3.19 Cumulative Impacts

This section presents an analysis of the cumulative effects of implementing the project in combination with other past, present, and reasonably foreseeable future projects that may result in environmental impacts. The focus of this cumulative impacts analysis is on the Merced to Fresno Section of the HST System and the regional context appropriate for each resource area. For a discussion of the impacts of implementing the California HST System in its entirety, see the Statewide Program EIR/EIS (Authority and FRA 2005). For a discussion of the impacts of implementing the HST System in the San Francisco Bay Area to Central Valley region, see the Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008) and the Bay Area to Central Valley HST Revised Final Program EIR (Authority 2010). The cumulative impacts of the HST System as a whole are summarized under each resource topic below, with additional refinements and detail since the publication of the Draft EIR/EIS.

3.19.1 Introduction

3.19.1.1 Laws, Regulations, and Orders

National Environmental Policy Act

Pursuant to NEPA regulations, 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 considerations. Beneficial effects are identified and described. When there is no measurable effect, an impact is found not to occur. The intensity of adverse effects is the degree or magnitude of a potential adverse effect, described as 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 the intensity of the impact is determined to be negligible or even if the impact is beneficial.

Under NEPA, a cumulative impact is the impact on the environment that results from the combination of incremental impacts of the action and other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal), entity, or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time (40 CFR 1508.7). A cumulative impact includes the combined effect on a natural resource, ecosystem, or human community that is attributable to past, present, or reasonably foreseeable future activities or actions of federal, nonfederal, public, and private entities. Cumulative impacts may include the effects of natural processes and events, depending on the specific resource. Accordingly, there may be different levels of cumulative impacts on different environmental resources.

California Environmental Quality Act

Under CEQA, an EIR must discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. The discussion of cumulative impacts need not provide as much detail as is provided for the effects attributable to the project alone (State CEQA Guidelines Section 15130(b)).

Cumulative impacts are defined as two or more individual effects which, when considered together, are considerable or compound, or increase other environmental impacts. The cumulative impact of several projects is the change in the environment that results from the incremental impacts of each project in combination with other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from the combination of individually minor but collectively significant projects over a period of time (State CEQA Guidelines Section 15355).

3.19.1.2 Methods

The following steps helped determine the project's contribution to cumulative impacts, if any, for each resource:

- Review the impacts of the proposed project for each resource area. In those instances where the project would have a beneficial effect, consider this in conjunction with any adverse effects to the resource and proposed mitigation.
- Compile a list and description, as well as environmental impact information for past, present, and reasonably foreseeable projects and relevant plans for consideration of cumulative impacts. Check for such projects in regional transportation plans (RTP); regional transportation improvement plans (RTIP); local long-range transportation plans; local land use, general, and specific plans; interviews with local and regional planning agencies; and recent environmental documents for other large-scale projects near HST alternatives.
- Reasonably foreseeable future projects are those that are likely to occur and will add to the cumulative impact on a particular resource. Generally, projects are reasonably foreseeable under the following conditions:
  - Applications for project entitlements or construction are pending with a government agency.
  - The project is included in an agency's budget or capital improvement program.
  - The project is a foreseeable future phase of an existing project.
  - The project would likely occur within the 2035 planning horizon for the HST Project.
- Define the study area for the cumulative effects for each resource area.
- Identify the resource areas where the proposed project and projects that are occurring or reasonably foreseeable to occur could, together, cause a cumulative effect.
- Determine whether the proposed project's incremental contribution to the cumulative impacts for each resource area is cumulatively considerable.
- Identify reasonable, feasible options for avoiding or mitigating the project's contribution to significant cumulative impacts.

3.19.2 Cumulative Projects and Growth Forecasts

This section discusses the historical context of the study area and how development trends in the past have influenced the environmental character of the study area. This section also discusses projected development trends and describes how future urbanization will change the character of the study area to the year 2035. The cumulative project list (see Section 3.19.2.3) includes projects identified in municipal capital improvement programs and other long-range plans or in the permitting/entitlement process.

3.19.2.1 Historical Context of Project Area

Section 3.16, Cultural and Paleontological Resources, provides an overview of the history of cultural development in Merced, Madera, and Fresno counties from the Spanish Period (1769 to 1822) through the Gold Rush period and the development of railroads that brought new settlers to this area. At the start of the American Period (1848 to present), the discovery of gold in 1848 at Sutter's Mill near Sacramento enticed thousands of settlers and immigrants to pour into the state, mostly in larger northern urban areas such as San Francisco and the Sierra foothill regions. During the Gold Rush years of the 1850s and 1860s, immigrants also traveled to the southern Mother Lode in the northern San Joaquin Valley. Many headed for the "gold hills", and enterprising individuals and businesses met the miners' increasing demand for food and supplies, boosting the establishment of farms, ranches, and small towns along

navigable waterways and tributaries. The cattle business and grain farming were particularly suited to the region's soils and climate, and in the 1870s, the valley became the center of California's wheat belt.

It was not until after the Central Pacific Railroad constructed its Southern Pacific line through the San Joaquin Valley in 1870 that the regional population and economy grew significantly. The railroad connected the valley to Sacramento and San Francisco and revolutionized the transportation network, passenger travel, and the ability of farmers and ranchers to sell their goods to distant markets. The railroad established stops and sidings along the tracks, forming the basis for settlement and growth of local farms and ranches, small communities, and later urban centers.

Irrigation transformed the agricultural potential of the drier portions of the northern San Joaquin Valley. By 1887, water from canal systems irrigated more than 600,000 acres in Fresno County. Compared to other parts of the state, the San Joaquin Valley continues to be a powerful economic center for the agricultural and livestock industries, and remains more rural in character. The popularity of the automobile ushered in the establishment of a state highway system in the early 1900s. Within the interior Central Valley, a north-south highway was planned to pass through as many population centers as possible. Widening of the first paved road segments, corresponding to today's SR 99, occurred in the 1920s and 1930s. This improvement in surface transportation encouraged the growth of existing and new residential, commercial, and industrial developments (i.e., neighborhoods, shopping centers, and light industry) along SR 99, particularly during the latter half of the 20th century. SR 99 was completed as a four-lane expressway between Sacramento and Los Angeles in the 1950s.

Historically, the Central Valley was characterized by California prairie, marshlands, valley oak savanna, and extensive riparian woodlands (Hickman 1993). Today, more than 80% of the land is covered by farms and ranches (Natural Resources Conservation Service [NRCS] 2006). In 2007, Madera County had 1,708 farms occupying nearly 700,000 acres, with an average farm size of 398 acres, Merced County had a total of 2,607 farms occupying more than 1 million acres, with an average farm size of 399 acres, and Fresno County had 6,081 farms occupying more than 1.6 million acres of land, with an average farm size of 269 acres (USDA 2007).

The San Joaquin Valley population growth has exceeded the statewide growth rate since 1970 (Fresno Council of Governments [COG] 2007); currently more than 10% of the state's population resides in this region. Fresno, the fifth largest city in California as of January 1, 2010, is the financial and commercial capital of the central San Joaquin Valley. Caltrans has begun implementing the *Route 99 Corridor Business Plan* (Caltrans 2009), which will remove remaining at-grade intersections and improve others to higher capacity. The plan calls for widening the route between Merced and Fresno from four to six lanes, and sometimes six lanes with auxiliary lanes, to ease traffic flow between interchanges. A list of completed projects along SR 99 is provided below:

- Convert 2.7 miles to 6 lanes north of Atwater to Arena Way, removed at-grade crossing at Westside Blvd and construct new interchange.
- Convert 4.6 miles to 6 lanes from Madera County line to Buchanan Hollow Road, removed at-grade crossings and construct new interchange at Plainsburg Road.
- Widen near Madera, south of Avenue 21.5 and SR 152/99 with interchange at Avenue 22.
- Improve interchanges at SR 145, SR 140, and Mission Avenue.

Over the next 10 to 15 years, depending on available funding, Caltrans will continue implementation of the plan.

Other major developments in the project area have included development of the University of California-Merced, terminal improvements at Fresno-Yosemite International Airport, and multiple mitigation banks for preservation of wetlands, including but not limited the Great Valley Conservation Bank and the San Joaquin River Ecological Reserve.

3.19.2.2 Projected Growth Trends

As discussed in Chapter 2, Alternatives, under the No Project Alternative, projections show that the San Joaquin Valley will grow at a higher rate than any other region in California. Projections also show that Merced, Madera, and Fresno counties will continue to grow an average of 3% per year. By 2035, the study area will grow from a population of 1,366,000 to 2,298,000, which is a net increase of 932,000 people, or 68%. This increase could result in approximately 93,200 acres in new development to support the increased population. Accommodating this new population will require land and the construction of new roadways, electric power generation facilities, utilities, schools, and hospitals, and commercial and industrial facilities. The combined environmental influence of these future changes is referred to as the "cumulative condition" for 2035.

The cumulative project list discussed in the following section identifies the known projects that will become a part of the cumulative condition.

3.19.2.3 Cumulative Project Lists

Appendix 3.19-A provides detailed information about the reasonably foreseeable development projects and plans, and Appendix 3.19-B provides similarly detailed information about transportation projects considered in the cumulative condition. These lists include projects that are intended to help accommodate the 2035 study area population. The lists represent a small number of the projects that likely will be constructed within the study area from now through 2035. This is because permits and other entitlements required for the approval of private projects generally present only a snapshot of development activity over the next 3 or 4 years, although this timeframe may expand somewhat because of construction delays caused by the recent recession.

Appendix 3.19-A includes a series of tables that list major capital or new development projects by jurisdiction for the study area counties and cities and their potential for contributing to cumulative impacts. The tables include mixed-use developments planned for the near term and general plan updates to accommodate long-term development and urbanization, including the conversion of agricultural land anticipated to occur with the growth in population. In summary, over 60 projects and plans have been identified for the Cities of Merced, Madera, Chowchilla, and Fresno and for Merced and Madera counties. In addition, four projects have been included for the BNSF planned and potential projects and the San Joaquin River Restoration Program. Agriculture, air quality, and noise and vibration would be the resources most often impacted by these projects.

Applicable plans, primarily RTPs and General Plan Transportation Elements, were also reviewed to identify planned and programmed transportation improvements that were considered in the setting, and to identify impacts. Funded and programmed improvements on the intercity highway network are based on financially constrained RTPs developed by regional transportation planning agencies and include over 200 improvements in the Merced, Madera, and Fresno areas, see Appendix 3.19-B. The primary projects involve the widening of SR 99 from four to six lanes north of Fresno and from six to eight lanes in Fresno. While these projects are planned to accommodate project traffic volumes, Caltrans has determined that many portions of SR 99 would remain congested in 2035 despite these improvements. In addition, there are plans for intersection improvements along SR 99 throughout the project corridor, including interchanges at SR 140, SR 145, SR 152, SR 12, SR 17, the Grantland diagonal, and an overcrossing at Shields. There are also several minor road-widening projects within the City of Fresno for smaller arterial roadways.

Section 3.18, Regional Growth, describes induced growth and indirect effects from growth; that section also identifies cumulative impacts associated with future projects and regional growth.

3.19.3 Analysis of Cumulative Impacts

The cumulative impacts discussion for each resource area considers the resource-specific study area, the condition of the resource, concurrent construction activities, the cumulative condition without the project, and the cumulative condition with the HST alternatives contribution. The cumulative condition is the No Project Alternative combined with the project list (reasonably foreseeable projects listed in Appendix 3.19-A and Appendix 3.19-B).

Cumulative Condition

Projected growth and conversion of land to urban uses associated with the cumulative condition is anticipated to have a substantial environmental effect in the study area over the 2010 to 2035 planning period. Populations of Merced, Madera, and Fresno counties are projected to increase by 80%, 104%, and 59%, respectively, between 2010 and 2035. Housing and infrastructure associated with this increase would result in approximately 91,000 acres of new land development (see Section 2.4.1 for rationale). The San Joaquin Valley Blueprint Roadmap (Mintier Harnish et al. 2010) calls for planning in the region to adopt smart growth principles, such as strengthening and directing development toward existing communities, that will focus growth in urban areas and population centers.

Nevertheless, urban development will continue to result in the conversion of agricultural land, especially for housing and associated developments. Under the cumulative condition, traffic would increase; ambient noise levels would increase; the demand for energy and water would increase; habitat for wildlife would become less available; the amount of impervious surfaces would increase and affect the quality and amount of stormwater runoff; demand for public facilities and parks would increase; the land available for agricultural production would decrease; and the visual character of many locations in the study area would change from rural to urban. Growth is projected to result in an increase of employment by 332,721 jobs, which would create additional economic opportunities in the study area (see Chapter 2, Alternatives, Table 2-4).

