

3 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

3.1 Introduction

Since publication of the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS), the following substantive changes have been made to this section:

- A footnote was added to Section 3.1.1, Federal and State Regulatory Context, regarding the updated FRA Environmental Procedures and Council on Environmental Quality (CEQ) regulations issued after release of the Draft EIR/EIS.
- Section 3.1.3, Changes between the Draft EIR/EIS and this Final EIR/EIS, was added.
- Section 3.1.4, Chapter 3 Purpose, was updated to include the Diridon design variant (DDV) and the tunnel design variant (TDV), which were included in Section 3.20 in the Draft EIR/EIS but have now been incorporated as appropriate into the resource topic sections of Chapter 3 of the Final EIR/EIS.
- Section 3.1.6.6, Environmental Consequences, was updated to reference ridership forecasts for 2040 from the 2020 Business Plan (Authority 2021).
- Where appropriate, the verb “would,” when used specifically to describe impact avoidance and minimization features (IAMFs) or mitigation measures, as well as their directly related activities, was changed to “will,” indicating their integration into project design.

3.1.1 Federal and State Regulatory Context

Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, addresses existing environmental conditions and the potential impacts of the California High-Speed Rail (HSR) San Jose to Central Valley Wye Project Extent (project or project extent) on environmental resources. This chapter examines each resource in a separate subsection. Section 3.1 describes the federal and state requirements to address potential environmental impacts, the purpose of this chapter, the environmental resources considered, and the organization and content of each resource subsection.

The California High-Speed Rail Authority (Authority) is preparing this Final EIR/EIS pursuant to the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The CEQA Guidelines (14 California Code of Regulations § 15000 et seq.) encourage the preparation of joint NEPA/CEQA documents and the use of an EIS to satisfy CEQA requirements, where possible and appropriate. The Authority has used its best judgment in preparing this combined EIR/EIS to satisfy both NEPA and CEQA requirements.

NEPA requires federal agencies to consider the potential environmental impacts in the evaluation of any proposed federal agency action. NEPA also obligates federal agencies to consider the environmental consequences and costs of their projects and programs as part of the planning process. Pursuant to the NEPA Assignment Memorandum of Understanding, the Authority has assumed the Federal Railroad Administration’s (FRA) obligations under NEPA and has prepared this Final EIR/EIS in compliance with CEQ regulations (40 Code of Federal Regulations [C.F.R.]

Parts 1500 to 1508) implementing NEPA and FRA's Procedures for Considering Environmental Impacts (64 *Federal Register* 28545) (FRA and State of California 2019).^{1,2,3}

CEQA (California Public Resources Code 21000 et seq.) and the CEQA Guidelines require state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, when feasible. California Public Resources Code 21100(b)(3) provides that an EIR will include a statement setting forth the mitigation measures proposed to minimize the significant impacts on the environment.

The requirements of NEPA and CEQA are not necessarily the same; similar requirements found in both statutes may have different performance criteria, and some requirements that appear in one statute may not appear in the other. In addition to NEPA and CEQA, the project is subject to additional federal and state environmental statutes and regulations, which also require analyses that must be incorporated into the EIR/EIS. For example, construction and operation of the project would require compliance with both federal and state regulations protecting endangered species. In circumstances where more than one regulation or statute might apply, this joint EIR/EIS has been prepared in compliance with the more stringent or inclusive set of requirements, whether federal or state. The timeline for construction of the project is provided in Section 2.10, Construction Plan.

The Authority has focused on avoiding and minimizing potential impacts through rigorous planning and thoughtful design, informed by the decisions made at the conclusion of the first-tier EIR/EIS process, including the adopted mitigation strategies.⁴ The project alternatives described in Chapter 2, Alternatives, and analyzed in Chapter 3 incorporate as part of their description means to avoid and minimize impacts through design, compliance with applicable laws and regulations, and compliance with established industry standards, as reflected in Appendix 2-E, Project Impact Avoidance and Minimization Features. The project-level environmental analysis conducted for this Final EIR/EIS and described in this chapter includes consideration of means to avoid, minimize, and mitigate potential adverse environmental impacts. In balance with other considerations, the Authority has defined alignments along existing transportation corridors and rights-of-way to the extent feasible, while accommodating the appropriate project features and design standards, to minimize overall impact potential. Where necessary, this chapter identifies site-specific mitigation measures to further minimize potential project impacts, including those specific to each alternative alignment, proposed stations, and the other facilities.

