navigate the revisions.

3.11.2 Regulatory Requirements

The following federal, state, and local laws, regulations, and agency jurisdiction and management guidance pertain to safety and security.

3.11.2.1 Federal

The Federal Railroad Administration (FRA) is the federal agency responsible for development and enforcement of safety rules for railroads and railroad employees.

Rail Safety Improvement Act of 2008 (Public Law 110-432)

The Rail Safety Improvement Act reauthorized the FRA to oversee the nation's rail safety program. One aim of the statute is to improve conditions of rail bridges and tunnels. The Rail Safety Improvement Act also requires that railroads implement Positive Train Control (PTC) systems by the end of 2015 on certain rail lines. PTC infrastructure consists of integrated command, control, communications, and information systems for controlling train movements that improve railroad safety by significantly reducing the probability of collisions between trains, casualties to roadway workers and damage to their equipment, and over-speed accidents.

Federal Railroad Administration (49 CFR Volume 4, Chapter 2, Part 200 to 299)

FRA regulations for railroad transportation safety, including standards, rules, and practices, are listed in 49 CFR, Parts 200 to 299.

U.S. Code on Railroad Safety (49 U.S.C. Section 20101 et seq.)

Part A of Subtitle V of Title 49 of the U.S. Code (49 U.S.C. Sections 20101 et seq.) contains a series of statutory provisions affecting the safety of railroad operations.

Department of Homeland Security/Transportation Security Administration (49 CFR 1580)

Part 1580, Rail Transportation Security, codifies the Transportation Security Administration inspection program. It also includes security requirements for freight railroad carriers; intercity, commuter, and short-haul passenger train service providers; rail transit systems; and rail operations at certain fixed-site facilities that ship or receive specified hazardous materials by rail.

Transportation Security Administration – Security Directives for Passenger Rail

Security Directives RAILPAX-04-01 and RAILPAX-04-02 require rail transportation operators to implement certain protective measures, report potential threats and security concerns to the Transportation Security Administration, and designate a primary and alternate security coordinator.

Emergency Planning and Community Right-to-Know Act (42 U.S.C. 116)

The objectives of the Emergency Planning and Community Right-to-Know Act are to allow state and local planning for chemical emergencies, provide for notification of emergency releases of chemicals, and address a community's right-to-know about toxic and hazardous chemicals.

3.11.2.2 State

California Public Utilities Code (Sections 309, 315, 765, 768, 7710 to 7727, 7661, and 7665 et seq.)

The California Public Utilities Code Sections 7710 to 7727 cover railroad safety and emergency planning and response. Under this code, the Public Utilities Commission is required to adopt safety regulations and to report sites on railroad lines that are deemed hazardous within California. The Rail Accident Prevention and Response Fund was created in an effort to support prevention regulations financially through fees paid by surface transporters of hazardous materials. In addition, the Railroad Accident Prevention and Immediate Deployment Force was created to provide immediate onsite response in the event of a large-scale unauthorized release of hazardous materials. Modifications of existing highway-rail crossings require Commission authorization, and temporarily impaired clearance during construction requires application to the Commission and notice to railroads.

California Emergency Services Act (Sections 8550 to 8692)

The Emergency Services Act supports the state's responsibility to mitigate adverse effects of natural, manmade, or war-caused emergencies that threaten human life, property, and environmental resources of the state. The act aims to protect human health and safety and to preserve the lives and property of the people of the state. The act provides the Office of Emergency Services with the authority to prescribe powers and duties supportive of the act's goals. In addition, the act authorizes the establishment of local organizations to carry out the provisions through necessary and proper actions.

California Public Resources Code (Section 21096)

The California Public Resources Code requires that the California Department of Transportation, Division of Aeronautics *Airport Land Use Planning Handbook* (Caltrans 2002) be used as a technical resource to assist in the preparation of an EIR for any project situated within the boundaries of an airport land use compatibility plan. The *Airport Land Use Planning Handbook* supports the State Aeronautics Act (California Public Utilities Code, Section 21670 et seq.), providing compatibility planning guidance to airport land use commissions, their staffs and consultants, the counties and cities having jurisdiction over airport area land uses, and airport proprietors.

3.11.2.3 Regional and Local

Section 65302(g) of the California Government Code requires all general plans to include a safety element for the protection of the community from any unreasonable risks associated with seismic and geologic hazards, flooding, and wildland and urban fires. The element must also address evacuation routes, peak load water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards. The general plans for Fresno, Kings, Tulare, and Kern counties and the incorporated cities within those counties contain safety elements addressing these issues.

In addition to the safety elements in the general plans, the counties and cities have adopted emergency plans that provide operating procedures for safety and security. Other local policies and ordinances related to safety and security include the safety provisions in county codes, city municipal codes, city and county hazardous waste management plans, and police and fire department master plans. Table 3.11-1 lists safety and security plans by jurisdiction. Section 3.10, Hazardous Materials and Waste, outlines hazardous waste response plans.

Table 3.11-1
General Plans and Other Plans Considered

Jurisdiction	Safety Plan
Fresno County	• Fresno County General Plan (2000a) • Fresno County Municipal Code, Chapter 2.44: Emergency Organization • Fresno County Operational Area Master Emergency Services Plan (1998) • Fresno County Multi-Hazard Mitigation Plan (2009)
City of Fresno	• 2025 Fresno General Plan and Related Environmental Impact Report No. 10130 (2002) • City of Fresno Emergency Operations Plan (2008) • Fresno Municipal Code, Chapter 2, Article 5: Emergency Services Ordinance
Kings County	• 2035 Kings County General Plan (adopted 1993, as amended) • Kings County Multi-Jurisdictional Multi-Hazard Mitigation Plan (2007) • Kings County Municipal Code, Chapter 6.8: Emergency Organization
City of Hanford	• Hanford General Plan (2002) • Hanford Municipal Code, Chapter 2.44.090: Emergency Organization
City of Corcoran	• 2025 Corcoran General Plan (2007) • Corcoran Municipal Code, Chapter 4, Section 2-4-9: Emergency Organization
Tulare County	• Tulare County General Plan (2012) • Tulare County Code, Chapter 15: Civil Defense and Disaster
Kern County	• Kern County General Plan (Kern County Planning Department 2009) • Kern County Emergency Operations Plan (KCFD 2008) • Kern County Municipal Code, Chapter 2.66.050: Emergency Organization
City of Wasco	• Wasco General Plan (City of Wasco Planning Division 2002) • Wasco Municipal Code, Chapter 2.32: Emergency Organization
City of Bakersfield	• Metropolitan Bakersfield General Plan (City of Bakersfield and Kern County 2009) • Bakersfield Municipal Code, Chapter 2.40.070: Emergency Organization—Constitution

Emergency services in the San Joaquin Valley are provided by fire and police departments that coordinate as necessary through California's Standardized Emergency Management System (SEMS). This system is explained further in Section 3.11.4, Affected Environment, which also contains information on emergency medical services. The following local plans and policies were identified and considered in the preparation of this analysis.

Airport Plans

Airport master plans and compatibility plans provide guidance for land use and facilities planning that minimize safety risks on the ground in airport influence zones. Table 3.11-2 provides a list of airport master plans and airport land use compatibility plans. These airport plans were also considered in the preparation of this analysis.

Table 3.11-2
Airport Plans Considered

Jurisdiction	Safety Plan
Fresno County	• Land Use Compatibility Plan (City of Fresno 2012) • Fresno-Chandler Downtown Airport Master and Environs Specific Plan (1999)
Kings County	• Land Use Compatibility Plan (Kings County Airport Land Use Commission 1994) • Hanford Municipal Airport Master Plan (2010)
Kern County	• Land Use Compatibility Plan (Kern County Airport Land Use Commission 2008) • Meadows Field Airport Master Plan (2006)

3.11.2.4 Other Requirements

Many state and local safety requirements refer to National Fire Protection Association (NFPA) Codes and Standards. The NFPA develops, publishes, and disseminates more than 300 codes and standards intended to minimize the possibility and effects of fire and other risks.

3.11.3 Methods of Evaluation of Impacts

This section considers the exposure of HST System passengers and employees or structures and the general public to significant risk of loss, injury, or death during construction and operation of the project. Because no HST system currently operates in the United States, the evaluation of safety and security impacts is based on (1) international high-speed rail operating experience, and (2) existing conditions compared with the design and operational features of the HST alternatives. For safety, issues addressed include future rail system operations, such as the following:

- Train travel.
- Vehicle, bicycle, and pedestrian access at stations.
- Emergency response by fire, law enforcement, and emergency services to fire, seismic events, or other emergency situations.

For security, the analysis evaluates impacts associated with the incidence of crime against people and property, including acts of terrorism.

3.11.3.1 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. The intensity of adverse effects is summarized as the degree or magnitude of a potential adverse effect where the adverse effect is thus determined to be negligible, moderate, or substantial. Context and intensity are considered together when determining whether an impact is significant under NEPA. Thus, it is possible that a significant adverse effect may still exist when, on balance, the project's impact is negligible or even beneficial.

For safety and security, the terms are defined as follows.

- Effects with *negligible* intensity on public safety are defined as impacts that would not increase emergency response times or risk of accidents beyond existing conditions. Effects with *moderate* intensity on public safety are defined as impacts that would increase emergency response times or risk of accidents at specific sites or localized areas but that would not have wide-ranging effects. Effects with *substantial* intensity on public safety are defined as impacts that would increase emergency response times or risk of accidents on a regional scale.

- Effects with *negligible* intensity on security are defined as effects that would not increase the risk of criminal or terrorist acts beyond existing conditions. Effects with *moderate* intensity on security are defined as effects that would increase the risk of criminal or terrorist acts in localized areas but that would not have wide-ranging effects. Effects with *substantial* intensity on security are defined as effects that would increase the risk of criminal or terrorist acts on a regional scale.

3.11.3.2 CEQA Significance Criteria

CEQA requires the analysis of impacts to determine whether significant impacts would occur as a result of the proposed alternatives and the identification of specific mitigation for significant impacts. A significant safety or security impact would occur if a project were to do one or more of the following:

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the safety of such facilities.

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.

- Result in a safety hazard for people residing or working in the project vicinity (for a project located within an area where there is an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and/or within the vicinity of a private airstrip).

- Result in substantial adverse physical impacts associated with the provision of and the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services, including fire protection, police protection, and emergency services.

- Result in inadequate emergency access.

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

3.11.3.3 Study Area

For the evaluation of direct safety and security effects, the Fresno to Bakersfield Section study area includes the HST right-of-way, areas adjacent to the construction footprint, and the area within a 0.5-mile radius of the proposed Fresno, Kings/Tulare Regional, and Bakersfield HST stations (this extends to Oswell Street in the case of the Bakersfield HST). The indirect effects study area is made up of the cities and counties between Fresno and Bakersfield. Since certain service providers' service boundaries fall within the direct impacts study area, indirect effects from the proposed project could influence an area larger than the direct impacts study area.

The safety and security evaluation also includes certain services (e.g., fire departments, police departments, hospitals) that are not located within the study area but have service boundaries in or would provide service within the study area, as well as airports and high-risk facilities within 2 miles of the project footprint.

3.11.4 Affected Environment

This section discusses the affected environment related to safety and security in the study area. There are no applicable regional plans or policies pertaining to safety and security within the Fresno to Bakersfield Section study area.

3.11.4.1 Emergency Services

Fire

Table 3.11-3 summarizes the fire departments and the types of equipment operated within the Fresno to Bakersfield Section. Fire stations in the vicinity of HST alternatives are shown on Figures 3.11-3 through 3.11-7. All of the fire departments consist of paid employees, and the Kings County, Tulare County, and Kern County fire departments also have volunteers. The City of Corcoran contracts for fire protection through the Kings County Fire Department. The cities of Wasco and Shafter contract fire protection through the Kern County Fire Department. The city fire departments have mutual aid agreements with county fire protection services (and in some cases with one another) to provide concurrent, cooperative response and assistance during emergencies. The Fresno and Bakersfield fire departments are certified as Type 1 Heavy Rescue and Regional Response Forces. They have specialized rescue equipment and contracted access to additional equipment, such as industrial cranes, as needed.

Table 3.11-3
Fire Departments and Equipment in the Fresno to Bakersfield HST Study Area

Fire Department	Service Area	Equipment
City of Fresno	City of Fresno and adjacent Fresno County areas under contract with the North Central Fire Protection District and Fig Garden Fire Protection District	19 engines 5 ladder trucks—at least 85 feet tall 1 urban search and rescue apparatus 2 water tenders 2 hazmat apparatus Hazmat decontamination trailer 2 brush rigs for vegetation fires Light and air unit
Fresno County Fire Department	Unincorporated Fresno County and cities of Joaquin, Parlier, Mendota, and Huron	Ladder at least 85 feet tall 18 engines Rescue truck Hazmat truck Containment trailer

Table 3.11-3
Fire Departments and Equipment in the Fresno to Bakersfield HST Study Area

Fire Department	Service Area	Equipment
Hanford Fire Department	City of Hanford	4 engines Hazmat apparatus
Lemoore Fire Department	City of Lemoore	1 ladder 1 ladder 4 engines 2 trucks 1 patrol truck
Kings County Fire Department	Unincorporated Kings County and cities of Avenal and Corcoran	Ladder truck at least 85 feet tall 26 engines Water tanker Helipad at Station #4
Tulare County Fire Department	Unincorporated Tulare County	2 ladder trucks at least 85 feet tall 33 engines Rescue truck 6 water tankers
Kern County Fire Department	Unincorporated Kern County and cities of Arvin, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco	3 ladder trucks 51 engines Hazmat truck 3 crash rescue vehicles Air van
Bakersfield Fire Department	City of Bakersfield	3 ladder trucks—100 feet tall 13 engines 4 type II engines for vegetation fires Light/air truck Hazmat truck USAR truck Technical rescue trailer Emergency medical service trailer Decontamination trailer

Sources: City of Fresno Fire Department 2010; Venegas, Kings County Fire Department 2010, personal communication; Hall, Fresno County Fire Protection District 2011, personal communication; Sumaya, Hanford Fire Department 2010, personal communication; Sunderland, Tulare County Fire Department 2010, personal communication; Kern County Fire Department 2010; Bakersfield Fire Department n.d.; Bailey 2012, Lemoore Fire Department, personal communication.

Response times for fire departments vary in the study area. The cities of Fresno, Hanford, and Corcoran have a goal of responding to calls within 5 minutes of receiving an alert 90% of the time or more. The Tulare County Fire Department goal is to respond to urban calls in 9 minutes 90% of the time and suburban calls in 10 minutes 80% of the time. The Kern County Fire Department goal is to respond to calls in Wasco and Shafter within 15 minutes. The City of Bakersfield has a call-response goal of 7 minutes 90% of the time or more. Response goals in the rural areas of Fresno, Kings, Tulare, and Kern counties are approximately 15 minutes. Response times depend on how close the nearest stations are, and whether firefighters are responding to other emergencies (Fresno County 2000b; Kings County n.d.; Tulare County Fire Department 2008; Kern County Board of Supervisors 2009; City of Fresno Fire Department n.d.; Hanford Chamber of Commerce 2009; Bakersfield Fire Department n.d.).