HST Alternatives Contribution

In most cases, the HST alternatives contribute an incremental impact over the past, present, and reasonably foreseeable project impacts and the cumulative condition. As analyzed in Section 3.18, Regional Growth, the project would contribute an additional 3% population increase and 4% employment increase over the cumulative condition. Over the 25-year planning horizon, these increments are cumulatively considerable in some resource topics and provide beneficial effects in others. However, compared to the cumulative condition (i.e., the growth associated with the No Project Alternative by 2035), the project would potentially improve the future environmental condition because of the benefits afforded by TOD, reduced automobile travel, reduced air pollutant emissions, and the economic activity generated.

At this level of analysis, there are few differences in the cumulative condition and the cumulative condition with the HST alternatives' contribution, with no apparent differentiating factors among the alternatives. As such, the cumulative analysis considers the environmental condition of the study area with and without the project and its cumulative effect with other past, present, and reasonably foreseeable projects.

The project has developed through the EIR/EIS process and has refined the project designs to avoid and minimize effects. As applicable, each resource analysis included a description of design features, including standards, regulations, and BMPs that will be implemented during construction and operation to further minimize effects. Finally, when an effect could not be avoided, each resource analysis provided one or more mitigation measures to address significant impacts. This cumulative analysis focuses on the effects that cannot be mitigated to avoid a significant effect. This analysis assumes that mitigation measures are complete and that no further mitigation measures are available to offer in the case where a significant cumulative impact occurs. The cumulative effect that is within the responsibility of the Authority and FRA is the potential for cumulative construction effects to occur in neighborhoods where multiple projects are

under construction concurrently in the same general vicinity. As described in Chapter 2, Alternatives, Section 2.8 (Construction), the mobilization of a contractor would include the development of a Construction Management Plan which would include the commitment to coordinate with concurrent construction projects.

3.19.3.1 Transportation

The HST alternatives study area for the transportation cumulative analysis includes Fresno, Madera, and Merced counties. Because the transportation analysis is regional, the transportation impacts presented in Section 3.2, Transportation, and the existing conditions already represent the cumulative condition. In Merced and Madera, roadways in the vicinity of the proposed HST alignment operate at level of service (LOS) D or better under existing conditions. In Fresno, major roadways such as Golden State Boulevard, Shaw Avenue, and McKinley Avenue in the vicinity of the proposed HST alignment, generally operate at LOS D or better under existing conditions. More information on the LOS calculation is provided in the *Merced to Fresno Section Transportation Technical Report* (Authority and FRA 2012a). The current vehicle miles traveled (VMT) in the study area is approximately 35 million.

By 2035, the cumulative condition would result in approximately 50 million VMT daily in the study area. Highway improvements planned in the study area would not reduce daily VMT but would help to reduce future congestion in some areas.

Construction

If the SR 99 expansion projects as listed in Appendix 3.19-B occur at the same time as the HST Project, the construction effects may compound and contribute to incrementally more delays in traffic and detours for travel within the region. Coordination and, to some degree, construction phasing would minimize these temporary effects, resulting in cumulative impacts that have negligible intensity under NEPA and are not cumulatively considerable under CEQA.

Cumulative Impacts on Transportation

Implementation of the HST Project is expected to result in a combined reduction in VMT of 7.0% for Merced, Madera, and Fresno counties. Highway improvements planned in the study area would not reduce daily VMT but would help to reduce future congestion in some areas. Cumulatively, the HST Project and the planned and programmed highway improvements would reduce congestion, reduce travel delays, and stimulate economic growth as a result of improvements in mobility for the study area population. Offering a broad range of transportation modes improves accessibility to the state's urban centers in the Central Valley beyond what would occur by only widening freeways, because HSTs offer a more reliable and safe mode of travel. Locally, the project would contribute to traffic in the HST station areas; however, only slight changes would be experienced with mitigation. The HST would close roads in rural areas where traffic volumes are minimal. However, the project includes overcrossings at least every 2 miles apart or would be elevated over existing transportation systems and therefore circulation effects would be moderate to negligible depending on the vicinity. Local circulation effects around HST stations are mitigated. As a result of reduced congestion and delay, and improved mobility and access, cumulative transportation impacts would be beneficial, resulting in cumulative impacts that have negligible intensity under NEPA and are not cumulatively considerable under CEQA.

As described in the Program EIR/EIS documents, implementation of the HST System as a whole could benefit intercity highways. The HST System could also have a significant impact on local traffic conditions near some HST stations, such as the Transbay Transit Center (San Francisco to San Jose Section) and Buena Vista Station Area (Palmdale to Los Angeles Section), resulting in decreases in level of service.

Summary of NEPA/CEQA Impacts

The HST Project's contribution to cumulative effects would provide benefits to the regional transportation system because of the reduced traffic congestion and delay, and improved mobility and access in the

region. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

Mitigation

The HST Project would implement transportation mitigation measures provided in Section 3.2.7. No added mitigation is needed to address cumulative impacts.

3.19.3.2 Air Quality and Global Climate Change

The study area for the cumulative analysis of air quality is the San Joaquin Valley Air Basin (SJVAB)**.** The SJVAB is in nonattainment for ozone and $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS), maintenance for PM_{10} and CO NAAQS (urban portion of Fresno County only), and nonattainment for ozone, PM_{10}, and $PM_{2.5}$ California Ambient Air Quality Standards (CAAQS). As a result, the area is subject to stringent emissions requirements for ozone precursors (VOC and NO_x) and particulate matter. The study area for direct and indirect impacts related to the HST alternatives is described in Section 3.3, Air Quality and Global Climate Change.

Regulatory agencies continue to pass more stringent criteria pollutant and GHG emission standards with the goal of reducing the amount of pollutant emissions in the atmosphere. Many of these regulations are not yet implemented but would be prior to the project planning horizon of 2035. Overall air quality has improved and is anticipated to continue to improve because of these regulations. However, growth and proposed developments will result in thousands of new homes and millions of square feet of new retail uses. The associated increase in slow-moving traffic will continue to affect air quality to some incremental degree.

The regional impacts for the project presented in Section 3.3, Air Quality and Global Climate Change, are the same as those in this cumulative analysis. The local impacts for the project were also evaluated with the reasonably foreseeable projects within each county to determine if they would cause a significant cumulative impact.

Regional: Emissions associated with long-term growth and development in Merced, Madera, and Fresno counties are expected to exceed the SJVAPCD CEQA significance thresholds. On a regional scale, past, present, and foreseeable projects would contribute to traffic congestion associated with long-term growth of the region and worsen air quality.

Local: Cumulative carbon monoxide impacts are accounted for in the CO hotspot analysis, presented in Section 3.3 (Air Quality and Global Climate Change). The CALINE4 air dispersion modeling evaluation indicated that the HST alternatives would cause a less than significant impact for CO emissions. Therefore, project CO effects would be cumulatively considered to have negligible intensity under NEPA, and the cumulative impacts would be less than significant under CEQA.

Greenhouse Gases: Regulatory agencies continue to pass more stringent GHG emission standards with the goal of reducing the amount of pollutant emissions in the atmosphere. While many of these regulations have not yet been implemented, they are anticipated to be in effect prior to the project planning horizon of 2035. Even with these regulatory reductions, the expected growth in the region would result in significant cumulative increases in GHG emissions. There is also a possibility that the HST alternatives' demand for electricity (16.55 to 11.04 gigawatt hours per day for ridership cases of ticket price 50% to 83% of air fare) would result in indirect GHG emissions impacts from power generation facilities. The Authority has adopted a policy to purchase renewable, clean power energy sources, but since the power distribution of PG&E cannot divide the power resources, there may be emissions associated with this energy resource. However, the HST alternatives would overall decrease GHG emissions by reducing vehicle and aircraft trips, as described in Section 3.3, Air Quality and Global Climate Change. This reduction in GHG emissions would more than the GHG emission increases associated with project facilities operation. Therefore, the HST alternatives would result in a net decrease in GHG emissions and would have a cumulatively beneficial effect on global climate change.

Construction

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted a cumulative threshold of significance of 10 tons per year for ozone precursors (VOC and NO_x) and 15 tons per year for PM_{10} and $PM_{2.5}$. Project construction emissions of NOx and VOC would exceed the CEQA threshold before mitigation. All pollutants emissions would be below the CEQA thresholds after mitigation. Construction emission impacts would be temporary, and would not contribute to air quality degradation and impede the region's ability to attain air quality standards. GHG emissions associated with project construction would be offset by the emission reduction during HST operation.

Construction of the HST Project would increase regional pollutant emissions; however, these emissions would be below the SJVAPCD CEQA thresholds after mitigation. Combined with the Fresno to Bakersfield Section and the San Joaquin Valley portion of the San Jose to Merced Section, it is possible that the regional pollutant impacts that were less than significant before mitigation will be significant, requiring further mitigation. The emissions for these other segments will be totaled to determine the cumulative impact, and mitigated appropriately. The past, present, and reasonably foreseeable projects in the region would have air quality impacts of substantial intensity under NEQA and significant under CEQA, and the contribution of the proposed HST Project construction on air quality impacts would be of substantial intensity under NEPA with implementation of mitigation measures and be cumulatively considerable under CEQA.

Cumulative Impacts on Air Quality

Although there would be significant cumulative impacts due to regional growth and development, operation of the HST would help the region attain air quality standards and plans by reducing the amount of regional traffic and providing an alternative mode of transportation. Operation of the HST Project would decrease emissions of criteria pollutants, thus resulting in a net benefit to regional air quality. Because operation of the HST Project would help the region attain air quality standards, the HST alternatives would have a cumulatively beneficial effect on air quality.

Operations at the HMF would emit hazardous air pollutants (HAPs). A health risk analysis performed for the HMF emissions indicated that health impacts would be less than significant for receptors farther than 1,300 feet from the HMF. Therefore, operation of the HMF would not contribute to cumulative effects beyond 1,300 feet from the facility. The operation of the remaining project components would not be a significant source of HAPs and would, therefore, would not contribute to a cumulative HAPs impact.

As described in the Statewide Program EIR/EISs, the HST System as a whole would have less than significant impacts on air quality. The HST System would reduce VMT and result in system-wide air quality benefits. Temporary short-term emissions increases associated with construction activities and localized air pollution increases associated with traffic near proposed HST stations would be substantially reduced by mitigation strategies and design practices. The HST System would result in beneficial impacts related to GHGs and global climate change. Additional carbon entering the atmosphere, whether by emissions from the system itself or by removal of carbon sequestering plants (included agricultural crops), would be more than offset by the beneficial reduction of carbon resulting from the project due to a reduction in automobile VMT (mobile sources) and reduction in the number of airplane trips.

Summary of NEPA/CEQA Impacts

Cumulative impacts on air quality caused by the buildout of other projects envisioned by the general plans would have incremental effect on air quality, which is considered to be an effect of moderate intensity under NEPA and cumulatively considerable under CEQA. However, operation of the HST Project would reduce regional VMT and consequently reduce criteria pollutants emissions. Therefore, operation of the HST Project would reduce regional emissions and would have a cumulative air quality benefit.

Increased GHG emissions from past, present, and foreseeable projects in the region would result in significant cumulative effects on global climate change under NEPA and a cumulatively considerable

impact under CEQA. The HST alternatives would result in a net reduction in CO2 emissions; therefore, the project would have a cumulative beneficial effect on global climate change.

Mitigation

The HST Project would implement air quality mitigation measures provided in Section 3.2.7. and the same measures would be applied to address cumulative construction impacts.

3.19.3.3 Noise and Vibration

The study area for noise and vibration is within the screening distance (up to 2,500 feet), as discussed in Section 3.4, Noise and Vibration. The three HST alternatives are located in existing transportation corridors (UPRR, SR 99, and BNSF), which have high noise levels caused by traffic and freight train operations. In addition, the downtown areas of Fresno and Merced have high noise levels from multiple sources. Concentrations of residences and other potentially noise- and vibration-sensitive receptor exist in the cities of Merced, Chowchilla, Madera, and Fresno. Outside of these urban and suburban areas, land is mostly agricultural. Measured day-night sound levels (Ldn) ranged from 56 dBA to 75 dBA along the UPRR/SR 99 Alternative where measurement locations were either in urban or suburban areas or near SR 99; Ldn levels along this alignment vary because of the proximity to SR 99. Ldn values ranged from 46 dBA to 69 dBA in areas along the BNSF Alternative where measurement locations were in suburban and rural environments; Ldn values vary, depending on community activity and traffic. Sources of existing vibrations along the UPRR/SR 99 Alternative alignment include UPRR and BNSF freight trains, Amtrak passenger trains, and truck traffic on SR 99. Sources of existing vibration along the unique portion of the BNSF Alternative include BNSF freight trains and Amtrak passenger trains.