3.1.2 State and Regional Policy Context

The California HSR System is an integral part of state and regional policy to improve mobility between the major metropolitan areas of the state and reduce statewide greenhouse gas (GHG)

¹ The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 United States Code Section 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the FRA and the State of California. The technical reports were prepared to support the EIR/EIS; however, many of the technical reports were prepared prior to the execution of the NEPA Assignment MOU and therefore still reflect FRA's involvement.

² While this EIR/EIS was being prepared, FRA adopted new NEPA compliance regulations (23 C.F.R. 771). Those regulations only apply to actions initiated after November 28, 2018. See 23 C.F.R. 771.109(a)(4). Because this EIR/EIS was initiated prior to that date, it remains subject to FRA's Environmental Procedures rather than the Part 771 regulations.

³ The Council on Environmental Quality issued new regulations on July 14, 2020, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. Parts 1500-1508. However, this project initiated NEPA before the effective date and is not subject to the new regulations, relying on the 1978 regulations as they existed prior to September 14, 2020. All subsequent citations to Council on Environmental Quality regulations in this environmental document refer to the 1978 regulations, pursuant to 40 C.F.R. 1506.13 (2020) and the preamble at 85 Fed. Reg. 43340.

⁴ The Authority and FRA's *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System* was published in August 2005. The FRA's program-level commitments are set forth in the November 2005 Record of Decision (FRA 2005) and the Authority's program-level commitments are set forth in November 2005 Authority Resolution 5-01 (Authority 2005). The Authority's program-level commitments are set forth in the CEQA findings for the *Partially Revised Final Program EIR* and the *Mitigation Monitoring and Reporting Program*, both published on April 19, 2012. The FRA's program-level commitments are set forth in the December 2, 2008, Record of Decision for the *Bay Area to Central Valley High-Speed Train (HST) Final Program EIR/EIS*.

emissions. The transportation sector—predominantly the cars, aircraft, and trucks that move people and goods—is the largest contributor to the state’s total GHG emissions. The HSR system would provide a direct reduction in GHG emissions by moving people from travel in personal vehicles and aircraft to a more energy-efficient mode of transportation. The HSR system would also indirectly promote a reduction in GHG emissions by providing opportunities for low-impact, transit-oriented development around HSR stations in major metropolitan areas.

California legislation to reduce GHG emissions includes Executive Order S-3-05, Assembly Bill (AB) 32, Executive Order B-30-15, and Senate Bill 375, which are described in Chapter 1, Section 1.2.4.4, Deterioration of Air Quality and Impact on Greenhouse Gas Emissions, of this Final EIR/EIS. Executive Order S-3-05 and AB 32 set target reductions for GHG emissions and require the California Air Resources Board to design and implement emission limits, regulations, and other measures to reduce statewide GHG emissions to 40 percent below 1990 levels by 2030. Senate Bill 375 built upon AB 32 by requiring regional transportation agencies to develop a *sustainable communities strategy* to reduce GHG emissions from auto trips. The sustainable communities strategy is now a component of each regional transportation plan in the state and a requirement of all local general plans.

Chapter 1, Section 1.3, Relationship to Other Agency Plans, Policies, and Programs, describes how the HSR system supports other state, regional, and local plans and policies. While the HSR system is intended and designed to implement state, regional, and local policies and laws related to transportation, GHG emissions, and sustainable communities, the project may not be consistent with some presently adopted regional or local policies or laws. Pursuant to CEQA Guidelines (Section 15125(d)), the FRA’s Procedures for Considering Environmental Impacts (64 *Federal Register* 28555, item 15), and the CEQ’s regulations implementing NEPA (40 C.F.R. § 1506.2(d)), each resource section in this chapter addresses inconsistencies or conflicts between the project and adopted regional or local plans or policies pertaining to particular resources. Where inconsistencies are found, these discussions also describe efforts to reconcile inconsistencies or conflicts and explain the rationale for proceeding if full reconciliation is not feasible. Appendix 2-K, Policy Consistency Analysis, in Volume 2, Technical Appendices, of this Final EIR/EIS documents the consistency analysis for all pertinent regional and local plans or policies.