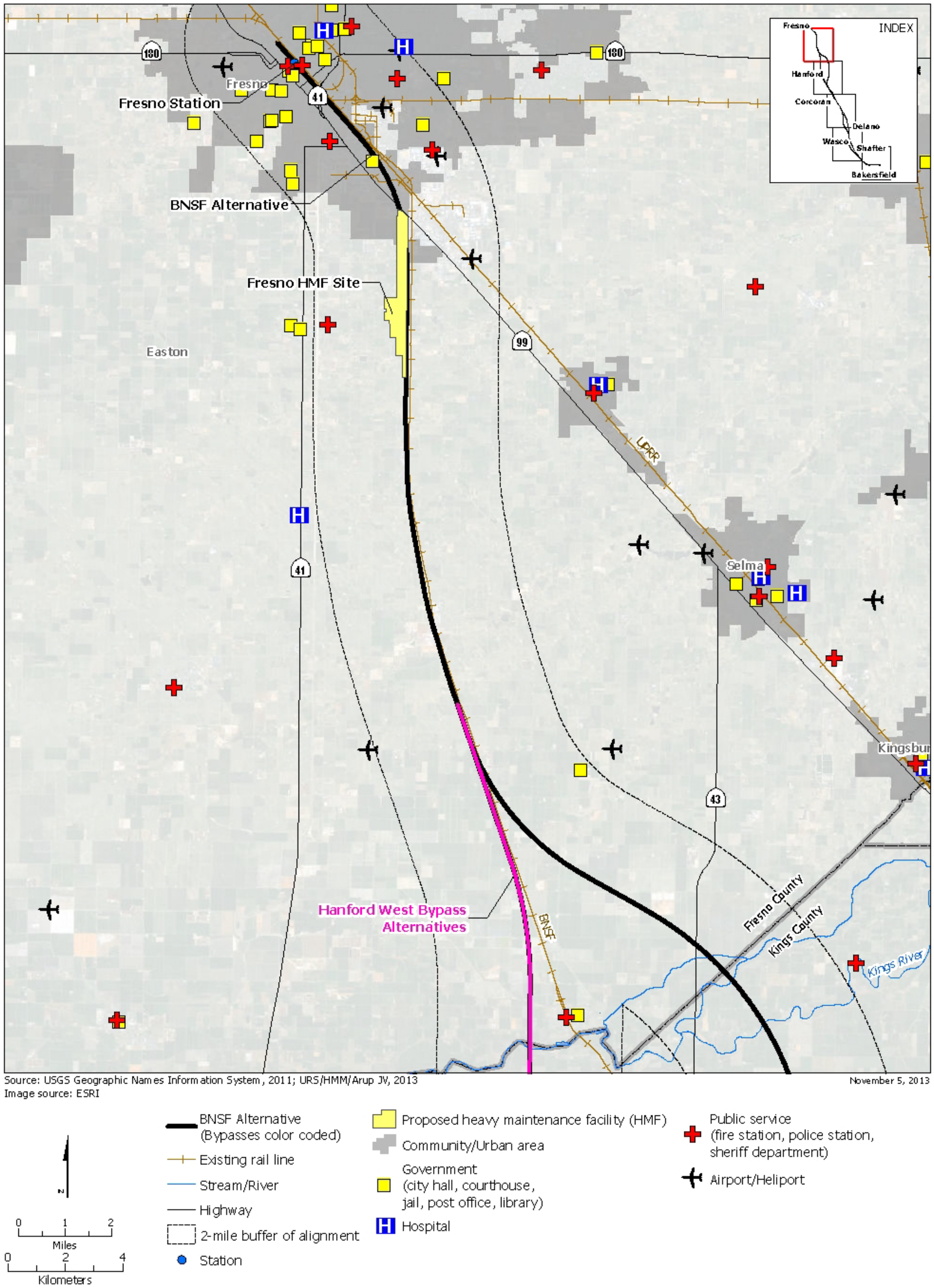

Figure 3.11-3
Fresno area: Safety and security existing conditions

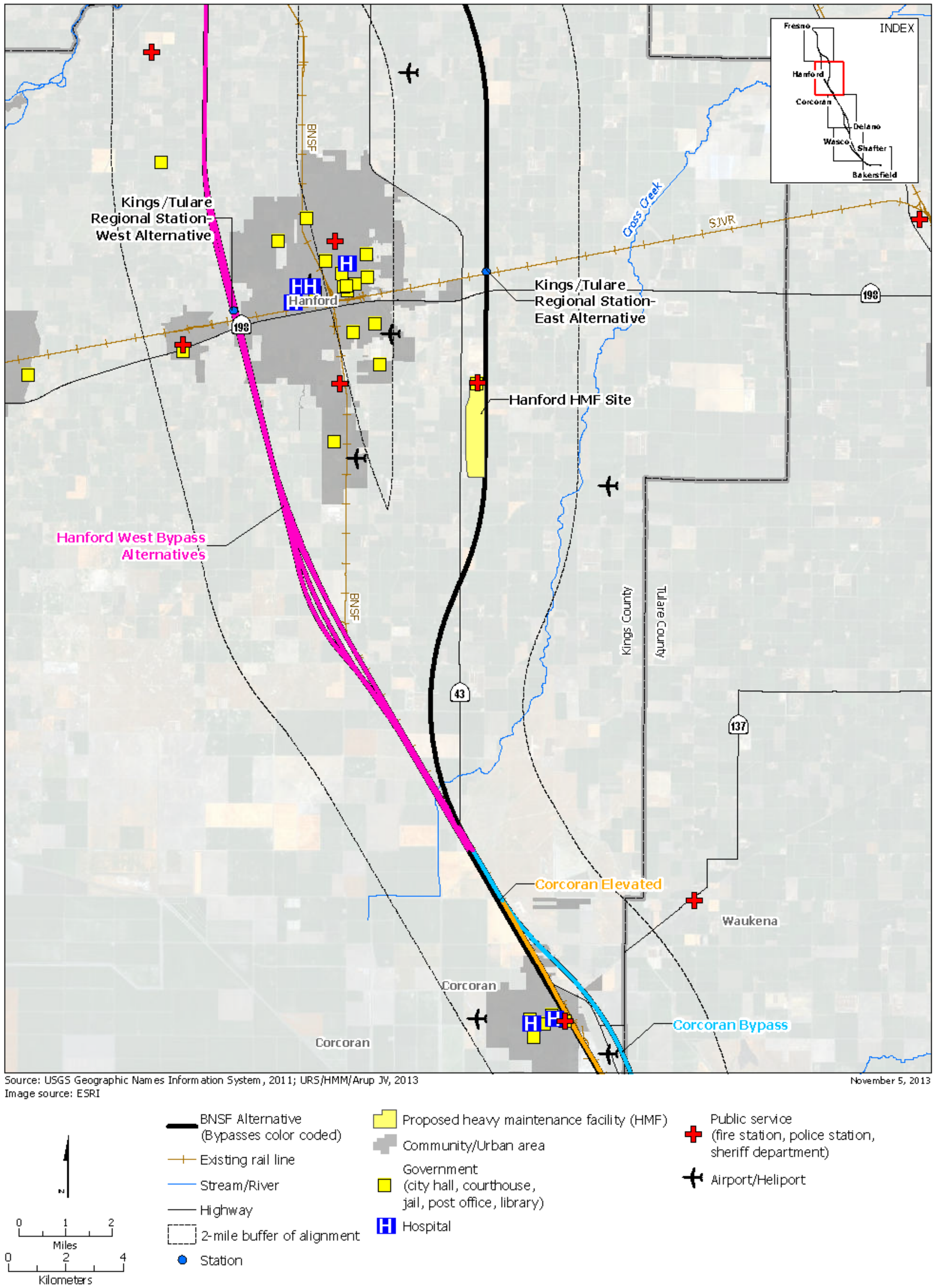

Figure 3.11-4
Hanford area: Safety and security existing conditions

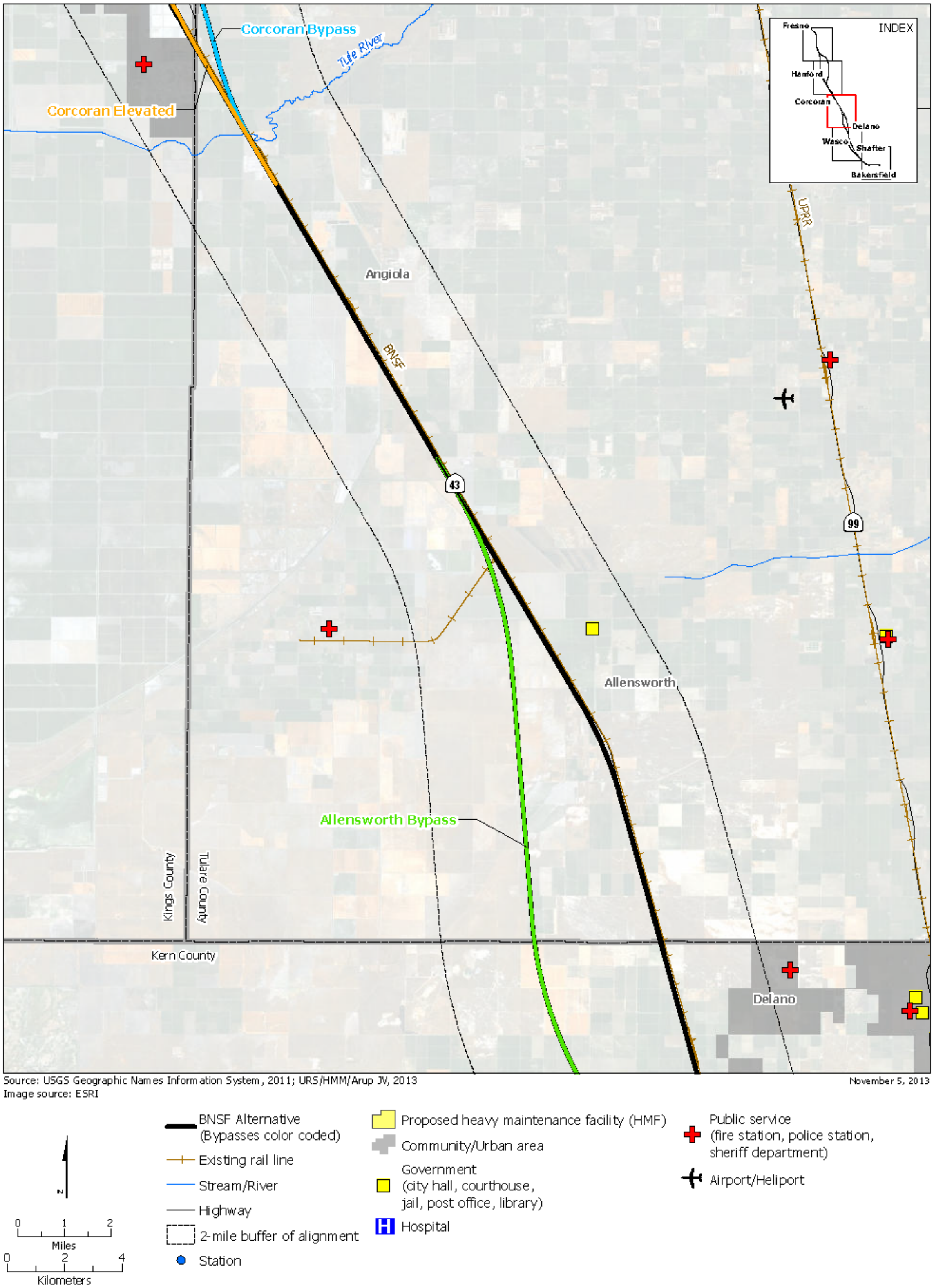

Figure 3.11-5
Corcoran area: Safety and security existing conditions

CALIFORNIA High-Speed Rail Authority
U.S. Department of Transportation Federal Railroad Administration