Generally, noise levels would increase with the inclusion of the 2035 increases in population and accompanying development and planned and potential transportation projects. The number of residences affected by noise will increase as traffic levels increase. The noise analysis compares conditions under an HST alternative with the existing condition, which is conservative, because noise is expected to be higher with population growth and expanded highways. There are several planned and potential transportation projects within the project corridor along the proposed UPRR/SR 99 Alternative alignment as listed in Appendix 3.19-B. However, improvements on SR 99 and the railroads would need to double their capacity to noticeably increase noise levels for the average person (i.e., an increase of 3 dBA).

In addition, there are several planned and potential development projects within the project corridor. The Castle Special Planning Zone project area would have potential cumulative noise impacts. The Castle Special Planning Zone environmental review analysis lists traffic noise impacts from roadway improvements and the potential for cumulative impacts from other projects. Generally, vibration impacts in the study area would not occur under the cumulative condition because there are no projects identified that would cause vibration.

Construction

Construction of the project would result in noise and vibration effects that would be managed and limited in duration. There are a few areas where SR 99 and other roadway improvements may result in cumulative construction noise and vibration impacts. It is likely that multiple projects would be under construction at the same time in the cities of Merced and Fresno, but construction on these projects would typically occur during daytime hours or with the addition of noise control measures to stay within required noise limits, and would be temporary. Because construction would typically occur during daytime hours and remain within required noise limits, cumulative noise effects would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Cumulative Impacts on Noise and Vibration

As described in the Programmatic documents, the HST System would create long-term noise impacts from the introduction of a new transportation system. The HST System would operate more than 200 trains per day after full buildout. In rural areas, where typical noise is approximately 60 dBA, passing

trains would result in an average noise increase of 11 dBA. In urban areas, the increases would range from 0 to 7 dBA. Noise mitigation (e.g., sound attenuation walls) may be balanced with other objectives of more importance to the adjoining land uses, such as visual aesthetics and integration with the community context. The Authority is committed to mitigating with multiple measures to remove severe noise effects in the living and sleeping area of buildings. However, there is the possibility of residual severe noise effects for exterior areas (defined as having substantial intensity) during HST operations along the alignment and at the HST stations. The effects would be less at the HMF sites, where HSTs would operate at slower speeds and create less noise. Because the Castle Special Planning Zone is located near the potential HMF site in Atwater and because of the spur between Merced and the HMF, there would be potential cumulative noise impacts (without mitigation). The Roeding Regional Park and Fresno Chaffee Zoo Facility Master Plans (City of Fresno 2011) environmental review analysis identifies that existing conditions in conjunction with the HST alternative would result in potential significant cumulative noise impacts. However, this EIR/EIS has identified mitigation with a noise wall and therefore the noise could be lower than current conditions. Alternatively, the HST System would also result in benefits from long-term noise reduction due to the construction of separated grade crossings, such as the grade crossings proposed in Madera Acres for the Hybrid Alternative and Olive Avenue in Fresno for all alternatives. This would eliminate freight horns for these neighborhoods and for Roeding park users for the Olive Avenue crossing. The cumulative effects of past, present and foreesable projects in combination with the HST Project, even with mitigation, would be of substantial intensity under NEPA and cumulatively considerable under CEQA.

The HST Project and the reasonably foreseeable highway improvements would not benefit from shared noise barriers because of the differences in profile and project location. There would be potential shared benefits, such as the HST guideway shielding traffic noise in locations where the tracks are on a berm. And in areas where both the freight railroad and the HST are at-grade, the noise walls may reduce freight and HST noise for adjacent neighborhoods.

The HST Project would exceed the vibration thresholds at two locations in Le Grand during operation under the BNSF Alternative. However, there are no other projects identified that would cause vibration and contribute to cumulative impacts.

Summary of NEPA/CEQA Impacts

During operation, the HST alternatives may result in severe residual noise effects in rural areas and continual incremental increase in noise in the urban areas which would result in a significant contribution to the cumulative condition. Therefore, cumulative impacts would have substantial intensity under NEPA and would be cumulatively considerable under CEQA.

Mitigation

The HST Project would implement noise and vibration mitigation measures provided in Section 3.4.7.

To minimize the potential cumulative effects of overlapping construction activities within the same area, the Authority would work with local jurisdictions to identify construction schedules of other nearby projects and coordinate construction and project activities. This may reduce cumulative construction noise impacts of multiple projects whose noise impacts may be individually minor but cumulatively considerable.

3.19.3.4 Electromagnetic Fields and Electromagnetic Interference

There are no cumulative impacts related to EMF and EMI because none of the identified past, present, or reasonably foreseeable projects would have EMF/EMI impacts.

As described in the Program EIR/EIS documents, the HST System as a whole could have significant direct and indirect EMF and EMI impacts. Based on the EMF/EMI analysis completed for the Merced Fresno HST Project, no EMF/EMI impacts would occur to sensitive receptors or special equipment.

3.19.3.5 Public Utilities and Energy

The study area for public utilities, water infrastructures and solid waste facilities includes Merced, Madera, and Fresno counties and includes surface, subsurface, and overhead utilities. The study area for energy includes the entire state of California (and western states that produce energy that is exported to California) because the HST System would obtain electricity from the statewide grid.

With the projected 2035 population and employment growth in the Central Valley, there would be an increased demand for utilities to support projected growth. Many of the planned and potential projects in the area reflect this increased growth, including numerous subdivisions and commercial developments. Demand for energy would also increase at a level commensurate with population growth. The region would increase peak and base period electricity demand and would require additional generation and transmission capacity.

Under the cumulative condition, there could be approximately 352,000 new households in the study area by 2035. Assuming 10,896 kWh per household (U.S. Energy Information Administration 2012), 3,835 MW of new power would be required in the study area. Residential development projects and associated commercial and industrial developments are required to apply for permits and undergo environmental review so that the electricity demands of the project can be met. In addition, electricity providers perform regular demand projections that include the demand created by planned development. New transmission and distribution lines would need to be built, or existing facilities would need to be upgraded to serve the increased demand. There are no major electrical infrastructure projects identified on the list of reasonably foreseeable projects. Although measurable, the energy used for project construction would not require significant additional capacity or significantly increase peak or base period demands for electricity and other forms of energy. Energy efficiency is expected for the offsite production of construction materials, based on the economic incentive for efficiency. Standard BMPs would be implemented onsite so that non-renewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner.

Water Infrastructure and Resources

The addition of 352,000 households under the cumulative condition would require 4.48 billion gallons of potable water per year, assuming 127,400 gallons per household annually (American Water Works Association 2010). Commercial and industrial development would also generate increased water demand which would be projected by water providers and approved through a permitting process. Proportionate increases in wastewater treatment would also be required. As with many communities throughout California, more conservation measures would be required to reduce water demand during multiple years of drought.

Solid Waste/Recycling Facilities

Existing solid waste facilities have permits to operate through the early 2030s and can serve the projected increase in population.

Construction

Construction could require the temporary shutdown of utility lines, such as water, electricity, or gas, to safely move or extend these lines. Where necessary, project design and phasing of construction activities would minimize interruptions, including for upgrades of existing power lines to connect the HST System to existing PG&E substations. During construction, the potential for accidental disruption of utility systems including overhead utility lines (e.g., telephone and cable television) and buried utility lines (e.g., water, wastewater, and natural gas lines) is low due to the established practices of utility identification. Because of the short duration of the planned interruptions, construction activities would not contribute to a cumulative reduction in utility service; therefore, cumulative impacts would have negligible intensity under NEPA and not be cumulatively considerable under CEQA.

During project construction, energy would be consumed to produce and transport construction materials. Operating and maintaining construction equipment would also consume energy resources. Energy would

be used for the construction of track work, guideways, maintenance yards, stations, support facilities, and other structures. The payback period for energy consumed during construction would be less than a year when compared to both the future and existing condition baselines. Although measurable, the energy used for project construction would not require significant additional capacity or significantly increase peak or base period demands for electricity and other forms of energy. Energy efficiency is expected for the offsite production of construction materials, based on the economic incentive for efficiency. Standard BMPs would be implemented onsite so that non-renewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner. The indirect use of energy for construction of the Merced to Fresno Section of the HST system would result in an impact with moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

Water Infrastructure and Resources

Construction activities involve the use of water to prepare concrete, increase the water content of soil to optimize compaction, control dust, and re-seed disturbed areas. Construction of the HST alternative, in addition to other past, present, and reasonably foreseeable projects within the project area, would result in incremental temporary increases in demand for water. However, these increases would not require construction or expansion of water treatment facilities, or new or expanded water entitlements. Because neither facility expansions nor new facilities are required, cumulative impacts under NEPA would have negligible intensity and would not be cumulatively considerable under CEQA.

Solid Waste/Recycling Facilities

Construction activities would result in debris, such as concrete from demolished structures and asphalt from removed roadways. Construction and demolition waste would be reused to the degree feasible. Other construction waste would be disposed at landfill facilities with sufficient permitted capacity to accommodate the project's solid waste disposal needs. Due to existing landfill capacity to receive construction-related debris, cumulative impacts under NEPA would have negligible intensity and would not be cumulatively considerable under CEQA.

Cumulative Impacts on Public Utilities and Energy

In addition to the power requirements discussed below, the HST Project would require connections to local utility services, including natural gas, petroleum, and telecommunications. Where necessary, the Authority would modify existing utilities to accommodate the project, including relocations and upgrades. The incremental draw on these services would be equivalent to similar commercial uses in the area and would result in impacts with negligible intensity under NEPA and no cumulatively considerable impacts under CEQA.

The project engineers have conservatively estimated that the electrical demand for the propulsion of the HSTs and operation of the HSTs at terminal stations, storage depots, and maintenance facilities would be approximately 9 to 14 gigawatt hours (GWh) per day, which can be derived by renewable resources. This is an increment of additional electrical load on the electric power system. However, HSTs use less absolute energy than an airplane service that provides only 25% of the passenger carrying capacity. As such, the HST System is a more energy-efficient mode of transportation than travel by aircraft or car, and the system would result in an overall reduction in total energy consumption (combined electric power demand and oil consumption). The HST alternatives are beneficial from an energy conservation perspective. The beneficial effects on energy and the upgrades to existing transmission lines for the HST alternatives would result in cumulative impacts with negligible intensity under NEPA and no cumulatively considerable impacts under CEQA.

As described in the Programmatic documents, the HST System would have a significant impact on statewide electricity demand. However, as explained above, the HST System is a more energy-efficient mode of transportation than travel by aircraft or car, and the system would result in an overall reduction in total energy consumption (combined electric power demand and oil consumption).

Water Infrastructure and Resources

The operation of the HST alternative alignments would result in an additional annual water requirement of approximately 1.5% of existing water usage in the construction footprint, and demand for the station alternatives would be less than 0.01% of the total projected water demands of the municipalities that would serve the sites. There would be insignificant increases in the use of potable and nonpotable water or the generation of wastewater from the proposed HST stations and HMF. The additional demand of the cumulative condition with the HST alternatives' contribution would not contribute to substantial or cumulatively considerable water resource impacts. The additional water demand would result in cumulative impacts with negligible intensity under NEPA and no cumulatively considerable impacts under CEQA.

As described in the Programmatic documents, the extension of facilities and provision of water and wastewater services for the entire HST System as a whole would have less than significant impacts and would not contribute to a substantial or cumulatively considerable impact from water demand, or a substantial or cumulatively considerable impact related to provision of water or wastewater infrastructure.

Solid Waste/Recycling Facilities

Operation of the HST Project would generate solid waste. The solid waste would be recycled to the extent that the waste management firms and utility districts implement recycling. Existing solid waste facilities have permits to operate through the early 2030s and can serve the projected increase in population; therefore, the additional demand on these facilities would result in cumulative impacts with negligible intensity under NEPA and no cumulatively considerable impacts under CEQA.

As described in the Programmatic documents, the HST System as a whole would generate small volumes of solid waste and would not place a substantial demand on landfill capacity. For example, the waste generated in the Merced to Fresno Section would be disposed at landfill facilities with sufficient permitted capacity to accommodate the project's solid waste disposal needs, and implementation of the Merced to Fresno HST Section is not anticipated to result in cumulatively considerable solid waste impacts. Because operation of the HST System would generate small volumes of waste and would not cause a substantial demand on landfill capacity, the HST System would result in cumulative impacts with negligible intensity under NEPA and no cumulatively considerable impacts under CEQA.

Summary of NEPA/CEQA Impacts

The public utilities and energy, water infrastructure and resources, and solid waste/recycling in the study area have sufficient capacity to accommodate planned growth and the HST Project would not substantially increase the overall demand; therefore, cumulative impacts on existing utilities would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Mitigation

The HST Project would implement design features and mitigation measures provided in Section 3.6.7. No added mitigation is needed to address cumulative impacts.