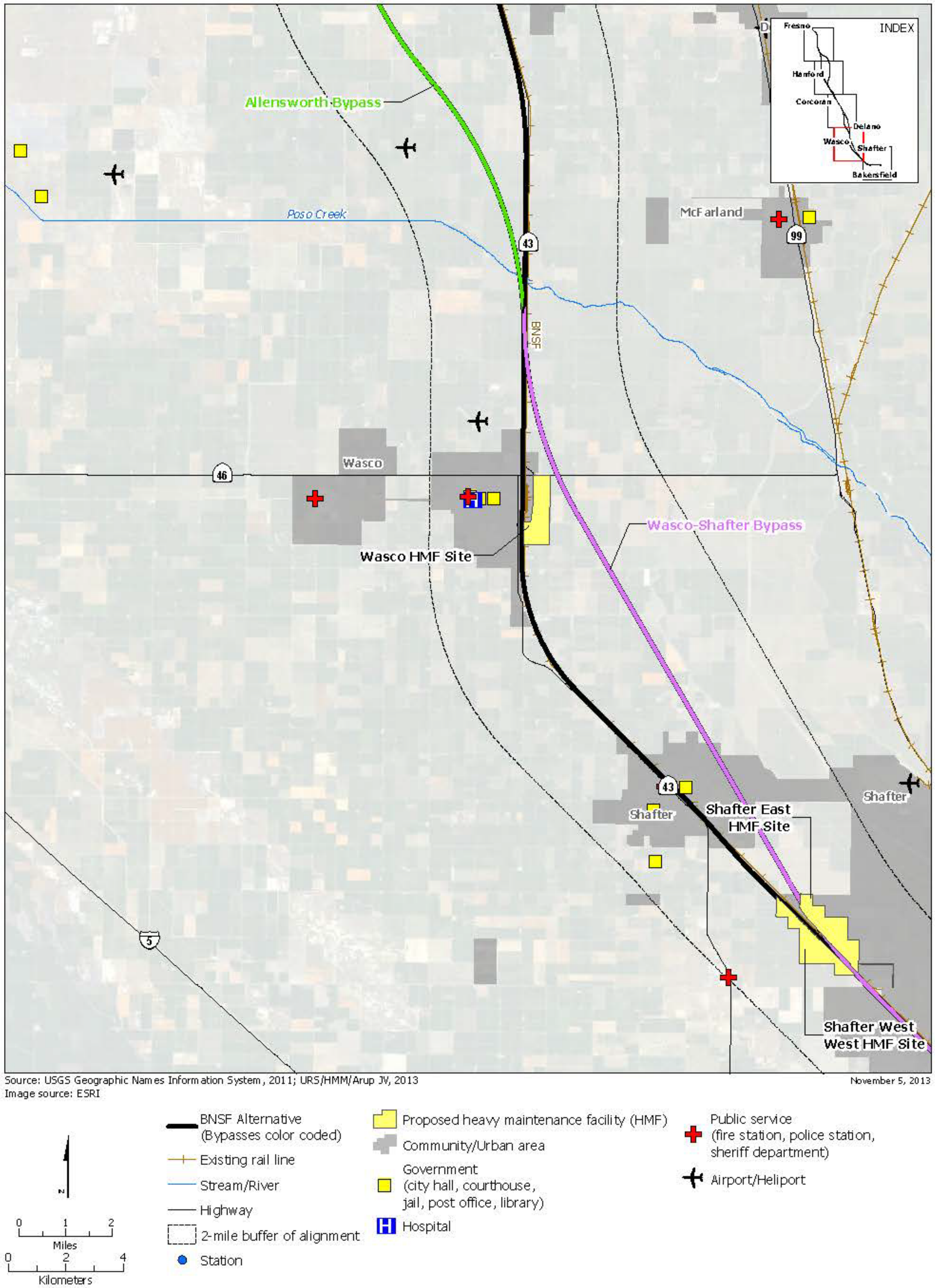

Figure 3.11-6
Wasco-Shafter area: Safety and security existing conditions

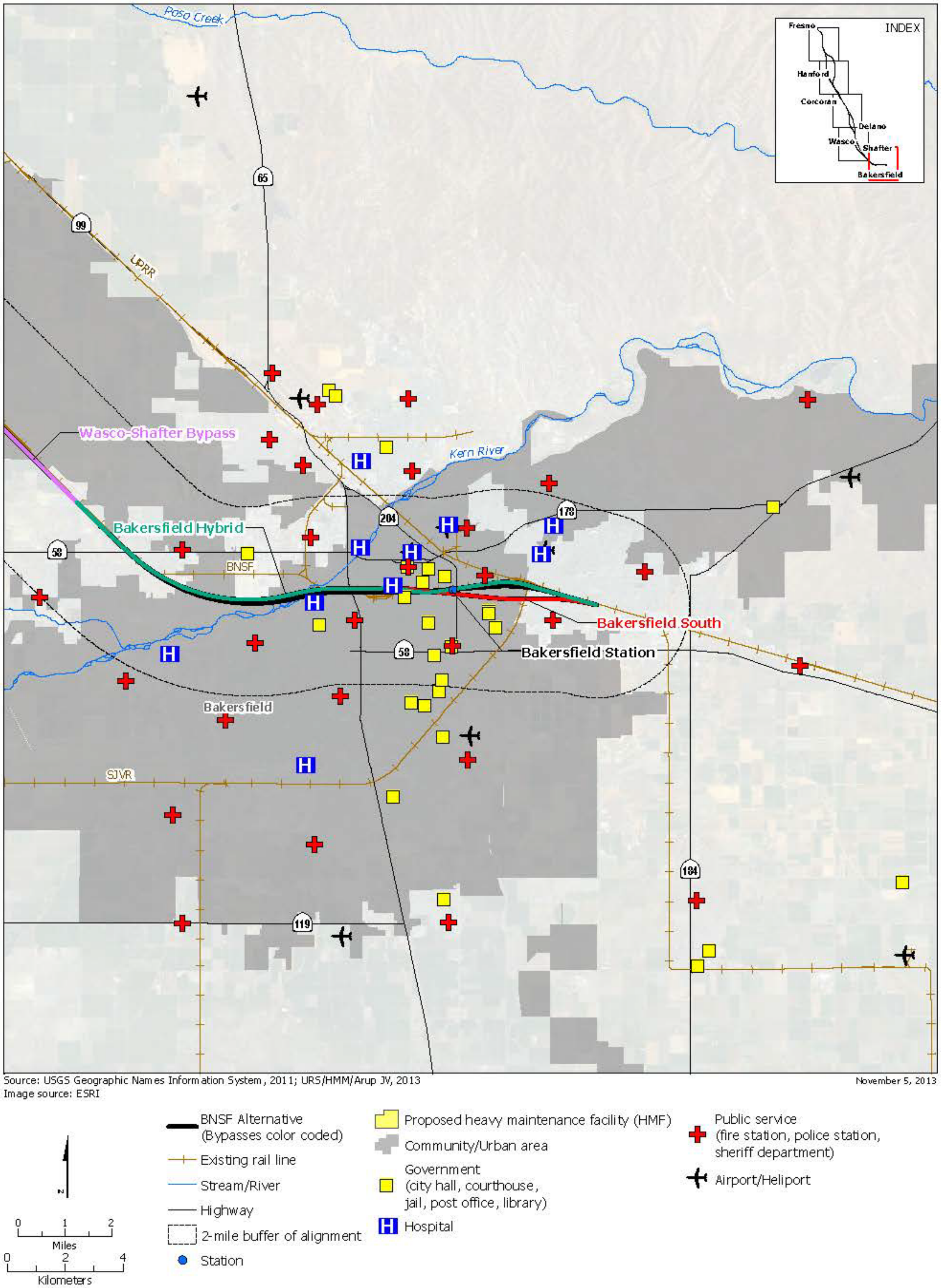

Figure 3.11-7
Bakersfield area: Safety and security existing conditions

At-grade railroad crossings hinder emergency response times when trains block the crossings. In such instances, emergency response teams must use out-of-direction routes in order to bypass the train and reach emergencies on the other side of the tracks. This is particularly problematic in rural areas where crossings are farther apart. The HST would not have at-grade crossings. Additionally, the HST alignment would have emergency access points every 2.5 miles along the right-of-way to facilitate emergency response access to the HST.

The California Department of Forestry and Fire Protection (CAL FIRE) has prepared the Strategic Fire Plan for California, which is the state's road map for reducing the risk of wildfire (CAL FIRE [1996] 2010). Part of this plan identifies and assesses community assets at risk of wildfire damage. CAL FIRE has generated a list of California communities at risk for wildfire and created Fire Hazard Severity Zones (CAL FIRE 2007). The project region is not in any of the Fire Hazard Severity Zones, and the area crossed by the project alternatives is not considered to pose a significant risk for wildland fires.

Law Enforcement

Response times to calls for law enforcement vary in the project area. City of Fresno police officers respond to the most urgent calls in about 6.5 minutes on average (Brogdon 2010, personal communication). City of Bakersfield police officers respond to the most urgent calls in about 9 minutes on average (Stein 2010, personal communication). City of Hanford police officers report that they respond to the most urgent calls in 6 to 8 minutes on average (Kings County 2011).

Crime rates in Fresno, Hanford, and Bakersfield, where the stations would be located, were compared to crime rates in the state. The violent crime rate in Fresno is higher than the state average (14 crimes per 1,000 inhabitants in Fresno versus 5 crimes per 1,000 inhabitants in California as a whole), Hanford had violent crime rates slightly lower than the state average at 4.5 crimes per 1,000, while the violent crime rate in Bakersfield is only slightly higher than the state average (5.7 crimes per 1,000 inhabitants). Property crime in Fresno, Hanford, and Bakersfield (35, 50, and 40 crimes per 1,000 inhabitants, respectively) is higher than the state average (29 crimes per 1,000 inhabitants) (FBI 2008).

Analysis of crime on board passenger trains used statistics gathered from the Los Angeles County Metropolitan Transportation Authority (MTA) and San Francisco Bay Area Rapid Transit (BART). The reported crimes include crimes committed on board trains and at transit facilities such as stations and parking lots. Compared to crime rates in the general population, crime rates on heavy rail systems in California are extremely low. Less than 1 crime occurs for every 1,000 riders on MTA lines. For every 1,000 riders on BART lines, less than 1 violent crime is committed and 2 property crimes are committed (FBI 2008).

Emergency Medical Services

Emergency medical services are provided by the local fire departments, emergency medical service agencies, and independent ambulance services. Eleven hospitals provide emergency medical service to the study area: Community Regional Medication Center and Saint Agnes Hospital in Fresno; Adventist Medical Center and Corcoran District Hospital in Corcoran; and Bakersfield Memorial Hospital, Bakersfield Heart Hospital, Healthsouth Bakersfield Rehabilitation Hospital, Kern Medical Center, Mercy Hospital, Mercy Southwest Hospital, and San Joaquin Community Hospital in Bakersfield. The Fresno Community Regional Medical Center is the only hospital in the study area with a Level I trauma center. Four air ambulance services operate in the study area: out of the Fresno Community Regional Medical Center; the San Joaquin Community Hospital; the Kern Medical Center; and seasonally (June through September), the Kings County Fire Department Station #4 in Hanford.

Emergency Response Plans

In addition to emergency operations requirements set forth in the county and city general plans, all the counties and cities operate under the guidance of emergency operations plans. These plans outline procedures for operations during emergencies such as earthquakes, floods, fires, and other natural disasters; hazardous materials spills; transportation emergencies; civil disturbance; and terrorism. The plans also identify the location of critical emergency response facilities, such as emergency dispatch and operations centers, government structures, and hospitals or other major medical facilities. Figures 3.11-3 through 3.11-7 and Appendix 3.11-A, Safety and Security Data, identify these facilities. Vital facilities that provide water, electricity, and gas are discussed in Section 3.6, Public Utilities and Energy. There are no federal or state buildings or centers in the study area.

Regionally significant roads, illustrated in Section 3.2, Transportation, Figures 3.2-1 through 3.2-4, are typically identified as emergency evacuation routes in the county and city general plans and emergency response plans. Eleven regionally significant roads cross the BNSF Railway (BNSF) tracks at grade along the alternative alignments, resulting in the potential for delays to emergency response and evacuation if trains block these roads. These roads are Ventura Avenue and East American Avenue in the city of Fresno, Flint Avenue in unincorporated Kings County, Whitley Avenue in the city of Corcoran, McCombs Road, Kimberlina, and Kratzmeyer roads in unincorporated Kern County, 6th Street and Poso Drive in the city of Wasco, and Shafter Avenue and Lerdo Highway in the city of Shafter.

Emergency Services for Heavy Maintenance Facility Alternatives

Safety conditions at the proposed Heavy Maintenance Facility (HMF) sites are similar for the project alignment alternatives. Table 3.11-4 provides information on site-specific conditions related to fire, law enforcement, and emergency medical services at the HMF alternative sites.

Table 3.11-4
Fire, Law Enforcement, and Emergency Medical Services Locations
by Heavy Maintenance Facility Site

Heavy Maintenance Facility Site	Closest Fire Station	Closest Police/Sheriff Office	Closest Hospital
Fresno Works–Fresno	1.25 miles, Fresno County Fire Protection District, Battalion 17 Station 89, Easton	1.75 miles, Fresno Police Department, Southeast Policing District, Fresno	7.2 miles, Community Regional Medical Center, Fresno
Kings County–Hanford	0.1 mile, Kings County Fire Department, South Hanford Station, Hanford	3.1 miles, Hanford Police Department, Hanford	3.0 miles, Central Valley General Hospital, Hanford
Kern Council of Governments–Wasco	1.2 miles, Kern County Fire Department, Wasco Station 31, Wasco	0.1 mile, Kern County Sheriff's Department, Wasco Substation, Wasco	6.1 miles, Delano Regional Medical Center, Delano
Kern Council of Governments–Shafter East and Shafter West	0.1 mile, Kern County Fire Department, Wasco Station 32, Shafter	0.1 mile, Shafter Police Department, Shafter	1.4 miles, Mercy Southwest Hospital, Bakersfield

3.11.4.2 Community Safety

Vehicular Safety

As described earlier, the automobile is the most used and hazardous transportation mode. In 2008, the California Highway Patrol reported there were over 3,400 fatalities and approximately 242,000 nonfatal injuries on California's highways (California Highway Patrol 2008a, 2008b). The following factors may influence automobile and highway safety:

- Operator age, experience, ability, and other factors.
- Vehicle reliability, maintenance, and crashworthiness.
- Environmental considerations, including roadway conditions, weather and lighting conditions (e.g., wind, rain, fog, darkness, and sun glare), and driver distractions and interferences.

Vehicular safety issues associated with the three railroads in the study area primarily concern the conflict between motor vehicles and trains at at-grade crossings. In 2009, California ranked second for most highway-rail grade crossing collisions in the nation; and first for highway-rail grade crossing fatalities (Operation Lifesaver, Inc. 2009). There were a total of 25 highway-rail grade crossing collisions in Fresno, Kings, Tulare, and Kern counties in 2009. These collisions resulted in four fatalities (FRA 2010b).

Additional details on existing vehicular traffic conditions, including congestion and accident patterns, within the station areas for the Fresno to Bakersfield HST Section are included in Section 3.2, Transportation, and in the *Fresno to Bakersfield Section Transportation Technical Report* (Authority and FRA 2012).

Rail and Airports

The study area includes the BNSF, Union Pacific Railroad (UPRR), and San Joaquin Valley Railroad (SJVR) railways. Within the study area, Amtrak provides passenger service on its *San Joaquin* trains, which operate on the BNSF Railway tracks from Fresno to Bakersfield with stops in Hanford, Corcoran, and Wasco. The BNSF Railway, UPRR, and SJVR operate only freight trains. Except for a few grade separations in Fresno and Bakersfield, all road crossings of the BNSF Railway, UPRR, and SJVR are at-grade. There are 104 at-grade crossings of the BNSF tracks and 76 at-grade crossings of the UPRR tracks in the project study area. The BNSF tracks are adjacent to State Route (SR) 43 from north of Corcoran to SR 58 near Bakersfield in the study area. The highway and BNSF rights-of-way are not fenced in this region, and there are no barriers between the highway and the railway. In many places, the BNSF tracks are on embankments up to about 8 feet above SR 43. Stormwater drainage ditches also provide a topographic separation between rail operations and vehicular traffic.

The FRA defines a train accident as a safety-related event (including events such as collisions, derailments, fires, and explosions) involving railroad on-track equipment, whether standing or moving, causing monetary damage to the rail equipment and track above a prescribed amount (FRA 2005). Accidents are categorized as derailments, collisions with other trains or vehicles, and other types of accidents that include incidents with pedestrians on the railways. According to FRA accident reports, 168 train accidents, including Amtrak accidents, occurred in Fresno, Kings, Tulare, and Kern counties on the UPRR and BNSF tracks between January 2004 and September 2009, including 9 accidents that resulted in 10 total fatalities, and 14 that resulted in 63 injuries. These accidents comprise all train accidents in the four counties, including train accidents outside of the study area. Most train accidents (approximately 63%) were associated with derailments, and approximately 17% of the accidents were highway/rail impacts (FRA 2010b). Faulty tracks, human error, and highway-railroad crossings were the primary cause of these accidents.

The FRA defines a highway-rail grade crossing accident/incident as any impact between railroad on-track equipment and a highway user (including motorists, bicycles, pedestrians, or any other mode of surface transportation), regardless of whether the impact results in a certain amount of property damage or a reportable injury. The following highway/rail grade crossing accidents/incidents occurred in the study area between January 2004 and October 2009 (FRA 2010b):

- Along the BNSF tracks, 26 highway-rail grade crossing accidents/incidents occurred between January 2004 and October 2009 that involved BNSF trains. Three of these impacts involved pedestrians in Fresno, one of which was a fatality. There were 15 vehicle collisions on at-grade highway crossings of the BNSF tracks in the study area that resulted in 17 injuries and 6 fatalities.
- Along the UPRR tracks, 22 highway-rail grade crossing accidents/incidents occurred between January 2004 and October 2009. Five impacts were pedestrian accidents in Fresno and Kings County at 11th Avenue. There were six vehicle collisions on at-grade highway crossings of the UPRR tracks in the study area that resulted in seven injuries and one fatality.
- Along the SJVR tracks, 13 highway-rail grade crossing accidents/incidents occurred between January 2004 and October 2009. These included five vehicle impacts on at-grade rail-highway crossings of the SJVR in the study area that resulted in six injuries.
- Amtrak trains, which use the BNSF tracks in the study area, were involved in 25 highway-rail grade crossing accidents/incidents between January 2004 and October 2009. Two impacts involved pedestrians at Divisadero Avenue in Fresno and Armona Road in Kings County, one of which resulted in a fatality. There were 15 vehicle collisions on at-grade highway crossings of Amtrak in the study area that resulted in 55 injuries and 7 fatalities. A single highway-rail grade crossing accident/incident at a crossing on Kansas Avenue in Kings County in 2008 accounted for 32 of these injuries, and another impact at a crossing on Los Angeles Avenue in 2007 accounted for 10 injuries.

The time frame for these train accidents and highway-rail grade crossing accidents/incidents is approximately 6 years. Appendix 3.11-A, Safety and Security Data, provides detailed information the data related to these train accidents and highway-rail grade crossing accidents/incidents.

There are four public-service airports, four private airports, and eight heliports within 2 miles of project alternatives (Table 3.11-5; Figures 3.11-3 through 3.11-7). None of the airports contains an international terminal. Airport master plans and land use compatibility plans from county airport land use commissions regulate land use within airport safety zones to minimize airport hazards and risk of accidents. None of the project alternatives encroach on areas covered by airport land use compatibility plans (Fresno County Airport Land Use Commission 2010; Kings County Airport Land Use Commission 1994; Kern County Planning Department 2008).

Table 3.11-5
Airports, Airstrips, and Heliports within 2 Miles of Alternative Alignment Centerlines

Facility	Distance from Centerline (miles)	County	Alternative Alignment
Fresno-Chandler Downtown Airport	1.29	Fresno	BNSF Alternative
Valley Medical Center Heliport	1.86	Fresno	BNSF Alternative
PG&E-Fresno Service Center Heliport	0.79	Fresno	BNSF Alternative
Turner Field (private airport)	1.40	Fresno	BNSF Alternative
Swanson Ranch Number 1 Airport (private airport)	1.58	Kings	BNSF Alternative
Hanford Municipal Airport	1.81	Kings	BNSF Alternative
Kings County Fire Department South Hanford Station #4 Heliport	0.16	Kings	BNSF Alternative
Hanford Community Medical Center Heliport	1.65	Kings	BNSF Alternative
Blair Strip Airport (private airport)	1.76	Kings	Hanford West Bypass Alternatives
Corcoran Airport	1.68 2.63	Kings	BNSF Alternative Corcoran Bypass Alternative
Salyer Farms Airport (private airport)	0.56 0.18	Kings	BNSF Alternative Corcoran Bypass Alternative
Burroughs Heliport	1.31	Kern	Allensworth Bypass Alternative
Wasco Airport	0.98 1.33	Kern	BNSF Alternative Wasco-Shafter Bypass Alternative
San Joaquin Community Hospital Heliport	0.80	Kern	BNSF Alternative, Bakersfield South Alternative, Bakersfield Hybrid Alternative
Kern Medical Center Heliport	0.83	Kern	BNSF Alternative, Bakersfield South Alternative, Bakersfield Hybrid Alternative
Memorial Hospital Heliport	1.33	Kern	BNSF Alternative, Bakersfield South Alternative, Bakersfield Hybrid Alternative

Note:
Distance is given in approximate miles from the centerline of each alternative.
Source: USGS 2009.

Pedestrian and Bicycle Safety

According to the FRA, in 2009, California ranked first in the nation in pedestrian rail-trespass fatalities, with 61 fatalities statewide. These fatalities occurred primarily from suicidal pedestrian rail trespass, followed by accidental pedestrian trespass. Between January 2004 and October 2009, 10 at-grade crossing accidents occurred within the study area. Two resulted in pedestrian fatalities in Fresno and Kings County, and seven resulted in seven pedestrian injuries in downtown Fresno, rural Kings County, and rural Kern County (FRA 2010b). Appendix 3.11-A, Safety and Security Data, provides information on the at-grade crossing accidents.

With regard to cyclist safety, most pedestrian and bicycle facilities are located in urban areas. Section 3.2, Transportation, describes existing pedestrian and bicycle traffic conditions, as well as accident data. Pedestrian and cyclist safety issues associated with the BNSF, UPRR, and SJVR tracks in the study region primarily result from the conflict between pedestrians and cyclists and trains on at-grade crossings. Some 70 at-grade crossings occur in the study area. In the cities of Fresno, Corcoran, Wasco, Shafter, and Bakersfield, intersections near the at-grade crossing are generally signalized or stop-controlled. Many of these intersections have marked crosswalks for safe pedestrian movement. Generally, sidewalks are available on both sides or on one side of the street, and meet the standards for the Americans with Disabilities Act (ADA). At-grade crossings of roads and highways outside these urban areas are often not stop-controlled and do not have marked crosswalks for safe pedestrian or bicycle movement. There are no Class I (paved bikeways physically separated from the roadway) or Class II (lanes for cyclists adjacent to the outside travel lane of the roadway, with special lane markings, pavement legends, and signs) bikeway facilities near the at-grade crossings. Class III (signed for bike use but with no separate or exclusive right-of-way or lane striping on the roadway) bikeway facilities are on or are proposed for several streets with at-grade crossings in Fresno, Wasco, Shafter, and Bakersfield. Tulare County is planning to establish a bike path along Sierra Avenue that would cross the BNSF tracks in the Allensworth area.

Schools

Table 3.11-6 lists the schools within 0.25 mile of the alternatives for the Fresno to Bakersfield Section. Several schools in Bakersfield are close to the alternative alignment construction footprints. The BNSF Alternative would cross a portion of the Bakersfield High School campus and require acquisition of the Industrial Arts building on the campus. The Bakersfield South and Bakersfield Hybrid alternatives are approximately 400 and 300 feet north of Bakersfield High School, respectively, and these alternatives are separated from the high school by the BNSF rail yard. The BNSF Alternative would cross over the northwest corner of the parking lot for Bessie E. Owens Intermediate School in East Bakersfield. The Bakersfield South and Bakersfield Hybrid alternatives would be approximately 200 feet south and north of the school, respectively. The Bakersfield South Alternative would require acquisition of the Bethel Christian School in East Bakersfield. The Bakersfield North and Bakersfield Hybrid alternatives are approximately 300 and 200 feet north of this school, respectively. The Bakersfield South and Bakersfield Hybrid alternatives would all be within 100 to 200 feet from the Warriors for Christ Academy. The edge of the HST right-of-way is at least 300 feet from the edge of all other school properties for all the alignment alternatives.

Table 3.11-6
Educational Facilities within 0.25 Mile of Alternative Construction Footprints[1]

Facility	Distance from Footprint (miles)	Direction from Alternative Footprint	County	Status
Fresno Academy of Civic and Entrepreneurial Leadership	0.09	East of BNSF Alternative	Fresno	Active
Lincoln Elementary	0.24	West of BNSF Alternative	Fresno	Active
Pacific Union Elementary School	0.12	West of BNSF Alternative	Fresno	Active
Monroe Elementary School	0.10	East of BNSF Alternative	Fresno	Active
Frontier Elementary School	0.20	East of Hanford West Bypass Alternatives	Kings	Active

Table 3.11-6
Educational Facilities within 0.25 Mile of Alternative Construction Footprints[1]

Facility	Distance from Footprint (miles)	Direction from Alternative Footprint	County	Status
Sierra Pacific High School	0.12 0.21	East of Hanford West Bypass 1 and 2 Alternatives East of Hanford West Bypass 1 and 2 Modified Alternatives	Kings	Active
College of the Sequoias – Hanford Center	0.04 0.12	East of Hanford West Bypass Alternatives East of Hanford West Bypass Modified Alternatives	Kings	Active
Parkview Middle School	0.24	East of Hanford West Bypass Alternatives	Kings	Active
John C. Fremont Elementary	0.18	West of BNSF Alternative	Kings	Active
John Muir Middle School	0.16 0.19	West of BNSF Alternative West of Corcoran Elevated Alternative	Kings	Active
Bethany Christian	0.19	West of BNSF Alternative	Kern	Active
Free Will Christian Academy	0.09	West of BNSF Alternative	Kern	Active
Redwood Elementary	0.13	Southwest of BNSF Alternative	Kern	Active
Richland Junior High School	0.13	Southwest of BNSF Alternative	Kern	Active
Warriors for Christ Academy	0.03 0.02	North of BNSF, Bakersfield Hybrid, and Bakersfield South alternatives	Kern	Active
Country Christian School, Inc.	0.25 0.25	North of Bakersfield Hybrid Alternative North of Bakersfield South Alternative	Kern	Active
Fruitvale Junior High School	0.17 0.17 0.17	North of BNSF Alternative North of Bakersfield Hybrid Alternative North of Bakersfield South Alternative	Kern	Active
Columbia Elementary School	0.21	South of BNSF, Bakersfield Hybrid, and Bakersfield South alternatives	Kern	Active
Franklin Elementary School	0.15 0.09 0.09	North of BNSF Alternative North of Bakersfield South Alternative North of Bakersfield Hybrid Alternative	Kern	Active
William Penn Elementary	0.21	South of BNSF Alternative	Kern	Active

Table 3.11-6
Educational Facilities within 0.25 Mile of Alternative Construction Footprints[1]

Facility	Distance from Footprint (miles)	Direction from Alternative Footprint	County	Status
Bakersfield High School / Bakersfield Adult School	0.0 0.05 0.08	South of BNSF Alternative South of Bakersfield Hybrid Alternative South of Bakersfield South Alternative	Kern	Active
Blanton Education Center	0.06 0.14 0.03	North of BNSF Alternative North of Bakersfield South Alternative North of Bakersfield Hybrid Alternative	Kern	Active
Our Lady of Guadalupe School	0.06 0.21 0.23	South of Bakersfield South Alternative South of BNSF Alternative South of BNSF Hybrid Alternative	Kern	Active
Bessie E. Owens Intermediate	0.04 0.03 0.0	North of Bakersfield South Alternative South of Bakersfield Hybrid Alternative South of BNSF Alternative	Kern	Active
Bessie E. Owens Primary	0.19	South of Bakersfield South Alternative	Kern	Active
Williams Elementary	0.03	North of Bakersfield Hybrid Alternative	Kern	Active
Mt. Vernon Elementary	0.23	South of Bakersfield South Alternative	Kern	Active
Bethel Christian School	On 0.04 0.06	Bakersfield South Alternative South of Bakersfield Hybrid Alternative South of BNSF Alternative	Kern	Active
Ramon Garza Elementary School	0.11 0.12 0.12	North of BNSF Alternative North of Bakersfield South Alternative North of Bakersfield Hybrid Alternative	Kern	Active
Sierra Middle School	0.15	North of BNSF, Bakersfield South, and Bakersfield Hybrid alternatives	Kern	Active

[1] This includes all construction footprints associated with the project.

High-Risk Facilities and Fall Hazards

High-risk facilities (such as refineries and chemical plants) and fall hazards (such as industrial facilities with tall structures like silos and distillation columns) could pose threats to operation of the proposed project in the event of a disaster at those facilities. High-risk facilities in and near the construction footprint are discussed in Section 3.6, Public Utilities and Energy, and Section 3.10, Hazardous Materials and Waste. The following high-risk facilities pose explosion threats along the BNSF Alternative Alignment:

- The Kinder-Morgan high-pressure petroleum pipeline in the UPRR corridor.
- Modern Custom Fabrication (2421 California Avenue, Fresno, CA): Bulk propane and fuel tanks.
- Western Manufacturing (corner of Railroad Avenue and South E Street, Fresno, CA): Bulk propane storage.
- Jack Frost Ice (2003 S. Cherry, Fresno, CA): Bulk chemical tanks.
- CAHFS (2797 S. Orange Avenue, Fresno, CA): Propane recycling with burn apparatus.
- KBK Oils, Inc. (corner of Golden State and Cedar Avenue, Fresno, CA): Bulk propane and fuel tanks.
- Pacific Pride Commercial Fueling (Gateway Avenue, Fresno County): Bulk fuel tanks.
- Kinder Morgan Energy (4073 S. Maple Avenue, Fresno County): Petroleum storage tanks.
- Silvan Oil (4073 S. Maple Avenue, Fresno County): Bulk fuel tanks.
- Chevron (4021 S. Maple Avenue, Fresno County): Bulk fuel tanks.
- Valley Pacific Petroleum (4073 S. Maple Avenue and 4149 S. Maple Avenue, Fresno County): Bulk fuel distribution.
- Kinder Morgan Energy (across from 2109 Malaga Avenue, Fresno County): Bulk fuel storage.
- Fowler Packing (near Manning Avenue and Chance Avenue, Fresno County): High-pressure gas pipeline.
- Unnamed propane storage facility (near Bowles Avenue and Chance Avenue, Fresno County).
- VIE-Del Company (11903 S. Chestnut Avenue, Fresno County): Food processing plant, with bulk chemical storage.
- Baker Commodities (7480 Hanford-Armona Road, Hanford, CA): Bulk chemical storage.
- Union 76/Pacific Pride (near corner of SR 135 and Ottis Avenue, Hanford, CA): Bulk fuel storage.
- J.G. Boswell vegetable oil refinery solvent storage facilities (Corcoran).
- Exxon (Corner of SR 46 and SR 43, “F” Street, Wasco, CA): Bulk fuel storage/distribution.
- Unnamed fuel distribution facility (next to 1524 “G” Street, Wasco): Bulk fuel storage/distribution.
- Unnamed facility (1868 “G” Street, Wasco, CA): Bulk chlorine storage tank.
- Helena Chemical Company (751 E. Ash Avenue, Shafter, CA): Bulk chemical storage tanks.
- Wilbur-Ellis (925 Gold Avenue, Shafter, CA): Bulk chemical storage tank.
- QDC/Industrial/Chemicals (32535 7th Standard Road, Kern County. Southeastern corner of Nord Avenue and 7th Standard Road): Bulk chemical storage tanks.
- Verdugo Ozone Treatment Facility (corner of Verdugo Avenue and Glenn Avenue, Bakersfield, CA): Ozone tank.
- Flying J Refinery (off of Rosedale Highway [SR 58] and Mohawk Street, Bakersfield, CA): Refinery process equipment and petroleum storage.
- Industrial Chemical Storage (west of Road 204 and North of Hayden Street, Bakersfield, CA): Bulk chemical storage.
- GEO Drilling Fluids (1431 Union Avenue, Bakersfield, CA): Bulk chemical storage.

The Bakersfield South and the Bakersfield Hybrid alternative alignments have the same explosive threats as the BNSF Alternative in Bakersfield. Those threats are Verdugo Ozone Treatment Facility, Flying J Refinery, Industrial Chemical Storage, and GEO Drilling Fluids. The BNSF and Corcoran Elevated alternatives would be located near the solvent storage facilities of J.G.

Boswell's vegetable oil refinery in Corcoran. There are no explosive threats along the Hanford West Bypass 1 and 2, Hanford West Bypass 1 and 2 Modified, Corcoran Bypass, Allensworth Bypass, and Wasco-Shafter Bypass alternative alignments.

The following high-risk facilities that pose explosion threats are in the vicinity of the Fresno Works–Fresno HMF site:

- Kinder Morgan Energy (4073 S. Maple Avenue, Fresno County): Petroleum storage tanks.
- Silvan Oil (4073 S. Maple Avenue, Fresno County): Bulk fuel tanks.
- Chevron (4021 S. Maple Avenue, Fresno County): Bulk fuel tanks.
- Valley Pacific Petroleum (4073 S. Maple Avenue and 4149 S. Maple Avenue, Fresno County): Bulk fuel distribution.
- Kinder Morgan Energy (Across from 2109 Malaga Avenue, Fresno County): Bulk fuel refinery storage.

No explosion threats are present in the vicinity of the other alternative HMF sites.

The fire and rescue agencies follow their own standard emergency response protocols for industrial sites when responding to emergencies at high-risk facilities (Hall 2010, personal communication; Maletta 2010, personal communication).

The stature of industrial facilities may pose a safety hazard because of the proximity of large industrial process machinery and/or tank storage, including silos, distillation columns, and multistory buildings that are several hundred feet in height. Tall structures pose a safety hazard because of their potential to topple onto HST facilities due to accidents, severe weather, or terrorist acts. Such tall structures along the BNSF Alternative Alignment include the following:

- Jensen & Pilegard (1068 G Street, Fresno, CA): Feed, seed, farm and garden supply; tall grain elevators.
- Warehouse (Corner G Street and Kern Street, Fresno, CA).
- Jack Frost Ice (2003 S. Cherry Street, Fresno County): Multistory building.
- Cell tower (Near California and Cherry Street, Fresno County).
- KBK Oils Inc. (Near Golden State and Cedar Avenue, Fresno County): Silo/elevator.
- SS Seeds (Near Golden State and Cedar Avenue, Fresno County): Water tank, elevators.
- Fambro (3600 South Cedar Avenue, Fresno County): Water tank.
- Calaveras Heidelberg Cement Group (2095 S. Central Avenue, Fresno County): Elevator.
- VIE-Del Company (11903 S. Chestnut Avenue, Fresno County): Food processing plant, with silo/elevator.
- Cextis (Near SR 43, F Street, and 5th Street, Wasco, CA): Chemical storage tank.
- Cell tower (Northeastern side of 7th Standard Road and Nord Avenue, Kern County).
- Water tower (Near D Street and 16th Street, Bakersfield, CA).