3.19.3.6 Biological Resources and Wetlands

The study area for the cumulative analysis of biological resources and wetlands considers the distribution of their habitat in the San Joaquin Valley. For wetlands, the study area includes the Middle San Joaquin-Lower Chowchilla Watershed (HUC 18040001) and the Tulare-Buena Vista Lakes Watershed (HUC 18030012) (Authority and FRA 2012b). The Middle San Joaquin-Lower Chowchilla Watershed includes Fresno, Madera, Mariposa, Merced, San Benito, and Stanislaus counties (EPA 2010a). The Tulare-Buena Vista Lakes Watershed includes Fresno, Kern, Kings, Madera, San Luis Obispo, and Tulare counties (EPA 2010b). Because of the length of the Merced to Fresno Section, the study area for San Joaquin kit fox is its range in the Central Valley, from southern Kern County to eastern Alameda County

and eastern Stanislaus County. This area includes Alameda, Merced, Madera, Fresno, Kings, Tulare, San Joaquin, Contra Costa, Kern, and San Benito counties (California State University at Stanislaus 2006).

Existing development trends affecting biological resources are expected to continue and potentially further degrade some natural systems because development, such as new residential communities and transportation infrastructure, would convert undeveloped habitat to other uses. In addition, the developments would degrade remaining habitat through pollution, noise, and dust, and would threaten species with mortality from vehicle strikes and habitat fragmentation.

Historical development patterns show that the Central Valley has lost 99% of its native grasslands and valley oak savanna, 95% of its wetlands, 66% of the vernal pools, and 89% of its riparian woodlands (CDFG 2007). The natural landscape has been converted into agricultural land, rural residential areas, and urban areas, which has reduced and fragmented the available wildlife habitat and limited the movement of wildlife between remaining habitat areas. Even under existing regulations that protect resources and mitigate potential impacts, these trends could persist under the cumulative condition given the projected 68% increase in population by the year 2035 that could result in the conversion of 93,000 acres of vacant land to urban uses. Given the currently available information, the extent of impact is unknown; however, land use planning controls are anticipated to protect the most valuable habitats.

Construction

Construction of the HST Project would affect biological resources, including plant communities and land cover types, special-status species, and habitats of concern (including critical habitat). Constructing the BNSF Alternative would have effects of moderate intensity on critical habitat, while the other two HST alternatives would have no effect on critical habitat. Construction at the Harris-DeJager HMF site would have effects of negligible intensity on the Eastman Lake-Bear Creek ECA, while the other four HMF sites would have no effect.

Cumulative Impacts on Biological Resources and Wetlands

The cumulative condition with the HST Project's contribution is anticipated to affect the following biological resources:

- Special-status species in northern claypan vernal pools, such as Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, succulent owl's-clover, Boggs Lake hedge-hyssop, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, vernal pool smallscale, and Wright's trichocoronis. Effects on northern claypan vernal pools may result in take of individual plants and animals associated with this habitat type. With the implementation of avoidance, minimization, and mitigation measures, the project and other foreseeable projects would affect a small proportion of suitable habitat within the reported range of these species. The loss of habitat is not anticipated to result in the loss of any sustainable populations associated with this habitat type. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Special-status species in vernal pools and adjacent California annual grasslands, such as California tiger salamander, western spadefoot toad, Hoover's spurge, palmate-bracted bird's beak, Henderson's bent grass, brittlescale, San Joaquin spearscale, lesser saltscale, subtle orache, Lost Hills crownscale, dwarf downingia, spiny-sepaled button-celery, Coulter's goldfields, little mouse tail, pincushion navarretia, shining navarretia, Heckard's pepper-grass and prostrate vernal pool navarretia. Vernal pool and adjacent California annual grassland habitat within the known range of these special-status species would be affected by the project and other foreseeable projects. However, the loss of habitat is not anticipated to result in the loss of sustainable populations associated with this habitat type if avoidance, minimization, and mitigation measures are implemented. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Special-status species in California annual grasslands, such as San Joaquin kit fox, American badger, Hartweg's golden sunburst, Keck's checkerbloom, heartscale, Hoover's calycadina, beaked clarkia, Hoover's cryptantha, recurved larkspur, and caper-fruited tropidocarpum. The loss of California annual grassland habitat and take of associated individual special-status plants and animals could occur. The project and other foreseeable projects are not expected to result in the loss of a substantial proportion of California annual grasslands and would not result in the loss of populations that are dependent on California annual grassland habitat. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Sanford's arrowhead, San Joaquin roach, Kern brook lamprey, and western pond turtle habitat in all watercourses within the study area. Hardhead occur in Bear Creek; Central Valley steelhead occur in Cottonwood Creek and the San Joaquin River; and spring-run Chinook salmon and Central Valley fall/late fall-run Chinook salmon occur in the San Joaquin River. A coordination meeting with the California Department of Water Resources and the Bureau of Reclamation on June 6, 2011, regarding the potential effects on the proposed San Joaquin River Restoration program concluded that the Merced to Fresno Section is unlikely to result in effects on the restoration program. The project design for the San Joaquin River crossing includes two options, which would be designed to avoid or minimize any appreciable changes in scour, sediment transport and deposition, or other hydrofluvial processes that could adversely alter salmonid habitat. The project and other foreseeable projects may affect watercourses that provide potentially suitable habitat for these special-status species and may result in individual take; however, these projects would not result in the loss of any populations. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Golden eagle, Swainson's hawk, western snowy plover, white-tailed kite, American peregrine falcon, greater sandhill crane, bald eagle, Belding's savannah sparrow, western burrowing owl, and other migratory bird and raptor foraging and nesting habitat. The project and other foreseeable projects may affect nesting and foraging habitat associated with individual special-status birds. Nesting and foraging habitat for these species is variable; however, the projects are not expected to result in the loss of sustainable populations of sensitive bird species. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Western red bat, western mastiff bat, and pallid bat foraging and roosting habitat. The loss of potential roosting and foraging habitat for these species is expected. Roosting and foraging habitat for these species is variable, and these species have large ranges that extend throughout California. The projects may result in individual take but would not result in the loss of local populations of these species. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Valley elderberry longhorn beetle host plant habitat. The project and other foreseeable projects within the range of this species may result in the loss of elderberry shrubs that provide suitable valley elderberry longhorn beetle habitat. Suitable habitat and reported occurrences of valley elderberry longhorn beetle are located throughout the study area. These projects would not result in the loss of local populations of this species. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Delta button-celery riparian scrub habitat. Riparian scrub habitat within the range of delta button-celery may be affected by the project and other foreseeable projects. This species is listed as a seriously endangered California endemic with a relatively limited range. The loss of suitable riparian scrub habitat may result in the loss of populations of this species; however, avoidance, minimization, and mitigation measures would minimize the effects on this species. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- California satintail mesic habitat. The project and other foreseeable projects may result in the loss of potentially suitable mesic habitat. This species is seriously endangered in California but is more common elsewhere. The loss of suitable mesic habitat in the study area could result in individual

take, but is not likely to result in the loss of local populations of this species. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

- Wetlands. Wetlands may be affected by the project and other foreseeable projects. Potential wetland losses would be small relative to the quantity of existing wetland habitat in the study area but would contribute to the net loss of wetland habitat within the California Central Valley. Avoidance, minimization, and mitigation measures would minimize impacts on wetlands. Nevertheless, cumulative impacts would likely have substantial intensity under NEPA and be cumulatively considerable under CEQA.

The cumulative condition with the HST alternatives' contribution would increase the extent and concentration of invasive plant species. Without weed control measures, potential impacts resulting from the spread of these species could have substantial intensity under NEPA and could be cumulatively considerable under CEQA.

The cumulative condition with the HST Project's contribution could contribute to potential cumulative impacts on wetlands and other Waters of the United States and state (e.g., vernal pools and creeks with a riparian corridor) and special status species (e.g., San Joaquin kit fox, western spadefoot, California tiger salamander, migratory nesting birds, valley elderberry longhorn beetle, and western burrowing owl). These impacts could include loss of wetlands, hydrological changes to wetlands, and loss of habitat for special status species. Most impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA. However, cumulative impacts on wetlands would have substantial intensity under NEPA and would be cumulatively considerable under CEQA.

The BNSF Alternative would have the greatest potential for cumulative impacts because it would have the greatest impacts on biological resources and wetlands. The UPRR/SR 99 Alternative would have the least potential, and the Hybrid Alternative would have intermediate potential. When combined with other projects that would reduce habitat and affect habitat connectivity, however, the difference in cumulative impacts is not as great as between the alternatives individually. As described in the Program EIR/EIS documents, the HST System as a whole would have significant impacts on sensitive biological resources and wetlands. Portions of the HST System located in new corridors could result in disturbance of sensitive habitats. With incorporation of wildlife-dedicated crossings, whose size and frequency are subject to resource agency approval, the HST System would not pose a significant barrier to the movement of wildlife in areas where at-grade track could sever wildlife movement corridors, such as those in the East Bay to Central Valley and the San Jose to Central Valley HST corridors. Similarly, the design of the San Joaquin River crossing for both the Merced to Fresno Section and the San Jose to Merced Section would avoid or minimize adverse alterations to salmonid habitat.

Summary of NEPA/CEQA Impacts

Because most impacts on biological resources would not result in the loss of species populations, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA. Because of the overall amount of land that would be converted to urban and transportation uses under the cumulative condition and buildout of the HST System, cumulative impacts on wetlands would have substantial intensity under NEPA and would be cumulatively considerable under CEQA

Mitigation

The HST Project would implement biological resources mitigation measures provided in Section 3.7.7. No additional mitigation is needed to address the project's contribution to cumulative biological impacts. Biological impacts resulting from projects proposed by others would be mitigated in accordance with the requirements under permits obtained for those projects, as necessary.

3.19.3.7 Hydrology and Water Resources

Issues surrounding hydrology and water resources include surface water and groundwater hydrology, floodplains, irrigation distribution systems, and water quality. The study area for the cumulative analysis of hydrology and water resources is approximately defined by the City of Merced to the north, the City of Fresno to the south, the lower San Joaquin River to the west, and the Sierra Nevada Mountain foothills and reservoirs to the east. The cumulative impact study area includes the project impact study area and upstream and downstream reaches of streams and rivers that cross through the study area.

Much of the region is in a floodplain, which has a relatively flat gradient that generally slopes slowly to the west or southwest. Most watercourses in the San Joaquin Valley drain from east to west and eventually join the San Joaquin River. The Fresno River is controlled upstream by the Bureau of Reclamation's John Franchi Diversion Dam, which is operated by the Madera Irrigation District to support the Madera Canal. The Bureau's Friant Dam, which forms Millerton Lake, controls the San Joaquin River. Millerton Lake provides irrigation of the San Joaquin Valley, distributed by the Madera and Friant-Kern-Canals, as well as power generation, flood control, and recreation. Stormwater and irrigation runoff enters streams directly as overland flow and, therefore, surrounding land uses affect surface water quality. Urban and agricultural runoff can carry the dissolved or suspended residue of both natural and human land uses within the watershed. Pollutant sources in urban areas primarily include parking lots and streets, industrial uses, rooftops, exposed earth at construction sites, and landscaped areas. Pollutant sources in rural and agricultural areas primarily include agricultural fields and operations. Pollutants in runoff can include sediment, oil and grease, hydrocarbons (e.g., fuels, solvents), heavy metals, organic fertilizers and pesticides, pathogens, nutrients, and debris.

Surface Water and Groundwater Hydrology

The new urbanization that would accommodate the population increase by 2035 would result in an estimated 93,000 acres of additional development and land use changes to accommodate housing, commercial, office, transportation, parks, and schools (see Chapter 2, Alternatives). These changes would affect surface water and groundwater hydrology. The increased area of impervious surfaces would cause changes in runoff patterns, surface water, and groundwater.

The cumulative condition would result in changes to existing onsite drainage patterns and could result in increased stormwater runoff from an increase in impervious surface area. Conversion of vacant undeveloped land to accommodate the population by 2035 is estimated at 93,000 acres, which would result in up to 33,000 acres of new impervious surface (assuming an average of 35% of new development is impervious). However, new developments would comply with stormwater control ordinances, thus mitigating the impact of the runoff.

Floodplains

The cumulative condition would result in impacts on flooding if the projects are within a Special Flood Hazard Area (SFHA), such as the Buena Vista Project. Similar impacts would result from operation of the project where the alignment would cross SFHAs. However, potential cumulative impacts would be reduced because all projects in SFHAs are subject to project-level environmental analysis, standards, and permits (prepared by project proponents).

Irrigation Distribution System

Under the cumulative condition, an estimated 23,200 acres of farmland would be converted to urban uses. This would reduce the water demand in those urbanized areas because agricultural uses require more water than does domestic consumption.

Water Quality

Some of the foreseeable projects identified for the study area (e.g., dairy expansion, new urban development, and mining operations) could create new sources of runoff pollution that would contribute

to the cumulative condition; therefore, preservation of water quality is anticipated to be a greater challenge by 2035 under the cumulative condition. These projects, however, would be subject to regulations and permits required by the Central Valley Regional Water Quality Control Board to mitigate impacts on water quality. As a result, potential cumulative impacts would be reduced. These regulations are in place to make sure that new developments and infrastructure projects do not result in water quality standard violations, and the cumulative impact on water quality is not expected to be negative, as all new projects would be required to meet water quality standards.