The Bakersfield South and Bakersfield Hybrid alternative alignments have the same safety hazards from tall structures as the BNSF Alternative in the Bakersfield metropolitan area. No tall structures are present in the vicinity of the Corcoran Bypass, Allensworth Bypass, and Wasco-Shafter Bypass alternative alignments.

3.11.5 Environmental Consequences

This section describes the environmental consequences and impacts related to safety and security associated with construction and operation of the HST project. Proposed mitigation measures to address these adverse/significant impacts are discussed in Section 3.11.7, Mitigation Measures.

3.11.5.1 Overview

Operating on a fully grade-separated, dedicated track alignment using contemporary safety, signaling, and automatic train control systems that would include all positive train control functions and be compliant with the requirements of 49 CFR Part 236 Subpart I, the HST System would provide a safe and reliable means of intercity travel. Design of the system also would prevent conflicts with other vehicles, pedestrians, and bicyclists and allow the trains to operate year-round under different weather conditions. Overall, the HST would provide a safety benefit.

Project features, plans, and protocols developed as part of the HST project would avoid or minimize most adverse safety and security effects. Except for the proximity of the BNSF Alternative to Bakersfield High School, safety and security effects among the HST alignment alternatives would be similar and negligible.

The HST project would potentially increase emergency services demands at stations and the HMF. The impacts of increased demand for fire, rescue, and emergency services at these facilities could have substantial intensity under NEPA and could have a significant impact under CEQA. Emergency responses to incidents at stations and the HMF would be monitored. If it were determined that the HST project increased demand for these services, a fair-share impact fee to local service providers would be negotiated, which would reduce the effects to negligible intensity under NEPA and to a less-than-significant impact under CEQA.

3.11.5.2 No Project Alternative

The No Project Alternative is based on existing conditions, and the funded and programmed transportation improvements and land use projects that are expected to be developed and in operation by 2035 (see Section 3.2, Transportation, and Section 3.19, Cumulative Impacts). It is anticipated that under the No Project Alternative, safety and security in the study area would follow current trends. Increased vehicular traffic volumes over the next 25 years would be expected to result in increased traffic accidents and resultant injuries and fatalities. However, planned roadway capacity expansions would improve operations. These programmed roadway projects would incorporate design features that would reduce the potential for automobile and truck accidents. For these reasons, it is expected that existing accident trends in the study area would continue into the future. Counties and cities have the financial mechanisms in place to meet service level goals for emergency responders with the population growth planned for the study area. For these reasons, no adverse or significant impacts on accident prevention or emergency response are anticipated. Crime rates depend, in part, on economic conditions; therefore, predictions are speculative.

Safety

Existing safety conditions related to motor vehicles, pedestrians, and bicyclists would not change under the No Project Alternative. Emergency responders would continue to experience delays throughout the study area at numerous at-grade crossings of the UPRR, BNSF, and SJVR when trains block crossings. The demand for law enforcement, fire, and emergency services would change commensurate with anticipated population growth and implementation of the development projects, which include residential subdivisions, quarries, and shopping centers (see Section 3.19, Cumulative Impacts).

Security

Under the No Project Alternative, existing emergency response plans and procedures would not be affected. Emergency responders and evacuees would continue to experience delays at numerous at-grade crossings of the BNSF, UPRR, and SJVR when trains block crossings.

Conditions related to airports, critical facilities, and high-risk facilities in the study area would not change as a result of planned future projects.

3.11.5.3 High-Speed Train Alternatives

Construction Period Impacts

Construction of an HST alternative could result in accidents at construction sites and in temporary increases in risks to motor vehicle, pedestrian, and bicycle safety from traffic detours, as well as increased response times by law enforcement, fire, and emergency services personnel.

Common Safety Impacts

Impact S&S #1 – Accidents at Construction Sites

Safety of construction workers and the public could be compromised during construction, potentially resulting in accidental injuries and deaths. Work site safety in California, including construction work site safety, is regulated by provisions of Title 8 of the California Code of Regulations and overseen by the California Occupational Safety and Health Administration or Cal-OSHA. Title 8 requires compliance with standard procedures to prevent construction work site accidents, and requires a written workplace Injury and Illness Prevention Program to be in place (CCR Tit. 8, Section 1502 et seq.; Cal-OSHA (2013a) Pocket Guide for the Construction Industry; Cal-OSHA (2013b), Users' Guide to Cal-OSHA). Standard implementation of a construction safety and health plan during construction in compliance with legal requirements would reduce risks to human health during construction by establishing protocols for safe construction operations including daily safety awareness meetings and training to establish a safety culture among the construction workforce. Therefore, the frequency of construction site accidents is expected to be low with a negligible intensity under NEPA, and impacts would be less than significant under CEQA for all alignment and HMF alternatives.

As discussed in Section 3.9 (Geology, Soils, and Seismicity), the alternatives for the Fresno to Bakersfield Section pass close to numerous active and abandoned oil and gas fields. The BNSF Alternative crosses the Fruitvale Oil Field approximately 1.5 miles west of Bakersfield, the Rosedale Oil Field approximately 6 miles west of Bakersfield, the Seventh Standard Oil Field between Bakersfield and Shafter, and the Rose Oil Field near Wasco. The Wasco-Shafter Bypass Alternative passes roughly through the center of the North Shafter Oil Field. As described in Section 3.9, Geology, Soils, and Seismicity, the number of oil and gas wells within 200 feet of the centerline or within the construction footprints of project alternatives are as follows:

- BNSF (Fresno to Bakersfield) 15 wells
- Wasco-Shafter Bypass 18 wells
- Bakersfield South 14 wells
- Bakersfield Hybrid 14 wells

California Code of Regulations (CCR) Title 14, Chapter 4, Article 2, Section 1720, states that any oil or gas well within 100 feet of a regularly used operating railway is deemed a critical well. Critical wells require more stringent safety measures than non-critical wells; these measures are listed in 14 CCR 1724.3.

Active, plugged, and abandoned or unrecorded oil or gas wells and ancillary equipment and piping may be encountered during construction. The Authority has obtained well information from the Division of Oil, Gas, and Geothermal Resources (DOGGR) for the EIR/EIS and will continue to utilize the division's resources to identify the location of active and plugged and abandoned wells consistent with industry best practices before construction (DOGGR 2007). If a plugged and abandoned or unrecorded well is encountered during construction, the Authority will conduct remedial plugging operations and equipment removal or in-place abandonment in accordance with the standards stated in 14 CCR 1723 and in consultation with the owner and DOGGR. Therefore, the risk of accidents associated with project construction encountering a plugged and abandoned or unrecorded oil or gas well would have negligible intensity under NEPA, and the impact would be less than significant under CEQA.

As discussed in Section 3.10, Hazardous Materials and Waste, landfills within 0.25 mile of the study area were analyzed for their potential to release methane gas, which may present an explosion risk. There are three active and three inactive landfills within 0.25 mile of the BNSF Alternative, three in the Fresno area, two in the Hanford area, and one in Corcoran. The Hanford Municipal Solid Waste Disposal Site is 0.02 mile west of the BNSF Alternative, and the Corcoran Sanitary Landfill is 0.01 mile east of the BNSF Alternative. An analysis of the potential for hazardous materials risks concluded that the likelihood of methane landfill gas impacting an area beyond the landfill property is low because these landfills have gas mitigation control systems and monitoring programs. Therefore, the risk of project construction activities igniting methane releases from adjacent landfills would have negligible intensity under NEPA, and the impact would be less than significant under CEQA.

Impact S&S #2 – Accidents Associated with Construction-Related Detours

As discussed in Chapter 2, Alternatives, and as shown in Appendix 2-A, a few roads would be closed where they cross the HST alignment, but most public roads crossing the HST alignment would be grade-separated, typically with a road overcrossing. The road crossings would be built at the same locations as the existing roads, which would have to be closed, and traffic would have to be detoured onto other roads during construction of the road crossings. These closures would typically last 8 to 10 months and, in a worst-case scenario, the road could be closed for 18 months. At these sites, lane closures and detours could potentially create a distraction to automobile drivers, pedestrians, and cyclists. Distraction and unfamiliarity with detours could lead to accidents. In addition, the road closures, detours, and localized automobile congestion could increase the response time for law enforcement, fire, and emergency services personnel and school buses. Emergency evacuation times could also increase.

The project design features would include development of a detailed construction transportation plan that would require coordination with local jurisdictions on emergency vehicle access. The plan would also include a traffic control plan that establishes procedures for temporary road closures including: access to residences and businesses during construction, lane closure, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, pedestrian access, and alternative access locations. Construction of road crossings would be staggered so that the next adjacent road to the north and south of a road temporarily closed for construction would remain to accommodate detoured traffic. This would typically result in 1 to 2 miles of out of direction travel during temporarily road closures. Because the project would implement a construction transportation plan and associated traffic control plan, resulting effects would have negligible intensity under NEPA, and the impact would be less than significant under CEQA for all alignment and HMF alternatives.

Alternative Alignments

Table 3.11-7 summarizes the numbers of roads that would be temporarily closed during construction of each alternative. The risk of accidents associated with construction-related detours would be highest in the city of Fresno because of the relatively high traffic volumes and the large number of detours that would take place in the city. The potential for detour-related accidents would be the least with the Corcoran Bypass, Allensworth Bypass, and Wasco-Shafter Bypass alternatives because there will be fewer detours along these alternatives alignments and traffic volumes are relatively small in the rural areas crossed by these alternatives.

Table 3.11-7
Number of Temporary Road Closures for Fresno to Bakersfield Alternatives

Alternative	Closures
BNSF	140
Hanford West Bypass 1 and 2	24
Hanford West Bypass 1 Modified	30
Hanford West Bypass 2 Modified	31
Corcoran Elevated	9
Corcoran Bypass	5
Allensworth Bypass	6
Wasco-Shafter Bypass	11
Bakersfield South	45
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Heavy Maintenance Facility Alternatives

Construction of a HMF at any alternative site would not result in road closures, and therefore would not pose safety risks to motor vehicles, pedestrians, or bicyclists. There would be no effects under NEPA and no impacts under CEQA.

Common Security Impacts

Impact S&S #3 – Crime at Construction Sites

Criminal activity around HST construction sites would be typical of the types of crimes that occur at other heavy construction sites, such as theft of equipment and materials, or vandalism after work hours. Construction contractors would institute security measures common to construction sites, including securing equipment and materials in fenced and locked storage areas and the use of security personnel after work hours. Security lighting would be required to be focused on the site, minimizing light spillage onto neighboring property. Resulting effects would have negligible intensity under NEPA, and the impact would be less than significant under CEQA for all alignment and HMF alternatives.

Project Impacts

Common Safety Impacts

Operating on a fully grade-separated, dedicated track alignment using contemporary safety, signaling, and automatic train control systems, the HST System would provide a safe and reliable means of intercity travel. Design of the system also would prevent conflicts with other vehicles, pedestrians, and bicyclists, and allow the trains to operate year-round under different types of weather conditions. Overall, the HST would provide a safety benefit for travelers in the Central Valley.

Although there would be many benefits, HST operation could result in inadvertent impacts on public, passenger, and employee health and safety, such as increased response time by law enforcement, fire, and emergency services personnel. As discussed below in Section 3.11.6, Project Design Features, project design would reduce the risks to human health. Some system safety and security measures, such as fencing along the track, also would reduce the risk of non-accidental events, such as suicide attempts.

The HST System Operations Control Center (OCC) would retain operational control of all train movements along tracks, and to stations, maintenance, and storage facilities at all times. The OCC would operate and maintain a comprehensive communications system that would allow for wireless communications between the OCC, trains, and system staff for routine operations and in emergency situations.

Impact S&S #4 – Train Accidents

The types of accidents that could be associated with an HST can be broken down into train-to-train collisions, collisions between an HST and objects entering the HST corridor such as vehicles from adjacent highways or trains from adjacent freight lines, and HST derailments. These types of accidents are discussed below.

Train-to-train collisions. Current practice in the United States to ensure safety of passengers in the event of a conventional train-to-train collision is to provide locomotives with sufficient weight and strength to protect the trailing passenger cars. This approach is sometimes referred to as *crashworthiness*, as both of the lead vehicles, or locomotives, are designed to withstand the impact of a collision (Aldrich 2006). If applied to all trains, this approach ensures that the trains would be of like weight and strength, and the impact would be distributed equally to the two trains involved in a collision. The result is a safer operating environment with a very heavy lead vehicle.

Design of HST systems takes a different approach for ensuring safety of passengers from a train-to-train collision. This approach is known as *collision avoidance* (Wyre 2011; Rao and Tsai 2007). HST systems take advantage of a *system-design approach* in which the HST, the automatic train control system, the electrification system, and the rail infrastructure include automation that will control or stop the trains without relying on human involvement. The general approach for the automatic train control system is to monitor the location and speed of all trains on the high-speed network and to coordinate and maintain enough physical separation to allow safe braking. If a fault occurs within the HST network (i.e., intrusion, derailment, significant natural event such as earthquake), the automatic train control system will immediately slow or stop the train and minimize or eliminate a potential hazard. In areas of high risk, the system-design approach can also provide protection from other intrusions into the HST corridor, such as errant automobiles, trucks, or other unauthorized entry, by the use of intrusion-detection and other monitoring equipment to detect a fault and initiate action as needed.

The system-design approach using a collision avoidance philosophy has proven to be very effective in maintaining passenger safety in both Asian and European HST systems. In more than 40 years of operation in Japan and in over 25 years of operation in Europe, there have been no reported passenger fatalities resulting from a train-to-train collision on an HST network that has applied a system-design approach to provide passenger and worker safety. As discussed in Section 3.11.1, in its haste to build a world-class high-speed train industry, Chinese management largely ignored quality control procedures in the design of equipment, substantially jeopardizing the safety of the system (Areddy 2011). This has not been the situation in Europe and other parts of Asia. FRA and CPUC regulations and oversight described in Section 3.11.2 would also ensure safe design of the California HST System. In the recent accident in Spain, the train did not have a positive train control system to protect against over-speed derailment. A positive train control system is required by the Railway Safety Improvement Act of 2008 through regulations enforced by the FRA. The California HST System will enforce all speed restrictions, including slower speed restrictions for curves. If the engineer does not voluntarily slow the train, the system will slow or stop the train, as appropriate. As a result of implementing this system-design approach, the direct effects from train-to-train collisions are expected to have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Collisions with vehicles or other trains entering the HST corridor. Safety considerations are also included in the design of the HST alignments with regard to proximity of the HST line to other transportation facilities, including other railroads or highways (Authority 2010). The primary safety concern is that a derailed train or errant vehicle would enter the HST corridor and foul the line. Because a portion of the Fresno to Bakersfield Section of the HST System would operate adjacent to either the BNSF Railway or UPRR, there is a risk of a conventional passenger or freight train derailing, entering the HST trackway, and obstructing or impacting an HST. Historically, train derailments in the U.S. have generally occurred where there is special trackwork, such as turnouts and crossovers, or where a rail network may not have been adequately maintained to the authorized speed.

Safety can be achieved where there is sufficient horizontal or vehicle separation between these facilities, and/or by use of a physical barrier to separate the facilities. A horizontal separation of approximately 102 feet between the centerlines of adjacent conventional and HST trackways has been determined to be a distance sufficient to require no additional protection (FRA 1994). This minimum separation distance includes the distance of the maximum practicable excursion of the longest U.S. freight rail car from the center of track, plus an allowance for overhead catenary system (OCS) masts. A car body length of 89 feet for the freight rail car displacement, plus an allowance of 12.5 feet to include an OCS mast foundation, results in a minimum separation distance, without an intrusion protection barrier, of 101.5 feet, rounded up to 102 feet.