Construction

Construction of the HST Project, in conjunction with construction activities associated with other past, present, and reasonably foreseeable projects, could alter existing drainage patterns and redirect stormwater runoff. The HST alternatives and other future projects would be subject to regulations and permits required by the Central Valley Regional Water Quality Control Board to mitigate construction impacts on water quality. Therefore, potential cumulative construction impacts would be reduced, and cumulative construction impacts on water quality and water resources would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Cumulative Impacts on Hydrology and Water Resources

Surface Water and Groundwater Hydrology

Impacts from the HST Project would occur as a result of the increase in impervious surface area caused by structures and parking facilities at the HST stations and HMF. The HST alternatives' contribution would result in changes to hydrology and connectivity of natural watercourses, including floodways, where the project crosses these watercourses. Similar impacts would occur where other projects cross or otherwise alter the hydrology of a natural watercourse. However, potential cumulative impacts would be reduced because all projects are subject to project-level environmental analysis and permits, such as compliance with the State Water Resources Control Board Construction General Permit (2009-0009 DWQ) and Title 23 of the California Code of Regulations (CCR). Project-level analysis would identify and analyze, and avoid, minimize, or mitigate potential impacts on hydrology and connectivity of natural watercourses, to the extent feasible.

Guideway construction materials and soil compaction below the guideway would divert the point of infiltration, but along the rural portions of the guideway and in urban areas the stormwater would be incorporated into the urban stormwater system. The HST Project's contribution would negligibly reduce the amount of groundwater available for use in the study area because of an increase in impervious surface area and reductions in infiltration. Therefore, the project would minimally contribute to a cumulative impact on groundwater quantity through an increase in impervious area when considered in combination with other past, present, and future projects and would result in impacts that have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Floodplains

Project-level analyses would identify and analyze, and avoid, minimize, or mitigate, potential impacts on floodplains to the extent feasible; therefore, cumulative impacts on floodplains would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Irrigation Distribution System

Depending on the HST alternative selected, the HST alternatives' contribution would affect up to approximately 1,361 additional acres of farmland, which would contribute to a cumulative effect where the planned growth would convert as much as 93,000 acres of farmlands. As a result, the cumulative condition would potentially reduce the amount of water needed for irrigation. Because operation of the HST System would generate a small reduction in water demand, the HST System would result in cumulative impacts with negligible intensity under NEPA and no cumulatively considerable impacts under CEQA.

Water Quality

The HST Project's contribution to hydrology and water resources impacts would result in an incremental addition of impervious surface and impacts on farmlands. However, because the project is subject to regulations and permits required by the Central Valley Regional Water Quality Control Board, it would result in cumulative impacts on water quality with negligible intensity under NEPA and no cumulatively considerable impacts under CEQA.

As described in the Programmatic documents, the HST System as a whole would have cumulative hydrology and water quality impacts that have moderate intensity under NEPA and would not be cumulatively considerable under CEQA, with implementation of mitigation measures. The construction of the HST System predominantly in existing transportation corridors would reduce the potential for cumulatively adverse effects to water resources, and engineering and design practices would further reduce potential adverse impacts.

Summary of NEPA/CEQA Impacts

Based on project-level analysis, the HST Project would avoid, minimize, or mitigate potential impacts on floodplains, to the extent feasible; and the HST alternatives would contribute only negligible reductions in the amount of groundwater available. Because all projects would be subject to regulations and permits required by the Central Valley Regional Water Quality Control Board to mitigate impacts on water quality, the cumulative impacts on hydrology and water quality would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA

Mitigation

The HST Project would implement hydrology and water resources mitigation measures provided in Section 3.8.6. No added mitigation is needed to address cumulative impacts.

3.19.3.8 Geology, Soils, and Seismicity

The study area for the cumulative analysis of geology, soils, and seismicity is the San Joaquin Valley region, because impacts (e.g., erosion and sedimentation) would affect areas around the region, and some seismic impacts (e.g., a large earthquake) while originating in other areas, could affect the construction footprint. The study area is located in the central part of the San Joaquin Valley. The topography in this part of the Central Valley is flat-lying, and the only steep slopes along the HST alignments are located along river and creek banks. Surficial geology underlying the project alternatives consists primarily of alluvial deposits of clay, silt, sand, and gravel with varying grain sizes and content. There are several soil types found in the project area.

The study area is located in the central part of the San Joaquin Valley. The topography in this part of the Central Valley is flat-lying, and the only steep slopes along the HST alignments are located along river and creek banks. Surficial geology underlying the project alternatives consists primarily of alluvial deposits of clay, silt, sand, and gravel with varying grain sizes and content. There are several soil types found in the project area. Historically, existing agricultural and urban development has substantially altered geology and soil conditions throughout the study area. Cumulative development in the region results in topsoil loss and erosion, and as infrastructure has aged, a greater percentage of constructed projects do not meet evolving seismic design standards. Projects during the nineteenth century and early twentieth century produced cumulative impacts related to geology and soils that were largely negative because of substandard construction and land use practices. As these trends became evident, roadway and bridge design codes were updated and development occurring on unstable soils and slopes required that specific site preparation measures be applied to reduce hazards and to provide better protection for the public, resulting in facilities that are more capable of resisting seismic events without damage.

Construction

Construction of facilities and infrastructure requires aggregate, concrete, and steel reinforcement. When considered with other concurrent construction, there would be a large demand for these and other construction materials. Although over the long-term, this could result in development of new borrow sites or expansion of existing sites, the analysis has determined that there are multiple resources with ample aggregate supplies in the region, and it is anticipated that sufficient materials are available to meet this demand. Standard engineering design measures and BMPs during construction would moderate construction impacts on geology, soils, and seismicity. Construction impacts would be localized, and cumulative effects would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Cumulative Impacts on Geology, Soils, and Seismicity

Any impacts on geology, soils, and seismicity would be largely controllable with appropriate designs and implementation of BMPs and mitigation measures during design, construction, and operation. Some direct and indirect impacts would be unavoidable, such as the incremental reduction in aggregate supply and continued use of aging infrastructure that could be more susceptible to geologic risks. However, as discussed above the analysis has determined that there are multiple resources with ample aggregate supplies in the region, and it is anticipated that sufficient materials are available to meet this demand. Therefore, cumulative impacts on geology and soils would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Impacts from seismic hazards for multiple structures have been identified as a cumulative impact. In addition, soil settlement and slope failures could occur in areas with shallow groundwater, near streams, and in areas with certain types of soil (e.g., shrink-swell soils could affect the structural integrity of infrastructure facilities and buildings.) All structural components of the HST alternatives would be designed to meet or exceed engineering design requirements for railways, highways, and buildings. These new structures would be able to withstand ground motions that have a low probability of being exceeded. Construction methods and designs would reduce the potential effects on structures caused by soil conditions. This would result in improved public safety. It is also possible that some liquefaction-related hazards, such as lateral spreading, might be reduced if projects adjacent to the HST alternative or HMF (e.g., the SR 99 Avenue 7 to Avenue 12 widening) include ground improvements. Therefore, cumulative impacts resulting from seismic hazards would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA. Potential cumulative impacts on geology, soils, and seismicity would be similar among all alternatives because geologic conditions and risks are similar throughout the region.

As described in the Programmatic documents, the HST System as a whole could have significant impacts on geology and soils, which could be reduced to less than cumulatively significant with implementation of mitigation. Significant impacts related to slope stability (in areas susceptible to slope failure) as well as impacts related to subsidence (if other concurrent construction projects in the area dewater from the same drainage basin) could cause cumulatively considerable impacts to occur. These impacts could be reduced to less than cumulatively significant with implementation of project-specific measures to reduce impacts.

Summary of NEPA/CEQA Impacts

Because standard engineering design measures and BMPs would minimize impacts on geology, soils, and seismicity, cumulative impacts of the project would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Mitigation

The HST Project would implement transportation mitigation measures provided in Section 3.9.6. No added mitigation is needed to address cumulative impacts.To further minimize cumulative impacts related to the depletion of aggregate supplies and building materials, the HST Project will coordinate with other

projects that are under construction at the same time to create opportunities to reuse excavated soil and demolition debris among the projects.

3.19.3.9 Hazardous Materials and Wastes

The study area for the cumulative analysis of hazardous materials and wastes is the same as the study area used in the assessment of the proposed HST alternatives in Section 3.10, Hazardous Materials and Wastes.Historically, the Merced to Fresno corridor has had numerous industrial and agricultural zones, large industrial and agricultural facilities, major transportation routes, and distribution systems including petroleum pipelines. The transportation routes pipelines are used to transport large quantities of hazardous materials and petroleum products. The lack of hazardous material regulations before RCRA was enacted resulted in areas of environmental contamination. Documentation of these hazardous waste sites, regulatory oversight, and clean-up efforts began in the early 1980s under CERCLA. Enterprises that use, store, transport, or dispose of reportable quantities of hazardous materials or petroleum products are now required to comply with federal, state, and local regulations designed to minimize the risk of exposure or release of hazardous materials.

Historically, the Merced to Fresno corridor has had numerous industrial and agricultural zones, large industrial and agricultural facilities, major transportation routes, and distribution systems, including petroleum pipelines. The transportation routes and pipelines are used to transport large quantities of hazardous materials and petroleum products. The lack of hazardous material regulations before RCRA was enacted resulted in areas of environmental contamination. Documentation of these hazardous waste sites, regulatory oversight, and clean-up efforts began in the early 1980s under CERCLA. Enterprises that use, store, transport, or dispose of reportable quantities of hazardous materials or petroleum products are now required to comply with federal, state, and local regulations designed to minimize the risk of exposure or release of hazardous materials.

The 68% increase in population by the year 2035 is anticipated to contribute incrementally to historical increases in the transport, storage, use, and disposal of hazardous substances within the Merced to Fresno corridor. Households, industrial sites, and agricultural operations use hazardous materials and generate hazardous waste.

Construction

While hazardous materials handling may increase during construction, compliance with regulations would reduce potential cumulative impacts to negligible intensity under NEPA and impacts would not be cumulatively considerable under CEQA.

Cumulative Impacts on Hazardous Materials and Wastes

The HST alternatives would contribute incrementally to the regional transportation, use, storage, and disposal of hazardous materials and petroleum products (such as diesel fuel, lubricants, paints, solvents, and cement products containing strong basic or acidic chemicals). HMF operations would comply with regulatory requirements to minimize the risk of exposure to or release of hazardous materials. The HST alternative would potentially result in incidental improved environmental quality because of the discovery and required remediation of existing soil and water contamination. For this reason, it is possible that there would be fewer contaminated sites under the cumulative condition in 2035. The cumulative condition would reduce traffic congestion and would improve mobility and access on the regional transportation network, resulting in negligible changes to the risk of accidental spills or releases of hazardous materials. Overall cumulative impacts on the transportation, use, storage, and disposal of hazardous materials would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

As described in the Programmatic documents, the HST System as a whole would have less than significant impacts on hazardous materials and waste, with implementation of mitigation measures, which would be less than cumulatively considerable. While hazardous materials may be unearthed during project construction, such as at the Diridon Station (San Francisco to San Jose Section), hazardous

wastes encountered through ground-disturbing activities during construction would be handled and disposed of in accordance with regulatory requirements.

Summary of NEPA/CEQA Impacts

Because the project would comply with regulatory requirements that minimize the risk of exposure to or release of hazardous materials, the cumulative impacts on the transportation, use, storage, and disposal of hazardous materials would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Mitigation

The HST Project would implement hazardous materials and waste mitigation measures provided in Section 3.10.7. No added mitigation is needed to address cumulative impacts.

3.19.3.10 Safety and Security

The study area for the cumulative analysis of safety and security includes the transportation system and fire protection, law enforcement, and other emergency response service areas in the southern half of Merced County, Madera County, and the City of Fresno.

Accommodating the population growth expected by 2035 would result in a cumulative increase in demand for fire protection, law enforcement, and other emergency response services. A large number of residential projects, many of which include commercial components, would substantially increase the population in Madera County, and to a lesser extent, the populations of Merced and Fresno counties. The additional long-term demand would be particularly difficult to accommodate in Madera County without additional funding for fire protection and law enforcement agencies.

The cumulative condition is anticipated to provide beneficial effects for the emergency response capability within the study area. Planned transportation projects in the study area would widen existing roadways (including SR 99), create new grade-separated crossings for the UPRR or BNSF tracks, and construct new interchanges along SR 99. The planned highway projects that would occur under the cumulative condition would improve the roadway network connectivity, reduce congestion, and cumulatively benefit fire protection, law enforcement, and other emergency services through better response times and access. However, with the transportation improvements planned for SR 99 and the urban areas along SR 99, Caltrans operating standards would not be met in some urban areas in 2035. Non-urban areas would operate at a level of service of D or better (Caltrans 2009).

Enhanced travel safety would be a cumulative benefit with the SR 99 safety improvement projects. They would improve overall safety in regional travel. At-grade intersections and substandard designs along SR 99 would be removed. The HSTs would provide a transportation option that is safe during inclement weather. In addition, the project would help improve other transportation projects and reduce emergency response times by constructing new grade separations for the BNSF tracks and SR 99 and by reducing the volume of traffic on SR 99 (some long-distance travelers would use the HST System instead of driving).

Construction

The number of construction workers required to meet the needs of concurrent construction projects would result in an increased demand for emergency response services. However, most of this development would occur over time, thus allowing local agencies to plan for the increased demand and reduce the impact. If all construction were to occur concurrently, it would require several thousand construction workers per year from the surrounding communities during the HST construction period. The increase in construction population would temporarily increase the need for fire protection, law enforcement, and other emergency response services. If all planned transportation projects were built simultaneously, Madera County emergency services may be overburdened, especially if current budget

challenges persist. However, many of the other planned projects in the study area are currently on hold because of the economy, postponing the need for some of the construction workers.

Because most of the development in the study area would occur over time, and local agencies would plan for the increased demand, the cumulative impacts would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Cumulative Impacts on Safety and Security

The associated redevelopment and economic activity that would indirectly result from the presence of the HST stations could increase demand for local emergency responders and require additional government facilities (such as police or fire stations) that might affect the environment. The Authority would monitor the station area security needs and if demand for services were to increase, then the Authority would provide its fair share to secure needed services. Additionally, any redevelopment near the Downtown Merced or Downtown Fresno 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. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

The HST alternatives' contribution to cumulative effects would provide a transportation option that is safe during inclement weather. In addition, the project would help improve other transportation projects and reduce emergency response times by constructing new grade separations for the BNSF tracks and SR 99 and by reducing the volume of traffic on SR 99 (some long-distance travelers would use the HST System instead of driving). Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

As described in the Programmatic documents, the HST System as a whole would result in less than significant impacts on safety and security, with implementation of mitigation measures, and would not be cumulatively considerable. Overall, the system could result in greater safety and security with installation of grade separations at roadway crossings. For example, roadway separations along the Caltrain corridor (San Francisco to San Jose Section) would improve safety in the study area. In other sections of the HST System, construction could result in traffic detours and longer emergency response times (for example at locations along the Merced to Fresno Section), and peak short-term demand for emergency services would increase during construction (Fresno to Bakersfield Section); such impacts could be mitigated to less than cumulatively significant.

Summary of NEPA/CEQA Impacts

As discussed above, the additional long-term demand would be particularly difficult to accommodate in Madera County without additional funding for fire protection and law enforcement agencies. Because HST payment of impact fees would support new or expanded government facilities, the cumulative impacts on emergency service demands in Madera County would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

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 not be cumulatively considerable under CEQA.

In addition, the cumulative condition with HST would improve other transportation projects and reduce emergency response times by reducing the volume of traffic on SR 99 (some long-distance travelers would use the HST System instead of driving). Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

Mitigation

The HST Project would implement safety and security mitigation measures provided in Section 3.11.7.

3.19.3.11 Socioeconomics, Communities, and Environmental Justice

The study area for the socioeconomics, communities, and environmental justice cumulative impacts analysis includes the cities of Atwater, Merced, Chowchilla, Madera, and Fresno and the unincorporated areas of Merced, Madera, and Fresno counties.

Community Cohesion, Neighborhoods, and Community Facilities

Transportation projects can bisect neighborhoods and reduce community cohesion. Railways may be perceived as a barrier in current development. However, in the study area, it was the communities that developed around the railways, so the railways did not originally bisect the communities. Currently planned projects would widen SR 99 and add new interchanges between the cities of Merced and Fresno. These projects would not create barriers that would disrupt or sever community interactions or divide established communities. The SR 99 corridor is primarily associated with commercial and industrial development and acts as a boundary between most of the established communities and neighborhoods in the study area. Widening SR 99 would not create additional barriers, and new interchanges would provide safer and more efficient access to the highway. Future planned growth and associated development would occur in accordance with general plans and land use plans, which aim to strengthen community cohesion.

Economics

Although the agricultural sector is not the largest employer, it accounts for one in six jobs. The largest employers are the service and government sectors, which together account for 50% of all industry jobs in the study area. Unemployment rates in the study area are typically higher than those for the state and are among the highest in the state. Unemployment rates for 2010 were 18.9%, 15.6%, and 16.8%, respectively, for Merced, Madera, and Fresno counties (CEDD 2011).

Under the cumulative condition, numerous planned and potential projects would be necessary to accommodate the population growth by 2035. The growth would result in a cumulative economic impact, especially with respect to employment and unemployment rates. The conversion of agricultural land to nonagricultural uses may result in increased unemployment rates for agricultural workers if they are unable to find work on another farm in the region.

Merced, Madera, and Fresno counties include some of the most agriculturally productive areas in the world, and farming is a primary economic factor in the regional economy. In 2009, these counties ranked 1st (Fresno County), 5th (Merced County), and 14th (Madera County) in total agricultural production value in California. Although agriculture still plays a large role in the regional economy, there has been a shift toward the services sector of the economy. The real estate boom of the mid-2000s created new construction jobs that resulted in increased retail sales and increased sales tax and property tax revenues (Cowan 2005). However, the San Joaquin Valley has been one of the hardest-hit areas in the nation since the real estate market decline in 2007. As a result of the recession, the counties and cities in the study area have experienced substantial increases in unemployment and residential foreclosure rates, as well as sharp declines in housing prices (Bertaut 2009). Unemployment rates have increased since the real estate boom ended in 2007 in all three counties, with Merced County's 18.9% average annual unemployment rate the highest in the region in 2010. This exceeds the state average of 12.4% for the same period (California Employment Development Department [CEDD] 2010a). Madera and Fresno counties also had unemployment rates higher than the state average at 15.6% and 16.8%, respectively. Increased unemployment rates have reduced retail sales and associated sales tax revenues in the study area. Declining housing values and increasing foreclosure rates have reduced property tax revenues and have negatively affected school districts that depend on those revenues.

Environmental Justice

Populations within the study area are ethnically diverse and low-income. All but three of the census block groups within the study area have environmental justice populations, based on the high concentration of

minority or low-income populations. The majority of the low-income populations are located in the urban areas, primarily in the cities of Merced, Madera, and Fresno.

Construction

Community Cohesion, Neighborhoods, and Community Facilities

Construction of the proposed project and other planned projects is not anticipated to result in adverse impacts on neighborhoods and community facilities except in the downtown areas of Merced and Fresno where the HST stations would be constructed, whereas the alignment can be substantially constructed from within the project footprint. Impacts would include temporary increases in traffic, changes in traffic patterns, changes in access to community facilities, and construction noise and dust. Construction activities can hinder access and interaction among neighborhoods because of increased congestion, detours, and lane or road closures. These impacts would be greatest if several of the other foreseeable projects were constructed at the same time, and would likely have substantial intensity under NEPA and would be cumulatively considerable under CEQA. The cumulative impact of the project and other reasonably foreseeable projects on neighborhoods and communities during construction would not be adverse except in the downtown areas of Merced and Fresno where the HST stations would be constructed. In these areas, cumulative construction impacts would have substantial intensity under NEPA and would be cumulatively considerable under CEQA because of traffic and access changes and construction noise and dust.

Economics

Because the construction schedule and the workforce required during construction and operation of the project have not been fully developed, cumulative economic impacts cannot be identified or quantified at this time. The addition of a large construction project, such as the proposed project, would cumulatively stimulate local economies. Construction of an HST alternative and other planned projects would cause large increases in the number of jobs and spending within the Merced to Fresno Section. Depending on the HST alternative selected, construction of the HST is anticipated to create between 8,000 and 15,000 jobs (including both direct and indirect jobs) over the 5-year construction period, and that number could increase by 2,300 to 4,000 jobs if an HMF is constructed in the Merced to Fresno Section. Combined with the anticipated new homes, roads, and infrastructure, the economic benefits would be cumulatively substantial. Construction would require the relocation of businesses. The Merced HST station would affect up to 42 businesses; however, most businesses that would relocate under any of the HST alternatives would continue to benefit from the improved economy. A preliminary analysis of replacement facilities confirmed that there are a sufficient number of suitable business properties for nearly all displaced occupants in the cities of Atwater, Merced, Le Grand, Chowchilla, Madera, and Fresno, and in the rural areas of Merced and Madera counties. The cumulative effects of the HST System and reasonably foreseeable future projects in conjunction with projected population and employment growth would be beneficial to the local and regional economy. The cumulative construction effects on the local and regional economy would be beneficial because of the new jobs and other economic benefits created by multiple construction projects in combination with projected employment growth in the area.

Environmental Justice

All but three of the census block groups within the study area have communities of concern, based on the high concentration of minority or low-income populations. Cumulative impacts of construction would not be appreciably more severe or greater in magnitude than effects on populations of non-communities of concern; however, even though low-income residents in the affected neighborhoods would be exposed to the same impacts as other residents, the cumulative impact on low-income residents could be disproportionately high and adverse and could be a greater hardship for them. Although cumulative construction impacts on communities of concern would not be appreciably more severe or greater in magnitude than effects on non-communities of concern populations, the cumulative impact could be a greater hardship for low-income residents and could result in disproportionately high and adverse effects on those residents.

Cumulative Impacts on Socioeconomics, Communities, and Environmental Justice

The HST Project are primarily located adjacent to an existing transportation corridor, which can be perceived as an existing barrier, and therefore would not result in any considerable changes to the perception of a barrier within communities. The potential barrier would not be a physical barrier because in these communities all alternatives are designed to minimize any effect on circulation. Therefore, they would not further disrupt community cohesion over the existing condition and cumulative impacts would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA. After mitigation, the project may help minimize these barriers by potentially adding amenities below elevated HST guideways and implementing other measures to minimize the visual and noise impacts.

The guideway to the Castle Commerce Center HMF site is an exception, because the guideway would create a new transportation corridor between SR 99 and Santa Fe Avenue through the unincorporated Community of Franklin-Beachwood. In combination with the Atwater-Merced Expressway, which traverses in a nearly perpendicular direction, cumulative impacts on the community may have substantial intensity under NEPA and would be cumulatively considerable under CEQA.

In general, HST operations would benefit neighborhoods and communities by increased access and the potential for redevelopment within HST station areas. The proposed Merced to Fresno Section, in conjunction with other projects, would result in primarily beneficial cumulative impacts on neighborhoods and community cohesion. In many neighborhoods, other transportation improvements and economic development projects would collectively enhance access options and reduce travel time to regional destinations. Therefore, cumulative impacts would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

School districts would not experience adverse cumulative impacts, and Appendix 3.12-B (*Effects on School District's Funding and Transportation Routes*) provides further information on impacts specific to area school districts.

As described in the Programmatic documents, the entire HST System from San Francisco to Los Angeles could result in significant impacts associated with community and neighborhood cohesion and property loss, which would be cumulatively considerable along with other foreseeable projects. Impacts could occur in areas of the HST System that are not within existing railroad rights-of-way, due to the creation of new transportation corridors, as described in the 2005 Statewide Program EIR/EIS (Authority and FRA 2005) and the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008). For example, during construction, the HST System could result in impacts on community cohesion in the City and County of Fresno and City of Bakersfield.

Economics

The HST Project would pass through the cities of Merced and Fresno. The HST stations in these cities would encourage redevelopment, attract new businesses, and revitalize the downtown areas, resulting in primarily beneficial social impacts. The HST alternatives would provide increased employment opportunities and economic benefits. In the City of Merced, the HST station and the guideway associated with the Castle Commerce Center HMF would require the acquisition of facilities used by residents in the surrounding area, including communities of concern. The project would improve regional access, reduce travel times, and reduce traffic congestion on many local roadways. This would provide an economic benefit to the region (see Section 3.2, Transportation). Key economic benefits from the project include the potential for increased in property tax and sales tax revenue and new employment. *The Economic Impact of the California High Speed Rail in the Sacramento/Central Valley Area* (Kantor 2008) determined that the HST Project would provide several economic benefits to the region. The study evaluated the effects for the all project components including the guideway, HST stations, and HMF. Benefits include positive effects on services, communications, utilities, finance, insurance, and real estate sectors in the Central Valley. Section 3.18, Regional Growth, provides additional information on HST effects related to employment and describes regional economic activities. Because project operations would result in positive economic effects, this is considered a beneficial effect under NEPA.