These separation requirements, described in Technical Memorandum 2.1.7 - Rolling Stock and Vehicle Intrusion Protection for High-Speed Rail and Adjacent Transportation Systems (Authority 2008), were developed specifically for the HST and do not directly adopt existing criteria for separation requirements. The guidance for intrusion protection generally follows the recommended practices described in the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual and the design standards developed specifically for the construction and operation of HSTs, based on international practices. This includes technical guidance from National French Railways for separation between HST System and roadway infrastructure and International Union of Railways Codes for Structures Built over Railway Lines. For intrusion from highways/roadways and protection of highway motorists, the design guidance follows FRA recommendations and was revised to be compliant with Caltrans Highway Design Manual, which was updated in 2011 to specifically address separation requirements for HST facilities adjacent to the state highway system.

If a railroad line is less than 102 feet from an HST track and both are at ground level, additional protection is required. The need and type of protection is subject to the distance between tracks and the risk of a derailment. Earth berms can be used as intrusion protection for tracks with centerline separation of 45 to 102 feet. A minimum of 29 feet of separation is required between centerlines of HST and adjacent railroad tracks, and this separation requires a physical intrusion barrier. When intrusion protection is needed, the minimum total height must be 10 feet with either ditch plus berm, concrete wall plus screen, or only a concrete wall.

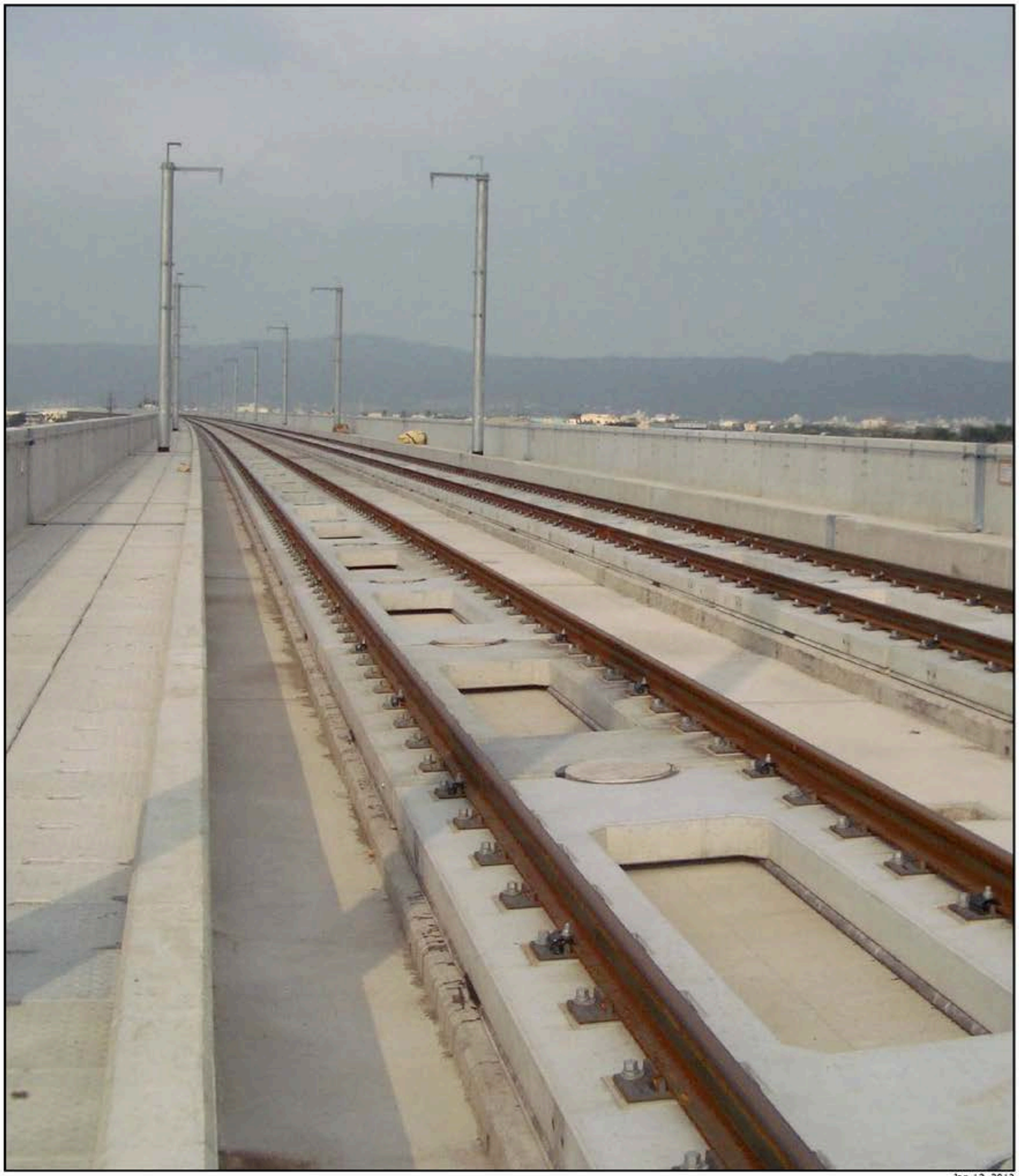
When an HST track is adjacent to a highway or roadway, a barrier is typically required where the roadway is less than 30 to 40 feet from the HST access control fence. Depending on the highway facility, the barrier can range from a standard concrete barrier to a taller barrier that protects against errant commercial trucks and trailers. Where the separation is greater than 30 to 40 feet, barriers may be considered, subject to a risk assessment.

The need for and type of protection are subject to the distance between tracks and the risk of a derailment. Barriers between the HST and freight rail lines and highways are shown in Volume III, Alignments and Other Plans. In the city of Fresno, there would be a barrier between the HST and UPRR from the northern end of the station tracks near Amador Street to about 700 feet south of Ventura Street. The Corcoran Elevated and Corcoran Bypass alternatives are located between the BNSF Railway and SR 43, beginning at SR 43 where it parallels the BNSF Railway north of Corcoran. A barrier between the HST and SR 43 would be required for the Corcoran Bypass from this point south to about Nevada Avenue, a distance of approximately 1.8 miles. For the Corcoran Elevated Alternative, the barrier between the HST and SR 43 would be required from the point where the HST is between SR 43 and the BNSF Railway south to Santa Fe Avenue, a distance of approximately 5 miles.

Vertical separation—where one of the transportation facilities is on an aerial structure and the other is at ground level—can also provide protection from intruding vehicles into the HST right-of-way. Consistent with standard railroad practice, where the HST track would be on an aerial structure, the adjacent facilities would be at least 25 feet from the nearest supporting column face. Where 25 feet of clearance are not available, then a barrier may be required to protect the supporting columns. As a result of implementing standard design practices, the potential intrusion of motor vehicles or trains into the HST corridor would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Train Derailment. A basic design feature of an HST System is to contain train sets within the operational corridor (FRA 1993). Strategies to ensure containment include operational and maintenance plan elements that would ensure high-quality tracks and vehicle maintenance to reduce the risk of derailment. Also, physical elements, such as containment parapets, check rails, guard rails, and derailment walls, would be used in specific areas with a high risk of or high impact from derailment. These areas include elevated guideways and approaches to conventional rail and roadway crossings. Figure 3.11-8 shows an example of concrete derailment walls and containment parapets on an elevated section of an HST in Taiwan. The concrete derailment walls are like tall curbs that run close to the train wheels. In the event of a derailment, these walls keep the train within the right-of-way and upright. Figure 3.11-9 shows a derailed HST and how it is prevented from leaving the right-of-way. This photograph shows a train that derailed in Taiwan in March 2010 after an earthquake. The train was traveling at 175 miles per hour when the railway earthquake sensors picked up seismic movements. The traction power supply was automatically cut, and the on-board ATP system was instructed to bring the train to an emergency halt. As a result of the lateral seismic movements during the earthquake, the train jumped the track; but as designed, the train bogies were contained by the derailment wall alongside the track. As a result of implementing these standard design practices, the potential for HST derailments would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

As described above in Section 3.11.1, an HST derailment in Germany in 1998 resulted in substantial deaths and injuries. This accident could have been prevented by proper maintenance of the train and installation of the containment elements described above.



Source: URS, 2010.

Figure 3.11-8
Derailment wall and parapet

Jan 13, 2012

Source: URS, 2010.

Figure 3.11-9
High-speed train derailment

Impact S&S #5 – Motor Vehicle, Pedestrian, and Bicycle Accidents Associated with HST Operations

Project design accounts for motorist, pedestrian, and bicyclist safety in several ways, including HST grade-separation from automobile and pedestrian traffic. The HST tracks would be located in a dedicated right-of-way, eliminating potential conflict with other trains (e.g., freight trains) or other vehicles. Therefore, effects to motor vehicle safety would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Roadway improvements included in the project, such as overpass construction (see Chapter 2, Alternatives), would improve vehicular and pedestrian safety through associated street widening, traffic restrictions, and/or new traffic signals. The HST tracks would be grade-separated, and the roadways improvements near the stations and along the alignment would comply with design standards for pedestrian and bicycle safety. Therefore, effects to pedestrian and bicycle safety would be beneficial under NEPA, and impacts would be less than significant under CEQA.

As indicated in Chapter 2 (Alternatives), road overcrossings in rural portions of the Fresno to Bakersfield Section would be designed in accordance with county standards that take into account the movement of large farm equipment. Overcrossings would have two 12-foot wide lanes. Depending on average daily traffic (ADT) volumes, the shoulders would be 4 to 8 feet wide. Therefore, the paved surface for vehicles would be 32 to 40 feet wide. Most farm equipment would be able to travel within one lane, possibly overlapping onto the adjacent shoulder. Particularly large equipment may be so wide that it would cross over the centerline even when using the shoulder of the roadway. In accordance with California Motor Vehicle Code 24615, slow-moving farm machinery is required to display a slow-moving vehicle emblem when operating on a public road. Other safety precautions can also be used, such as flashing lights or placement of warning vehicles before and after the farm equipment. Because of the width of the overcrossings and the use of standard safety practices, the effects on motor vehicle safety from the movement of farm equipment on overcrossings would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Impact S&S #6 – HST Accidents Associated with Seismic Events

Sections of the HST alignment and infrastructure would be located in seismically sensitive areas, and therefore would be constructed to specifications capable of withstanding defined levels of seismic activity without incurring structural failure. As discussed in Section 3.9, Geology, Soils, and Seismicity, because the project design features would meet specifications contained in AASHTO guidance, FHWA guidance, the AREMA manual, Caltrans design standards, California Building Code, and International Building Code accounting for seismic activity, the resulting potential effects would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

High-speed trains operate in highly seismic areas of Japan and Taiwan. Since HSTs have been built in those countries, substantial efforts have gone into the design and implementation of dynamic rolling stock and structures to prevent catastrophic accidents during seismic events (Kumagai 2008; Cheng et al. 2011). The Taiwan derailment during an earthquake described above is one example of how a severe accident was prevented through structural elements that kept the train upright and within the right-of-way.

In addition to structural design features, the HST System would implement operational procedures to protect passenger and employee health. The HST would also have a seismic monitoring system of sensors that would automatically stop trains approaching areas of seismic activity in order to minimize the possibility of a derailment due to a seismic event. The monitoring system would be connected to an alert warning system at the OCC, so that OCC staff and train crews could take action to reduce the impact of a seismic event. Following a seismic event, inspections of track, structures, bridges, and other system elements would be a priority; and the necessary repairs and operational precautions, such as service suspension or speed restrictions, would be implemented as necessary and prudent.

Impact S&S #7 – Risk of Fire

The HST alternatives would include project elements that have a potential risk of fire and related hazards, including station facilities, passenger vehicles, maintenance facilities with fuel storage, traction power and paralleling stations, and the OCC. These elements have electrical equipment and/or combustible materials and thus represent a fire and explosion risk. The project design includes fire warning and suppression systems, such as sprinklers, as well as emergency exits and notification systems, consistent with the requirements of the NFPA Safety Code and Standard for Fixed Guideway Transit and Passenger Rail Systems, the California Building Standards Code, and the International Building Code. With implementation of these design features and the standard operating provisions listed in Section 3.11.6, Project Design Features, the risks to human health resulting from fire and explosion would have negligible intensity under NEPA, and the impact would be less than significant under CEQA.

Impact S&S #8 – Increased Response Times for Fire, Rescue, and Emergency Services from Permanent Road Closures

Road closures and modified traffic routing along HST tracks could result in increased response times for emergency responders. As discussed in Section 3.2, Transportation, existing roads would either remain unchanged where elevated track would cross them or would be modified into overcrossings or undercrossings where at-grade track would conflict with them. Road segments that would be permanently closed are typically short (less than 1 mile) and access to properties adjacent to these closed roads would be readily available from other roads (see Section 3.2, Transportation). Road crossings in rural areas would occur approximately every 2 miles. Section 3.2.5, Transportation Environmental Consequences, states that limited traffic impacts are expected as a result of the closures and diversion of traffic. Because the project design would include coordination with emergency responders to incorporate roadway modifications that maintain existing traffic patterns and fulfill response route needs, effects on the response times by service providers would have negligible intensity under NEPA and would be less than significant under CEQA.

Impact S&S #9 – Increased Response Times for Fire, Rescue, and Emergency Services Associated with Access to Elevated Track

The HST design would include elevated tracks as high as 45 feet above ground north of Bakersfield, and as high as 80 feet above ground level in Bakersfield (see Chapter 2, Alternatives). These elevated sections could be difficult to evacuate and difficult to reach by emergency responders, in case of emergencies during which a train is stopped. The elevated track portion includes a walking surface and a lateral safety railing, in accordance with standard engineering design requirements (NFPA International 2001). The design also would include ground access from the elevated tracks at regular intervals along the elevated structure, allowing for emergency passenger evacuation if needed, as well as for routine track maintenance.

As discussed in Section 3.11.6, Project Design Features, the emergency response along elevated tracks would be conducted swiftly and efficiently. Because of the incorporation of design features into the track to facilitate safe evacuation of individuals, the potential for delayed or hampered response to emergencies on elevated track portions would have negligible intensity under NEPA, and the impact would be less than significant under CEQA.

BNSF Alternative Alignment

The BNSF Alternative would have the largest number of aerial structures of any of the project alternatives. It would be elevated at the following locations: southern end of the Fresno metropolitan area where the alignment crosses the UPRR and SR 99; Conejo where the alignment crosses from the western to the eastern side of the BNSF; Kings River complex (Dutch John Cut, Cole Slough, and Kings River); Cross Creek; Tule River; Deer Creek; Poso Creek; Wasco; Shafter; and Bakersfield, beginning between Jewetta and Calloway and extending to the terminus of the project.

Hanford West Bypass 1 and 2 Alternative Alignments and Hanford West Bypass 1 and 2 Modified Alternative Alignments

The Hanford West Bypass alternatives would be primarily at-grade but would have an elevated profile in three locations:

- In the northern portion of the Hanford West Bypass alternatives crossing of the Kings River, including Murphy Slough on the north and Riverside Ditch on the south.
- In the southern portion of the Hanford West Bypass Alternative where it spans Cross Creek in the floodplain.
- At the crossing of the BNSF Railway near Kansas Avenue (Hanford West Bypass 2 only) including Kent Avenue on the north and S. 10th Avenue on the south.

Corcoran Elevated Alternative Alignment

The Corcoran Elevated Alternative would be elevated throughout the city of Corcoran.

Corcoran Bypass Alternative Alignment

The majority of the Corcoran Bypass Alternative would be at-grade. However, two short, elevated structures would carry the HST over Cross Creek and the BNSF at the northern end of this alignment, and the BNSF and Tule River at the southern end of the alignment.

Allensworth Bypass Alternative Alignment

Most of the Allensworth Bypass Alternative would be constructed at-grade. An elevated structure would be built at the northern end of the alignment where it crosses the Alpaugh railroad spur.

Wasco-Shafter Bypass Alternative Alignment

All of the Wasco-Shafter Bypass would be at-grade.

Bakersfield South Alternative Alignment

The Bakersfield South Alternative would essentially have the same length of aerial structure as the corresponding segment of the BNSF Alternative.

Bakersfield Hybrid Alternative Alignment

The Bakersfield Hybrid Alternative would have essentially the same length of aerial structure as the corresponding segment of the BNSF Alternative.

Heavy Maintenance Facility Alternatives

The HMF tracks accessing the far main track would be elevated to cross the near track (see Chapter 2, Alternatives).

Impact S&S #10 – Need for Expansion of Existing Fire, Rescue, and Emergency Services Facilities

As discussed above, project design features have minimized the potential for train accidents; therefore, local response to accidents is not expected to be required, because any incident would be extremely rare. For emergency preparedness, however, the Authority would collaborate with local responders to develop a Fire and Life Safety Program for emergency response in case of an accident or other emergency (see Sections 3.11.6, Project Design Features, and 3.11.7, Mitigation Measures). Because the project has been designed to avoid accidents, average response times are not expected to change, and new or physically altered government facilities that would create physical impacts on the environment are not anticipated. Consequently, there would be no effect under NEPA and no impact under CEQA.

As described in Section 3.12 (Socioeconomics, Communities, and Environmental Justice) and Section 3.13 (Local Growth, Station Planning, and Land Use), the Fresno and Bakersfield HST stations would introduce new activity centers into the downtown areas. These economic impacts would be beneficial because the stations would help implement local goals for downtown revitalization. The potential Kings/Tulare Regional Station-East Alternative would be located immediately east of the City of Hanford sphere of influence. Kings County has zoned land in the vicinity of the station site for commercial development, and the station could help accelerate this development. The potential Kings/Tulare Regional Station—West is located adjacent to the city of Hanford planning boundary, and is within the Armona Community Planning Area of Kings County. The station site land use designation within Kings County is Limited Agriculture. This station could stimulate development in the area.

The associated development and economic activity that would indirectly result from the presence of the HST stations could increase demand for local emergency responders and require new or physically altered government facilities (such as police or fire stations) that might affect the environment. Any revitalization near the Downtown Fresno and Downtown Bakersfield stations would follow the cities' site development and building permitting processes, including the payment of impact fees that support capital costs for new or expanded government facilities. Any new or expanded government facilities would be designed and constructed to be consistent with local land use plans, and would be subject to separate site-specific analysis under CEQA. The indirect effects of economic revitalization in station areas would have negligible intensity under NEPA and the impact would be less than significant under CEQA, because development and expanded facilities would comply with local site development and permitting processes, including impact fees and CEQA analysis.

The stations themselves would introduce new passengers into the cities, which could increase the demand for fire and ambulance services. Because the stations would have onsite security patrols by Authority police, no increased demand for police protection is anticipated. Increased economic activity around stations would result in increased property and sales tax revenues to help offset costs of additional service demands. However, the impact on emergency response could have moderate intensity under NEPA and could be significant under CEQA.

Development of an HMF alternative could increase the demand for fire and ambulance services. Because the HMFs would have control access with onsite security, no increased demand for police protection is anticipated. These emergency services are expected to be provided from existing facilities listed in Table 3.11-4. The City of Fresno does not have an automatic aid agreement with the Fresno County Fire Protection District. Delivery of an Effective Response Force (ERF) within the time frames prescribed in NFPA 1710 (22 to 25 fire fighters within 8 minutes) to a proposed Fresno HMF south of Fresno will not be possible until such an instant aid agreement can be implemented. Additionally, Fresno County Fire Protection District has only one truck company and NFPA 170 specifies a minimum of two truck companies to comprise an ERF.

For the HMFs, this effect would have moderate intensity under NEPA, and the impact would be significant under CEQA. If new fire and/or ambulance emergency response facilities are needed, the Authority and the local providers could agree to develop emergency response capacity at the HMF sites.

Impact S&S #11 – Accident Risks to Airports, Private Airstrips, and Heliports

As indicated below, none of the project alternatives encroach on areas covered by airport land use compatibility plans. An analysis of airspace, discussed below, indicates that none of the project alternatives would intrude upon Part 77 airspace for public service airports, private airstrips, or heliports. Therefore, there would be no increased accident risk to these facilities and no effect under NEPA and the impact would be less than significant under CEQA.

BNSF Alternative Alignment

As indicated in Table 3.11-5, the BNSF Alternative is within 2 miles of four public service airports, four private airports, and seven heliports. The project would not increase risks to people in the vicinity of the heliports because the HST facilities would not intrude on the flight paths to these heliports. The results of the analysis of Part 77 airspace surfaces are provided in Table 3.11-8. The analysis details are provided in Appendix 3.11-B, Airport Obstructions. As shown in Table 3.11-8, the BNSF Alternative would not intrude on the Part 77 airspace surfaces of any public service airport. Therefore, it would not increase risks to people in the vicinity of these airports.

Table 3.11-8
Location of High-Speed Train Facilities Relative to Airport Airspace

Airport	Project Alternative	Closest Vertical Distance from Part 77 Airspace Surfaces
Fresno-Chandler Downtown Airport	BNSF Alternative Alignment	64 feet below horizontal surface
Hanford Municipal Airport	BNSF Alternative Alignment	108 feet below conical surface, 109 feet below horizontal surface
Corcoran Airport	BNSF Alternative Alignment	296 feet below conical surface
Wasco Airport	BNSF Alternative Alignment	64 feet below conical surface
Wasco Airport	Wasco-Shafter Bypass	298 feet below conical surface
Note: A Part 77 airspace surface is an imaginary surface of a takeoff and landing area of an airport or any other imaginary surface established for the airport under 14 CFR Part 77.24.		

The BNSF Alternative would run within 1.40, 1.58, and 0.56 miles of Turner Field, Swanson Ranch Number 1 Airport, and Salyer Farms Airport, respectively. The BNSF Alternative is far enough from these airports that the HST would not result in a safety hazard for people residing or working in the study area, and would have no effect under NEPA, and impacts would be less than significant under CEQA.

The BNSF Alternative is located approximately 845 feet east of the heliport at the Kings County Fire Department Station #4. In addition, the Houston Avenue overcrossing of the HST alignment is located about 320 feet south of the heliport at its closest point. The Part 77 approach and departure surface for a heliport has an 8 to 1 slope and extends 4,000 feet from the takeoff and landing area, which is centered on the helipad. The HST would be at-grade in the vicinity of the heliport, which would put the top of the catenary system for the train at an elevation of about 35 feet above the ground surface. The helipad Part 77 approach and departure surface is about 105 feet above the ground surface at this location. The helipad Part 77 surface is about 40 feet above the ground surface at its closest point to the Houston Avenue overcrossing. At this location, the overcrossing would be approximately 12 feet above ground surface. None of the proposed HST facilities would penetrate the Part 77 surfaces for the Station #4 heliport. Therefore, the project would have no effect on the heliport under NEPA, and there would be no impact under CEQA.

Hanford West Bypass 1 and 2 Alternative Alignments and Hanford West Bypass 1 and 2 Modified Alternative Alignments

The Hanford West Bypass alternatives are not in proximity to any public service airport. They are within 1.85 miles from the Blair Strip Airport. The Hanford West Bypass alternatives are far enough from this airport that the HST would not result in a safety hazard for people residing or working in the study area, and any potential effects would have no effect under NEPA, and impacts would be less than significant under CEQA.

Corcoran Elevated Alternative Alignment

The Corcoran Elevated Alternative would be more than 250 feet below the Part 77 airspace surfaces of the Corcoran Airport. Therefore, it would not increase risks to people in the vicinity of this airport. The Corcoran Elevated Alternative would be 0.3 mile from Salyer Farms Airport. At this distance, the project would not increase risks to people in the vicinity of this airport. Therefore, there are no potential effects on public safety under NEPA, and impacts would be less than significant under CEQA.

Corcoran Bypass Alternative Alignment

The Corcoran Bypass Alternative Alignment is not in proximity to any public service airport. It is within 0.18 mile of the Salyer Farms Airport. The potential for HST facilities to encroach on Part 77 surfaces for this airport was evaluated where the HST alignment roughly parallels the runway approximately 800 to 1,000 feet to the east, where the HST alignment comes close to the northeastern corner of one of the Runway Protection Zones, and at the point where the HST alignment crosses the projected runway centerline to the north of the airport. Two potential HST communication sites are also located within 1,000 feet of the Salyer Farms Airport, and these sites were evaluated for their potential to penetrate Part 77 surfaces. The analysis indicated that no HST facilities would penetrate Part 77 surfaces for the Salyer Farms Airport. Therefore, the project would not increase risks to people in the vicinity of the Salyer Farms Airport. No potential effects on public safety are indicated under NEPA, and impacts would be less than significant under CEQA.

Wasco-Shafter Bypass Alternative Alignment

The Wasco-Shafter Bypass Alternative would not intrude on the Part 77 airspace surfaces of the Wasco Airport (Table 3.11-8). Therefore, it would not increase risks to people in the vicinity of this airport.

Bakersfield South Alternative Alignment

The Bakersfield South Alternative is not in proximity to any public-service airport or private airstrip. Therefore, it would not increase risks to people in the vicinity of this airport.

Bakersfield Hybrid Alternative Alignment

The Bakersfield Hybrid Alternative is not in proximity to any public-service airport or private airstrip. Therefore, it would not increase risks to people in the vicinity of this airport.

Heavy Maintenance Facility Alternatives

None of the HMF alternative sites are in proximity to any public-use airport or private airstrip. Therefore, the HMF would not increase risks to people in the vicinity of this airport.

Impact S&S #12 – Hazards to the HST from Nearby Facilities

The height and type of industrial facilities near HST facilities may pose a safety hazard because they include silos and distillation columns that are several hundred feet in height. Tall structures pose a safety hazard because of their potential to topple onto HST facilities, or to affect them because of explosions resulting from accidents, severe weather, or terrorist acts.

Building codes and safety regulations ensure the safe construction and operation of industrial facilities in the Central Valley. Therefore, the probability is low of a catastrophic industrial accident resulting in substantial offsite consequences occurring adjacent to the HST alignment as a train is passing by. Many tall structures such as silos and elevators are located adjacent to railroads and highways throughout the Central Valley, including those along the HST alternative alignments described above. There is no available information to indicate that any of these facilities have undergone a catastrophic failure in the past several decades, let alone a failure that toppled the structure onto a transportation corridor. Propane, bulk fuel, and bulk chemical storage facilities are also located throughout the industrial portions of communities in the Central Valley, many of which are adjacent to railroads and highways. There have been no recent incidents from these facilities involving explosions or catastrophic failures that have resulted in offsite injuries or property damage. Because the likelihood of a catastrophic industrial accident adjacent to the HST alignment is low, the hazards from nearby facilities are considered to have negligible intensity under NEPA and would be less than significant under CEQA. Should an incident occur adjacent to the HST alignment, appropriate measures would be taken to minimize risk to passengers and employees.

In conjunction with complying with federal safety directives for the HST, the Authority has established a risk-based hazard management program for the statewide HST System (Authority 2012). In furtherance of this program, the Authority prepared a "preliminary hazard analysis" or PHA as identified in Chapter 2 of this EIR/EIS, to consider risks to HST operations that may be posed by oil and gas wells adjacent to the HST right-of-way. The PHA assessed both the probability and the consequence of the risks with a main focus on well blowouts. Blowouts occur when a pressurized underground zone is encountered while drilling and the weight of the drilling mud in the wellbore is insufficient to hold back the pressure. The consequences of a blowout range from a spray of crude oil over the surrounding area, the displacement of earth around the wellbore, to a large-scale explosion and fire. A review of oil and gas well blowouts in the project region from 1991 to 2008 revealed that the occurrence of any level of such an event can be characterized as highly unlikely (Authority 2013).[1] High-speed trains will pass through areas

[1] California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR) District 4 covers Tulare, Kern, and Inyo counties. This district encompasses most of the oil wells in the

within the Fresno to Bakersfield Section at speeds up to 220 mph, so the presence of a high-speed train near any one nearby oil or gas well will be only for a matter of seconds. Moreover, the HST includes automatic train control, which has been an effective technological measure to ensuring the safety of train passengers and crew by providing for the ability to halt the high-speed train quickly in the event of a nearby well blowout (Fischer 2011). Because the likelihood of the well blowout is extremely unlikely on its own, is even more unlikely for a major well blowout occurring at the precise time of a passing train, and because of the HST's safety features, the potential for hazards to HST passengers and crew from nearby oil and gas wells is therefore the same as with the other types of nearby industrial facilities discussed above: negligible intensity under NEPA and less than significant under CEQA.

Impact S&S #13 – Hazards to Residences from HST Derailment

The HST alternative alignments are within one to two blocks of residential areas in Fresno, Corcoran, Wasco, and Shafter, and go through residential areas in Bakersfield. Derailment of a train during a seismic event or other natural disaster could be a substantial safety hazard to these residential neighborhoods if the train left the HST right-of-way and collided with other structures or people on adjacent properties. This hazard is associated with the physical mass and speed of the train. Because the HST carries passengers and it would be electric powered, there would be no safety hazard associated with HST cargo or fuel.

As discussed above, a basic design feature of an HST System is to contain train sets within the operational corridor. Thus, if a derailment were to occur in a residential area, the train would remain within the HST right-of-way. Because the train would be contained in the HST right-of-way and it would not contain cargo or fuel that would result in a fire or explosion, the proposed project would not substantially increase hazards to nearby residents, and thus, the resulting effects are considered negligible under NEPA, and impacts would be less than significant under CEQA.

Impact S&S #14 – Safety Impacts to Schools

Transportation safety for school children and accessibility to schools are discussed in Section 3.2, Transportation.

California Code of Regulations (CCR) title 5, Section 14010 provides siting standards for new schools. These standards are not for the location of facilities other than schools; however, they provide an indication of when safety impacts may occur to school employees and students.

CCR 14010c calls for a separation between schools and power transmission lines of 100 feet for 50-133 kV lines, 150 feet for 220-230 kV lines, and 350 feet for 500-550 kV lines. The HST project would be powered by a 25 kV system; therefore, the electrification of the trains itself would be a negligible safety hazard to schools. The Fresno to Bakersfield Section would not require the construction of new power transmission lines in the vicinity of existing or future planned schools. For these reasons, the electrification of the HST project would have no safety effect on school employees and students.

CCR 14010d requires a safety study for school sites within 1,500 feet of a railroad track easement. Because the HST would carry passengers and be electric-powered, there would be no

Fresno to Bakersfield Section. Between 1991 and 2008, there were 108 well blowouts in District 4. The number of well blowouts per year declined by approximately 80% during this period despite increased numbers of production wells because of advances in technology and well management. As a result, the well blowout rates from 2001 to 2008 were 1 per 100,000 well-years for active thermal-recovery wells and 1 per 520,000 well-years for inactive/abandoned wells.

safety hazard associated with HST cargo or fuel. The hazard associated with the derailment of an HST is the physical mass and speed of the train colliding with a structure or people, which could only occur adjacent to the right-of-way. There are three schools adjacent to the HST right-of-way: Bakersfield High School on the BNSF Alternative, Bessie E. Owens Intermediate School on the Bakersfield South Alternative, and Warriors for Christ Academy, a small private school in the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives. As discussed above, a basic design feature of an HST System is to contain train sets within the operational corridor. Since HSTs began operating in 1964, there has only been one case where a train within a dedicated HST right-of-way has left the operational corridor. That was the accident in China in 2011 described in Section 3.11.1 (Introduction). A formal government investigation identified the cause of the accident as a system-wide lack of emphasis on safety, both in terms of equipment development and operating personnel training, by the management of China's HST System. Where industry standards for design, maintenance, and operation have been employed, this type of accident has not occurred over the four decades of HST operation. Therefore, if an HST derailment were to occur next to a school, there is a very high probability that the train would remain within the HST right-of-way. Because the train would be contained in the HST right-of-way and would not contain cargo or fuel that would result in a fire, explosion, or the release of toxic substances, the proposed project would not substantially increase hazards to nearby schools, and resulting effects are considered to have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Impact S&S #15 – Hazards to HST Passengers and Employees from Flooding

The western slope of the Sierra Nevada is the site of many large dams that impound the waters of most of the west-flowing rivers that flow to California's Central Valley to provide water for irrigation, drinking, recreation, and flood control. As discussed in Section 3.9, Geology, Soils, and Seismicity, failure of Redbank, Fancher Creek, Pine Flat, Terminus, Success, or Isabella dams could result in inundation of the HST alignment, putting people traveling on the train at risk.