As described in the Programmatic documents, the construction and operation of the HST System would have beneficial impacts on tax revenues and employment. The operation of the HST and other planned projects would increase the number of jobs and along with this, the increase in new homes, roadways, and infrastructure that are projected would result in beneficial cumulative economic effects for the three counties.

Environmental Justice

Populations within the study area are ethnically diverse and low-income. All but three of the census block groups within the study area have environmental justice populations, based on the high concentration of minority or low-income populations. The HST Project would compensate and relocate displaced residents in equal or better housing, in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, as amended. This would mitigate effects on most residents; however, currently there is no replacement housing in Fairmead and Le Grand, which may require some residents to relocate outside of their communities and, together with widening of SR 99 at Fairmead, the HST alternatives (primarily the UPRR/SR 99 Alternative) would result in a cumulative impact on these residents. However, there are available vacant lots in Fairmead where new housing could be constructed, which would minimize the cumulative impact. The guideway between the Castle Commerce Center and the Downtown Merced Station would displace residents in Franklin-Beachwood. There are no other cumulative impacts from foreseeable projects on this community; therefore, cumulative impacts would be minimal.

The HST Project would also provide a cumulative benefit to environmental justice communities. The improved roadway network is anticipated to provide cumulative benefits for the public. These benefits include reduced traffic congestion on the existing highway system, connectivity of HST stations with local transit services, TOD, promotion of infill development, improved regional air quality, and improved accessibility for all populations, including communities of concern, to job markets, education, and social and health services.

As described in the Program EIR/EIS documents, implementation of the HST System as a whole is not expected to result in disproportionately high and adverse effects on minority or low-income populations, as described in the 2005 Statewide Program EIR/EIS (Authority and FRA 2005) and the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008). Systemwide, adverse effects on communities of concern would not be appreciably more severe or greater in magnitude than the adverse effects on non-communities of concern populations and therefore would not contribute to cumulatively considerable impacts.

Summary of NEPA/CEQA Impacts

The HST Project's contribution to cumulative effects would provide benefits for the general public and environmental justice communities, including reduced traffic congestion, improved multimodal access and connectivity, economic development, and improved regional air quality. Therefore, cumulative impacts would have negligible intensity under NEPA and would to be cumulatively considerable under CEQA. Cumulative impacts on the unincorporated community of Franklin-Beachwood, however, because of the physical presence of the Castle Commerce Center HMF tracks and the Atwater-Merced Expressway in the community cumulative impacts, could have substantial intensity under NEPA and would be cumulatively considerable under CEQA.

Mitigation

The HST Project would implement socioeconomics, communities, and environmental justice mitigation measures provided in Section 3.12.7. No added mitigation is needed to address cumulative impacts.

3.19.3.12 Station Planning, Land Use, and Development

The study area for the station planning and land use cumulative impacts analysis includes Fresno, Madera, and Merced counties. In much of the rural area traversed by the HST System, the alignment

would run parallel to the existing UPRR and SR 99 transportation corridor. Land uses adjoining the north-south alignment in these rural areas are predominantly agricultural, with small pockets of single-family residential and commercial uses. Non-rural land uses occur in Merced, Madera, and Fresno and include commercial, industrial, and residential.

Construction

Construction of the HST alternatives would require the acquisition of property and conversion of existing land uses to a transportation public right-of-way. This would reduce the amount of land available for development. The project and other foreseeable projects in the study area would cumulatively contribute to this land use conversion. However, the amount of land that would be acquired by the HST project constitutes a small portion of the total residential, commercial, and public land that would be required to accommodate the projected 2035 population (estimated to be 93,000 acres). This includes a small added percentage of projected population due to HST alternatives. See Table 3.18-16, in Section 3.18. The HST Project overall would be beneficial as an economic driver for densification in urban centers around the stations and, therefore, the cumulative impact would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Cumulative Impacts on Station Planning, Land Use, and Development

Changes in transportation systems can influence nearby land uses either directly through acquisition or indirectly by providing new or improved access. Under the cumulative condition, roadway improvements addressed in the regional transportation plans would reduce congestion and shorten travel times. This has historically encouraged longer commutes and sprawling development. Because these projects are constrained by RTPs, the projects conform to existing planning documents. Future development projects are anticipated to be implemented in compliance with local zoning and land use plans.

Although the HST stations are anticipated to generate TOD that would result in more compact and efficient development, the amount of land within the influence of the HST stations would be small (approximately 125 acres within 0.25 mile and 480 acres within 0.5 mile of an HST station). This benefit may initially be modest compared to the 93,000 acres of development anticipated to accommodate the 68% projected increase in the 2035 population; however, the HST Project may be an economic driver for increased densification in the future. Providing an important link to other economic centers makes the HST stations a focus area for economic investment and changes in land use patterns. Local land use planning agencies support an increase in density around the Downtown Merced and Downtown Fresno station areas. The HST Project also provides an opportunity to improve and expand local transit systems leading to the HST stations and offers additional job and housing growth at key central locations around stations. The general plans of the cities of Merced and Fresno include goals and policies that support development of an HST system to achieve their economic development goals and regional plans also support the development of an HST system. This is considered a beneficial effect under NEPA.

As described in the 2005 Statewide Program EIR/EIS (Authority and FRA 2005) and the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), the HST System as a whole could contribute to significant impacts associated with sensitive land uses, including in the Fresno to Bakersfield Section study area, as described in the 2005 Statewide Program EIR/EIS (Authority and FRA 2005) and the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008). Where the HST System would be located in new rail corridors in residential areas and parks, or require widening of existing corridors in residential and commercial business areas, it could have a cumulatively considerable contribution to impacts on neighborhoods and communities. Where the alignment would be located within existing transportation rights-of-way, such as in the San Francisco to San Jose and the Oakland to San Jose corridors, it would be highly compatible with existing land uses. In areas such as the East Bay to Central Valley Corridor, the HST alternative alignments would have moderate land use compatibility due to the mix of land uses, including agricultural and residential lands. Implementing portions of the HST System in new transportation corridors, such as the San Jose to Central Valley Corridor, would have the greatest land use incompatibilities.

Summary of NEPA/CEQA Impacts

The cumulative operations impacts of the project and other reasonably foreseeable projects on land use planning would be beneficial and therefore would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA because the HST Project would influence densification, economic investments, and desired land use changes around stations.

Mitigation

No additional mitigation measures are required for cumulative land use impacts from HST construction or operations.

3.19.3.13 Agricultural Lands

The study area for the cumulative analysis of agricultural lands includes Merced, Madera, and Fresno counties. These counties have been and continue to be important agricultural areas in California. Fresno and Madera counties are among the top five counties in the nation in terms of crop production. Farming and related agricultural industries are major employers in these counties and are vital to their economies. In 2007, California had approximately 25.4 million acres of farmland, with an estimated 81,000 farms (USDA 2009). In 2007, the state generated $36.6 billion in direct farm sales. California's agricultural production represents 12.8% of the nation's total agricultural value (in dollars). California is also a major global supplier of food and agricultural commodities, with exports reaching a high of $10.9 billion in 2007. This represents an 11% increase over the 2006 export totals.

In 2007, Madera County had 1,708 farms occupying nearly 700,000 acres, with an average farm size of 398 acres, Fresno County had 6,081 farms occupying more than 1.6 million acres of land, with an average farm size of 269 acres, and Merced County had a total of 2,607 farms occupying more than 1 million acres, with an average farm size of 399 acres (USDA 2007).

Construction

Approximately 145 to 261 acres of Important Farmland would be leased for temporary use as laydown areas, staging areas, and concrete prefabrication yards during construction of the HST alternative. Construction of other past, present, and reasonably foreseeable projects could also result in the temporary conversion of farmland for construction-related uses. It is anticipated that this land would be restored and returned to agricultural use after construction is completed. Therefore, cumulative construction impacts on farmland would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Approximately 1% of the Important Farmland and Grazing Land in Merced, Madera, and Fresno counties was converted to nonagricultural uses between 2000 and 2006. This trend is expected to continue in the future because more urbanization would continue to occur. By 2035, an additional 23,200 acres of farmland is projected to be converted to urban uses.

Cumulative Impacts on Agricultural Lands

The HST alternatives would require the acquisition of up to approximately 1,453 acres of farmland, and conversion of farmland to nonagricultural uses is considered a cumulatively considerable impact. Although conversion to urban uses in many cases is consistent with local plans and policies that identify areas for planned future growth, loss of Important Farmland would have substantial intensity under NEPA and would be cumulatively considerable under CEQA for all HST alternatives.

The HST Project would have a less than significant effect regarding Williamson Act conflicts. Most of the reasonably foreseeable projects identified are not under active Williamson Act contracts because they are within city spheres of influence that are planned for urbanization. Outside the sphere of influence of local jurisdictions, Williamson Act protections discourage the early conversion of agricultural lands. Although the Los Banos Bypass project would affect land contracted under the Williamson Act, those effects are

not significant because the land required for the project would be removed from Williamson Act contracts, and the contracts would not be cancelled if minimum acreage requirements were met. Conflicts with Williamson Act contracts are not cumulatively considerable, and no additional mitigation is required. The project would result in a slightly greater conversion of farmland than under the cumulative condition.

As described in the 2005 Statewide Program EIR/EIS (Authority and FRA 2005) and 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), the HST System as a whole could have a significant impact on agricultural lands, therefore contributing to a cumulatively significant impact. Impacts would result from direct conversion of agricultural lands to transportation uses, as well as indirect loss resulting from division of agricultural parcels. Impacts would be greatest in the Central Valley, such as along the Merced to Bakersfield Section, and least in the urbanized corridors, such as the San Francisco to San Jose Section.

Summary of NEPA/CEQA Impacts

Because of the acquisition and conversion of approximately 23,200 acres under the cumulative condition and up to 1,453 acres under the HST Project, the cumulative impacts on farmland would have substantial intensity under NEPA and would be cumulatively considerable under CEQA.

Because the effects of other projects would be less than significant or would not affect land contracted under the Williamson Act and the project would result in only a slightly greater conversion of farmland conflicts with Williamson Act contracts, the effects would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Mitigation

The HST Project will implement mitigation measure provided in Section 3.14.6 to preserve the total amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland, thereby reducing cumulative impacts. However, even with the implementation of mitigation measures, farmland impacts with substantial intensity under NEPA would remain and would be cumulatively considerable under CEQA because of the large amount of farmland conversion.

3.19.3.14 Parks, Recreation, and Open Space

The study area for the parks, recreation, and open space cumulative impacts analysis includes the cities of Atwater, Merced, Madera, and Fresno, and the unincorporated areas of Merced, Madera, and Fresno counties. There are 11 parks within 1,000 feet of the UPRR/SR 99 Alternative, six parks within 1,000 feet of the BNSF Alternative, and six parks within 1,000 feet of the Hybrid Alternative. There are also two parks within the study area for the Downtown Merced Station and three parks within the study area for the Downtown Fresno Station.

Demand for and use of most parks and recreation facilities has increased and will continue to increase in proportion to the population growth in the study area. To maintain the current quality of life, all of the communities would need to increase parkland to address the population forecast for 2035. The National Recreation and Park Association standards (Lancaster 1983) provide the following guidance for parkland:

1. Neighborhood parks – 2.5 acres per 1,000 population
2. District parks – 2.5 acres per 1,000 population
3. Large urban parks – 5.0 acres per 1,000 population

To accommodate the 2035 population increase of 932,000, approximately 9,300 acres of new parkland would be required. It is anticipated that the developers of new residential projects will be required to donate parkland as a condition of the entitlement process. This proportional increase in new parkland would mitigate the impact of new populations on existing parkland.

Construction

Construction of the HST alternatives would have substantial impacts on some parks and recreation resources in the Merced to Fresno Section because of partial or complete park closures. However, except at Roeding Park, construction of other past, present, and reasonably foreseeable infrastructure and development projects would not physically alter parks in the Merced to Fresno Section. Construction-related impacts on parks would, therefore, have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Roeding Park would experience cumulatively considerable impacts from construction of the HST Project, the Roeding Regional Park and Fresno Chaffee Zoo Facility Master Plan (City of Fresno 2011) renovations, and planned auxiliary lanes on SR 99 between Clinton Avenue and Fresno Street. The combination of impacts from these projects, which would include temporary closure of portions of the park, along with noise, dust, and visual changes within and immediately adjacent to the park, would be cumulatively substantial in intensity under NEPA and cumulatively considerable under CEQA.

Cumulative Impacts on Parks, Recreation, and Open Space

As described in the Programmatic documents, the HST System would have cumulatively significant impacts on parks, recreation, and open space when viewed on a systemwide basis. As described in Section 3.15, Parks, Recreation, and Open Space, the HST alternatives would have potential operational impacts on parks and recreation resources. Permanent property acquisition would range from approximately 0.6 to 14.5 acres, depending on the alternative and HMF selected. Reasonably foreseeable highway projects near the HST alternative could also affect parkland during operation. However, under Section 4(f), all impacts from federally funded projects will be mitigated, including replacing park property or providing financial compensation to the jurisdictions for replacement park property.