The California Water Code entrusts the regulation of large dams to the Department of Water Resources (DWR). DWR created the Division of Safety of Dams (DSOD) to administer the dam safety program. DSOD's mission is "[T]o protect people against loss of life and property from dam failure." DSOD imposes dam safety guidelines on all large dams in California, including all the dams mentioned above. DSOD engineers inspect over 1,200 dams each year to ensure they are performing and are being maintained in a safe manner. These inspections include thorough review of operational records, as well as site inspections of the dams and abutments, outlet works, spillways, and other critical structures. If deficiencies or potential problems are identified, interim remedial measures are typically directed, such as lowering the reservoir level, until permanent repairs, if needed, can be designed and implemented. Dam owners must submit any proposed structural or operational changes to DSOD for review and approval before they can be implemented. Because of this dam safety program, the potential risk of inundation of the HST due to dam failure is considered to be small. Therefore, the effects of this hazard are considered to have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Common Security Impacts

Impact S&S #16 – Criminal Activity Aboard Trains and at Stations

Criminal activity, such as theft and violence, could occur on trains and at station facilities. Terrorists could target the stations, tracks, or trains for the potential to inflict mass casualties and disrupt transportation infrastructure. The HST design would include access control and security monitoring systems that could deter such acts and facilitate early detection. They would also help to prevent suicide attempts. The system features include sensors on perimeter fencing, closed-circuit television, and security lighting where appropriate. The Authority and FRA are in discussions with the Transportation Security Administration (TSA) regarding security controls at stations. While the TSA has not yet prescribed safety standards for HST stations, station design provides for a range of possible security procedures and includes monitoring systems that rely on security personnel much like existing conventional train stations that would deter theft, violence, and terrorist threats. These system features would reduce the potential for successful criminal and terrorist acts to a negligible intensity under NEPA, and less-than-significant impact under CEQA.

3.11.6 Project Design Features

Project design would incorporate engineering measures and BMPs based upon federal and state regulations and on the Statewide Program EIR/EIS (Authority and FRA 2005). Applicable design standards for safety and security that would be used for the project are provided in Appendix 2-D. The standard engineering design guidelines and regulatory requirements include the following:

- Final design includes development of a detailed construction transportation plan that would include coordination with local jurisdictions on emergency vehicle access. The plan would establish procedures for temporary road closures including: access to residences and businesses during construction, lane closure, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative access locations.
- Engineering design and construction phases include preliminary hazard analysis (PHA), collision hazard analysis (CHA), and threat and vulnerability assessment (TVA) methods.
- PHAs follow the U.S. Department of Defense's System Safety Program Plan Requirements (MIL-STD-882) to identify and determine the facility hazards and vulnerabilities so that they can be addressed—and either eliminated or minimized by—the design.
- CHAs follow the Federal Railroad Administration's Collision Hazard Analysis Guide: Commuter and Intercity Passenger Service (FRA 2007), which provides a step-by-step procedure on how to perform a hazard analysis and how to develop effective mitigation strategies that will improve passenger rail safety.
- TVAs establish provisions for the deterrence and detection of, as well as the response to, criminal and terrorist acts for rail facilities and system operations. Provisions include right-of-way fencing, intrusion detection, security lighting, security procedures and training, and closed-circuit televisions. Intrusion-detection technology could also alert to the presence of inert objects, such as toppled tall structures or derailed freight trains, and stop HST operations to avoid collisions.
- Construction safety and health plans (CSHPs) establish the minimum safety and health guidelines for contractors of, and visitors to, construction projects. CSHPs require contractors to develop and implement site-specific measures that address regulatory requirements to protect human health and property at construction sites.
- Fire and life safety programs (FLSPs) implement any applicable federal and state requirements that address the safety of passengers and employees during emergency response. FLSPs are intended to promote fire and life safety and security in system design, construction, and implementation. FLSPs would be coordinated with local emergency response organizations to provide them with an understanding of the rail system, facilities, and operations, and to obtain their input for modifications to emergency response operations and facilities, such as evacuation routes. The Authority is committed to establishing FLSPs throughout the alignment, and would ensure that FLSPs address the needs of disabled persons.

- System security plans address design features intended to maintain security at the stations within the track right-of-way, at stations, and onboard trains. The design standards and guidelines require emergency walkways on both sides of the tracks for both elevated and at-grade sections. Adequate space would be present along at-grade sections of the alignment to allow for emergency response access. Ground access would be available for elevated tracks where access to ground equipment is required. This ground access could be used in the event of an emergency. Additional ground access would be considered, consistent with fire and rescue procedures, and where practical operational standards include a system-specific police force.

- Standard operating procedures and emergency operating procedures include industry best practices, such as the FRA-mandated Roadway Worker Protection Program. They address the day-to-day operation and emergency situations to maintain the safety of employees, passengers, and the public.

- System safety program plans (SSPP) incorporate FRA requirements and are implemented upon FRA approval. FRA's SSPP requirements will be determined in FRA's new System Safety Regulation (Docket No. FRA-2011-0060-1), which is not yet finalized. SSPPs are based on the principles outlined in *The Manual for Development of System Safety Program Plans for Commuter Railroads* (American Public Transportation Association 2006) and address project design, construction, testing, and operation.

- Rail systems must comply with FRA requirements for tracks, equipment, railroad operating rules, and practices, including the Passenger Equipment Safety Standards (49 CFR Part 238), *Highway-Rail Grade Crossing Guideline for the High-Speed Passenger Rail* (FRA 2009), and track safety standards (49 CFR Part 213). Requirements include warning systems and barrier systems to enhance track safety.

- Worker safety in the workplace is generally governed by the Occupational Health and Safety Act of 1970, which established the Occupational Safety and Health Administration (OSHA). OSHA establishes standards and oversees compliance with workplace safety and reporting of injuries and illnesses of employed workers. In California, OSHA enforcement of workplace requirements is performed by Cal OSHA. Under Cal OSHA regulations, as of July 1, 1991, every employer must establish, implement, and maintain an injury and illness prevention program.

- The HST Urban Design Guidelines (Authority 2011) require implementing the principles of Crime Prevention through Environmental Design. This is a design method that focuses on reducing opportunities for crime through the design and management of the physical environment. Four basic principles of Crime Prevention through Environmental Design should be considered during station and site planning: territoriality (designing physical elements that express ownership of the station or site); natural surveillance (arranging physical features to maximize visibility); improve sightlines (provide clear views of surrounding areas); and access control (physical guidance of people coming and going from a space).

- The HST design includes emergency access to the rail right-of-way, and elevated HST structure design includes emergency egress points.

- All active and abandoned oil and gas wells within 200 feet of the HST tracks would be identified in consultation with DOGGR. All active wells would be abandoned in accordance with DOGGR standards in coordination with the well owner, and these wells would be relocated farther than 200 feet from the HST tracks. In the event that relocated wells do not attain the current production rates of the active wells that are abandoned, the Authority would be responsible for compensating the well owner for lost production. All abandoned wells within 200 feet of the HST tracks would be inspected and re-abandoned, as necessary, in accordance with DOGGR standards and in coordination with the well owner.

3.11.7 Mitigation Measures

The Authority has considered avoidance and minimization measures that are consistent with commitments in the Program EIR/EIS documents. The following mitigation measure will apply to reduce substantial adverse environmental impacts resulting from implementation of the HST project.

S&S – MM #1: Monitor response of local fire, rescue, and emergency service providers to incidents at stations and the HMF and provide a fair share of cost of service. Upon approval of the Fresno to Bakersfield Section, the Authority will monitor service levels in the vicinity of the Fresno, Kings/Tulare, and Bakersfield stations and, at such time as an HMF site is selected, monitor service levels at the HMF site, to determine baseline service demands. “Service levels” consist of the monthly volume of calls for fire and police protection, as well as city- or fire protection district-funded EMT/ambulance calls that occur in the station and HMF site service areas.

Prior to operation of the stations for HST service, the Authority will enter into an agreement with the public service providers of fire, police, and emergency services to fund the Authority’s fair share of services above the average baseline service demand level for the station and HMF service areas (as established during the monitoring period). The fair share will be based on projected passenger use for the first year of operations, with a growth factor for the first 5 years of operation. This cost-sharing agreement will include provisions for ongoing monitoring and future negotiated amendments as the stations are expanded or passenger use increases. Such amendments will be made on a regular basis for the first 5 years of station operation, as will be provided in the agreement. To make sure that services are made available, impact fees will not constitute the sole funding mechanism, although impact fees may be used to fund capital improvements or fixtures (i.e., police substation, additional fire vehicle, on-site defibrillators, etc.) necessary to service delivery.

After the first 5 years of operation, the Authority will enter into a new or revised agreement with the public service providers of fire, police, and emergency services to fund the Authority’s fair share of services. The fair share will take into account the volume of ridership, past record and trends in service demand at the stations and HMF site, new local revenues derived from station area development, and any services that the Authority may be providing at the station.

No secondary effects are anticipated with the above mitigation measure. This mitigation measure would substantially lower impacts of safety and security hazards.

Impacts of Mitigation: If the only need for mitigation is the provision of additional emergency response equipment, this mitigation measure will result in no impacts. If the project requires funding of additional public-service facilities, such as a police substation, mitigation may result in impacts on the physical environment. Those impacts would include emissions and fugitive dust from construction equipment, construction-related noise, visual impacts associated with new structures, and impacts on biological and cultural resources that may be present on the site of new structures. Any new or expanded government facilities would be designed and constructed to be consistent with local land use plans, and would be subject to separate site-specific analysis under CEQA, including measures to mitigate impacts to a less-than-significant level. For this reason, it is expected that impacts of mitigation would be less than significant under CEQA, and the impact would have negligible intensity under NEPA.

3.11.8 NEPA Impacts Summary

Under NEPA, project effects are evaluated based on the criteria of context and intensity. Context is the environment that could be affected by a proposed project, and intensity is the degree or magnitude of a potential adverse effect, described as negligible, moderate, or substantial.

The context for safety is typically local (i.e., the immediate construction or operations area), although natural disasters (e.g., major seismic event, widespread flooding) could result in project impacts in a regional context. The context for security also is often local (e.g., vandalism of HST property, crime on trains or at stations), but major terrorist attacks could affect the project at the regional or statewide scale. Intensity definitions are provided in Section 3.11.3.1. Context and intensity are considered together when determining whether an impact is significant under NEPA. The following NEPA impacts were identified under the No Project Alternative and the HST project alternatives.

Under the No Project Alternative, existing safety conditions related to motor vehicles, pedestrians, and bicyclists would not change and existing emergency response plans and procedures would not be affected.

Under the HST alternatives, direct and indirect effects have been identified under NEPA for the construction period, as well as the operation of the proposed project. These effects and their significance under NEPA are summarized below.

- Accident risks at construction sites and around construction detours would be of negligible intensity of a local context with implementation of a standard construction health and safety plan, construction transportation plan, and traffic control plan. The majority of accident risks at HST construction sites are typical of transportation infrastructure projects, are local in scale, and affect only construction workers who are trained in safety and security measures. Therefore, construction accident risks would not be considered significant under NEPA.
- The effects from train-to-train collisions, collisions with vehicles or other trains entering the HST corridor, or train derailments would be of negligible intensity because of implementation of a system-design approach and design standards. The context for derailments and collisions would be local to the accident site. HST operations worldwide share the safest travel record of any mode of transportation, as supported in this section. With a commitment to the highest design standards, the potential of an accident with the HST would not be significant under NEPA.
- The HST alignment would have no effect on motor vehicle, pedestrian, and bicycle safety due to full grade separation and roadway improvements. Because the project involves replacement of at-grade crossings over existing railroad lines, the change of safety for the local communities would have a beneficial effect under NEPA.
- Seismic and fire hazards would be of negligible intensity under NEPA with implementation of design features and standard operating and emergency response plans. The context for project impacts from fire would be would be local; seismic hazard contexts could be local or regional. Considering standard design techniques for seismically active regions of California, the fact that the HST will not carry fuel or large quantities of flammable materials, and given the safety record of other HST systems in seismically sensitive areas, these hazards would not be significant under NEPA.
- Active and abandoned oil and gas wells located within 200 feet of the HST tracks pose a safety and operational hazard for the project. Active wells in this zone would be plugged and relocated, and inactive wells would be examined and reabandoned, as necessary. Therefore, for the local context along the HST alignment, the safety risk would be of negligible intensity

because wells will be plugged in accordance with current DOGGR standards, this safety hazard would not be significant under NEPA.

- Increased response times for emergency responders and their access to elevated tracks would be of negligible intensity with implementation of standard design features and operating and emergency response plans. The context for considering these project impacts is local in urban areas, and potentially regional in more remote, rural areas, where responders from multiple jurisdictions may be involved. Considering the available emergency service equipment and staff in the region, response times, and safety record of international HST systems, this impact would not be significant under NEPA.
- The HST project has the potential to increase demand for emergency responses in station areas and at the HMF in the local context. The number of people who may be present at a station may result in a concentration of additional emergencies in a localized area. Although emergency responses may be more frequent, the facilities and emergency responses can be achieved; therefore, this would not result in a new service, would be of negligible intensity, and would not be significant under NEPA.
- Project impacts from criminal and terrorist activity would have negligible intensity in local and regional/statewide contexts with implementation of standard design features and operating plans. The probability for a criminal or terrorist activity in the project corridor is remote and therefore would not be significant under NEPA.
- The HST project would not impinge upon Part 77 airspaces of any public or private airstrips or heliports in the project corridor. Therefore, HST project safety risks to people using these airstrips and heliports in the local context would be of negligible intensity, and would not be significant under NEPA.
- The hazard of nearby industrial and agricultural facilities failing and damaging the HST tracks or trains has negligible intensity in the local context because of building codes and safety regulations. Therefore, this hazard would not be significant under NEPA.
- The risks of accidents affecting the safety of residents, school children, and school employees are considered in a local context and would have negligible intensity because the risk is limited to the physical impact of a derailed train leaving the right-of-way and implementation of standard design features would keep trains within the right-of-way. Therefore, these risks would not be significant under NEPA.
- The existing dam safety program in California reduces the risk of flooding from a dam failure affecting HST facilities to a negligible intensity. This risk, in both the local and regional contexts, would not be significant under NEPA.

Residual effects of the project on safety and security following mitigation would be negligible. The Authority would compensate fire, rescue, and emergency service providers for increased services required because of the project.

3.11.9 CEQA Significance Conclusions

Table 3.11-9 lists significant safety- and security-related impacts, associated mitigation measures, and the level of significance after mitigation. After mitigation, no impacts related to safety and security would be significant under CEQA.

Table 3.11-9
CEQA Significance Conclusions for Safety and Security

Impact	CEQA Level of Significance before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Project			
S&S #10: Need for Expansion of Existing Fire, Rescue, and Emergency Services Facilities.	Significant	**S&S-MM #1**: Monitor response of local fire, rescue, and emergency service providers to incidents at stations and the HMF and provide a fair share cost of service.	Less than significant