Roeding Park in Fresno could experience impacts that have substantial intensity under NEPA and would be cumulatively considerable under CEQA as a result of the projects proposed in the Roeding Regional Park and Fresno Chaffee Zoo Master Plan (City of Fresno 2011), which would convert an existing portion of the park to zoo and amusement park uses; planned auxiliary lanes on SR 99 between Clinton Avenue and Fresno Street, which would possibly encroach on the park; and the HST Project, which would cause severe noise impacts along the eastern portion of the park without mitigation.

The cumulative impacts associated with the HST alternatives and foreseeable future transportation projects would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA for remaining parks and recreational facilities in the Merced to Fresno Section. Mixed-use development projects, quarries, industrial projects, and other activities associated with the foreseeable projects and 2035 cumulative condition are not anticipated to involve the acquisition of parkland.

Because of the HST connections to major economic centers, the project could result in an increase in population and the demand for park and recreation facilities in the communities with HST facilities. However, this increase is insignificant compared to the projected population growth without the project (Authority and FRA 2008). It is assumed that the developers of new TOD projects would be required to contribute park facilities as part of the entitlement process.

The UPRR/SR 99 Alternative would have the greatest potential for cumulative impacts to parks because it has the greatest impact to parks due to its route through primarily urban areas where parks are located.

Summary of NEPA/CEQA Impacts

Because other projects would not physically alter parks affected by the HST, with the exception of Roeding Park, and new developments would be required to provide new parks to meet the demands of a growing population, the cumulative impacts of the projects would have negligible intensity under NEPA and would not be cumulatively considerable under CEQA.

Because of multiple planned projects in an around Roeding Park that would cause permanent closure of portions of the park, along with noise, dust, and visual changes, cumulative impacts would have substantial intensity under NEPA and would be cumulatively considerable under CEQA.

Mitigation

The HST Project will implement mitigation measures for parks, recreation, and open space provided in Section 3.15.6 to minimize impacts, thereby reducing cumulative impacts.

If mitigation to address noise at Roeding Park is implemented, cumulative impacts at the park will still likely be substantial in intensity under NEPA and cumulatively considerable under CEQA because of the impacts resulting from the Roeding Regional Park and Fresno Chaffee Zoo Master Plan (City of Fresno 2011) and planned auxiliary lanes on SR 99 between Clinton Avenue and Fresno Street.

3.19.3.15 Aesthetics and Visual Quality

The study area for the cumulative analysis of aesthetics and visual resources is referred to as the potential viewshed (i.e., the area that could potentially view the proposed project features and the area that could be potentially viewed from the project). Accounting for the existing terrain, predominant land uses, and proposed elevated areas, the potential viewshed for the Merced to Fresno Section of the HST System is 0.25 mile on both sides of the alignment centerline in urbanized areas, including all of Fresno, and 0.5 mile on both sides of the alignment centerline in the agricultural areas between cities.

The project is located in an area visually characterized by the intersection of large- and medium-size agricultural operations, with steadily growing urban and suburban areas near the cities of Merced, Chowchilla, Madera, and Fresno. The most significant visual resources in the project vicinity (identified by using aerial and satellite maps, site surveys, and a review of policy documents) include designated scenic corridors in the cities of Atwater, Merced, and Chowchilla; parks and historically significant sites in the central areas of the cities of Merced, Madera, and Fresno; the San Joaquin River north of Fresno; and views toward the Sierra Nevada Mountains from Merced County.

Seven of the reasonably foreseeable projects proposed within the project study area would be located within the project's composite viewshed. Other visual impacts under cumulative conditions are less easily defined, but relate to the conversion of 88,000 acres of vacant and agricultural land to urban uses. All of the transportation projects are within existing transportation corridors where viewer sensitivity is low; however, a larger roadway could have an indirect impact by incrementally degrading visual quality.

Construction

Construction activities would create temporary visual changes from demolition, vegetation removal, construction staging areas, construction lighting, and general construction activities. Construction can have a moderate but temporary cumulative visual impact where multiple projects are under construction in the same area. This could occur along SR 99 and in urban areas where HST stations and other infrastructure and development projects would be under construction in a large area for multiple years. In these areas, cumulative visual impacts of construction would have moderate intensity under NEPA and would be cumulatively considerable under CEQA.

Cumulative Impacts on Aesthetics and Visual Quality

The HST Project would result in cumulative visual quality benefits in areas surrounding stations, such as visually iconic stations with landscaped plazas. There may be secondary visual benefits as the HST stations attract new development in the urban centers of Merced and Fresno. Other areas of the guideway would not provide the same opportunities without mitigation.

Generally, in open viewsheds along SR 99, the HST guideway would be at-grade and would not block scenic views. However, the elevated guideways may result in significant impacts on aesthetics and visual resources at the following general locations:

- The areas east and west of SR 99 along the Ave 21 and Ave 24 wyes, where elevated roadway crossings of the at-grade HST alignments would be necessary; and specifically along W Robertson Boulevard (SR 233) from SR 99 to SR 152 in Chowchilla, which is a locally designated scenic corridor.
- Established residential communities in the area between Chowchilla and Madera, including Fairmead.
- Residential neighborhoods in the community of Le Grand.
- Residential neighborhoods in the community of Madera Acres.
- Locations west of the HST alignment and between the communities of Le Grand and Madera Acres, from which there are panoramic views to the east.

Approximately one-half of the distinct lengths of HST corridor under each HST alternative would have permanent and significant impacts on aesthetics and visual resources. The HST Project and other foreseeable projects would result in a cumulative impact. The areas where the HST Project would lower the visual quality are not areas where there are foreseeable future projects planned. The cumulative effects would occur along SR 99, where the visual quality is generally moderate to low and viewer sensitivity is not high because SR 99 is along industrial, commercial, and railroad corridors. Therefore, the HST Project would have moderate intensity under NEPA and would not be cumulatively considerable under CEQA.

As described in the Programmatic documents, the HST System as a whole could have a significant impact on aesthetics. The HST System would create long-term visual changes from the introduction of 700 miles to 750 miles of a new transportation system that would be visible along many major highways and rail corridors in the state, and would be cumulatively considerable. For example, the loss of mature trees within the HST System footprint in several cities on the San Francisco peninsula would result in substantial changes in visual character. Changes in highly scenic areas, such as scenic open space, and mountainous areas, would be also significant. For example, the potential stations at Pleasanton (I-680/Bernal Road), Pleasanton (BART), Livermore (I-580), Livermore (I-580 Greenville Road), Tracy (Downtown), Tracy (ACE), Union City (Shinn), and San Jose (Diridon) in the San Francisco to San Jose Section could have significant visual impacts.

Summary of NEPA/CEQA Impacts

Cumulative operations visual impacts in areas surrounding HST stations would be beneficial, resulting from visually iconic stations and new development. Because visual changes would occur in viewsheds with moderate to low visual quality and lower viewer sensitivity, visual impacts in other areas, away from stations, would have moderate intensity under NEPA and would not be cumulatively considerable under NEPA.

Mitigation

The HST Project will implement mitigation measures for visual resources provided in Section 3.16.6. However, even with the implementation of mitigation measures for the HST Project, construction visual impacts will remain moderate in intensity under NEPA and cumulatively considerable under CEQA.

3.19.3.16 Cultural and Paleontological Resources

The study area for the cumulative analysis of archaeological and historical architectural resources is the project area of potential effects (as described in Section 3.17.3). The study area for paleontological resources includes the construction footprint plus a 250-foot buffer. In both cases, the study area also includes the geographic area that contains the other proposed projects that are part of the cumulative project scenario.

Most archaeological investigations within the San Joaquin Valley have been performed by Caltrans in preparation for road construction projects. Few other investigations have been conducted; as a result,

little is known about this area's archaeology. Excavations conducted for reservoir construction projects in the region helped to define four distinctive cultural complexes or adaptations to the natural resources found throughout the valley and its foothills. These data indicate that Native Americans lived in the valley from about 3000 BC to AD 1850.

Historical archaeological sites in California are places where human activities were carried out during the historic period between AD 1769 and 50 years ago. Some of these sites may be the result of Native American activities during the historic period, but most are the result of Spanish, Mexican, Asian, African-American, or Anglo-American activities. Most historical archaeological sites are domestic sites, places where houses formerly stood, and they tend to contain the types of household goods reflecting the economic standing and ethnic identity of their occupants. Remains of ceramic, metal, and glass containers and dishes are most common, together with remains of the materials used in house construction, such as nails, brick, and plate glass. Historical archaeological sites can also be nonresidential, resulting from ranching, farming, mining, manufacturing, transportation, and other commercial and industrial activities. Human burials dating to the historic period may also be considered archaeological resources.

Three reasonably foreseeable projects could affect cultural resources. The Tesoro Viejo Specific Plan (for the area approximately 10 miles northeast of the project) would potentially affect a burial area. The Madera County Dairy Standards Programmatic Final EIR (Madera County 2008) states that this project has the potential to affect cultural resources. The cultural resource impacts of these projects would be significant or significant and unavoidable. The Roeding Regional Park Master Plan and Fresno Chaffee Zoo Facility Master Plans (City of Fresno 2011) would affect cultural resources in the Roeding Park Historic District, but these effects would be less than significant after mitigation.

Future growth would result in the urbanization of land outside of existing urban areas but within urban spheres of influence.

Construction

Prehistoric sites are common in riverbank and floodplain areas, and burial sites are sometimes encountered during ground-disturbing activities. It is likely that known and unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during project construction activities. Significant and unavoidable losses of unique archaeological resources (as defined in Public Resources Code Section 21083.2) or a historical resource (as defined in Section 21083.2 of CEQA and Section 15064.5 of the state CEQA guidelines) could occur when excavations encounter archaeological deposits that cannot be removed or recovered (e.g., under levees) or where recovery would not sufficiently prevent the loss of significant cultural resources. Construction activities include monitoring and many measures to mitigate findings during construction in accordance with state and federal laws. If such permanent losses were to occur, cumulative construction impacts would be moderate under NEPA and cumulatively considerable under CEQA.

Cumulative Impacts on Cultural and Paleontological Resources

Historical architectural resources could also be damaged or require removal from areas in and around the study area. Furthermore, local projects and the secondary effects of redevelopment pressures around the HST stations would potentially result in the removal of historical buildings in Downtown Merced and Downtown Fresno. If these resources meet the definition of a historical resource or a historic resource (as defined in Section 106, 36 CFR 800), their modification or destruction would be significant. Although the implementation of mitigation measures would reduce the effects on significant cultural resources, significant impacts may still occur. There could be a loss of significant cultural artifacts, and due to this likelihood, cumulative impacts could be substantial under NEPA and cumulatively considerable under CEQA.

The UPRR/SR 99 Alternative would have the greatest potential for cumulative impacts to parks because it has the greatest impact to archaeological resources, with the potential to affect more than twice as many

archaeological sites as the other alternatives. Potential cumulative impacts to historical properties would be similar among alternatives because most historical properties are located in Fresno, where the route for all three alternatives is the same. For paleontological resources, the BNSF Alternative would have the greatest potential for cumulative impacts because it has the greatest area with high paleontological sensitivity.

As described in the Programmatic documents, the HST System as a whole could have a significant impact on archaeological resources, historical structures, and paleontological resources and therefore contribute to a cumulatively considerable impact. Potential impacts would likely occur in areas that cross formations with paleontological sensitivity, such as the Colma Formation (San Francisco to San Jose Section), and in areas where the HST alternative alignments use existing rail corridors, as these corridors and potential stations in urban centers typically are surrounded by historical structures and districts, such as the potential stations in Redwood City, Palo Alto, and Mountain View.

Summary of NEPA/CEQA Impacts

Because of the high likelihood of permanent loss of archaeological and cultural resources, the cumulative impacts of the project on cultural resources would be moderate in intensity under NEPA and cumulatively considerable under CEQA.

Mitigation

The HST Project would implement cultural and paleontological mitigation measures provided in Section 3.17.6. Although implementation of mitigation measures can reduce cumulative impacts, it cannot avoid them entirely, and impacts on archaeological and cultural resources would remain of moderate intensity under NEPA and cumulatively considerable under CEQA.

3.19.3.17 Differences Among HST Alternatives

Potential cumulative impacts would be similar among alternatives for most resources except for noise, biological resources, agriculture, and aesthetics. The UPRR/SR 99 Alternative would have the greatest potential for cumulative noise impacts because of the greater presence in urban areas and the potential additional noise impacts from the widening of SR 99 and traffic on the UPRR rail lines. The Hybrid Alternative would have the least potential for cumulative visual impacts because it is primarily at-grade within existing transportation corridors. The BNSF Alternative would have the greatest potential cumulative impacts to biological resources and agriculture because it primarily traverses undeveloped areas.