3.1.3 Changes between the Draft EIR/EIS and This Final EIR/EIS

This Final EIR/EIS is a “full” final document that includes the text of the Draft EIR/EIS with text and figure revisions made since publication of the Draft EIR/EIS. A vertical line in the margin indicates a substantive change in the text since publication of the Draft EIR/EIS; minor editorial changes and clarifications are not identified. In addition, substantive changes are summarized at the beginning of each chapter and resource topic section of Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures. Section 3.20, Design Variants to Optimize Speed, of the Draft EIR/EIS has been removed from the Final EIR/EIS, and the content has been incorporated into each resource topic. The following resource topics are areas with no impact differences as a result of the inclusion of the design variants: Section 3.5, Electromagnetic Fields and Electromagnetic Interference; Section 3.6, Public Utilities and Energy; Section 3.8, Hydrology and Water Resources; Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources; Section 3.10, Hazardous Materials and Waste; Section 3.11, Safety and Security; Section 3.13, Station Planning, Land Use, and Development; Section 3.14, Agricultural Farmland; Section 3.15, Parks, Recreation, and Open Space; Section 3.16, Aesthetics and Visual Quality; Section 3.17, Cultural Resources; and Chapter 4, Section 4(f)/6(f) Evaluation. Throughout the Final EIR/EIS, the IAMF and mitigation measure language has been modified to use the term “will” instead of the term “would.”

3.1.4 Chapter 3 Purpose

Each resource section of this chapter describes the following five primary topics of environmental information:

- **Consistency with Plans and Laws**—Discussion of project inconsistency with adopted regional and local plans and policies.
- **Methods for Evaluating Impacts**—Methods used to analyze potential environmental impacts that would be caused by project alternatives and to determine the significance of those impacts under CEQA.
- **Affected Environment**—Existing environmental conditions in the areas that would be affected by the project.
- **Environmental Consequences**—Potential environmental impacts associated with constructing and operating the project alternatives.
- **Mitigation Measures**—Site-specific mitigation measures where impacts cannot be otherwise avoided or reduced through project features and design standards, best management practices during construction, or project operations.

The analyses address the impacts of the alternative alignments, stations, and other related HSR facilities described in Chapter 2, and identify key differences among the impacts of the four alternatives evaluated in this Final EIR/EIS. As described in Chapter 2, the project consists of a No Project Alternative and four end-to-end alternatives identified as Alternative 1, Alternative 2, Alternative 3, and Alternative 4. Each end-to-end alternative comprises five subsections. Table 3.1-1 shows the design options of each alternative by subsection. These design options are referred to throughout this chapter.

Table 3.1-1 San Jose to Central Valley Wye Design Options by Subsection

Subsection/Design Options	Alternative 1	Alternative 2	Alternative 3	Alternative 4
San Jose Diridon Station Approach				
Viaduct to Scott Blvd	–	X	X	–
Viaduct to I-880	X	–	–	–
Blended, at-grade	–	–	–	X
Monterey Corridor				
Viaduct	X	–	X	–
At-grade	–	X	–	–
Blended, at-grade	–	–	–	X
Morgan Hill and Gilroy				
Embankment to downtown Gilroy	–	X	–	–
Viaduct to downtown Gilroy	X	–	–	–
Viaduct to east Gilroy	–	–	X	–
Blended, at-grade	–	–	–	X
Pacheco Pass				
Tunnel	X	X	X	X
San Joaquin Valley				
Henry Miller Rd	X	X	X	X

Source: Authority 2019

X = present

– = absent

I-880 = Interstate 880

The analyses also evaluate impacts associated with related infrastructure changes required to accommodate the alternatives, such as roadway and interchange modifications and utility relocation. This chapter analyzes mitigation, impacts resulting from mitigation, and feasibility of mitigation. In addition, the Authority has developed two design variants intended to optimize train speed. The first, referred to as the DDV, is located north and south of Diridon Station and at the station platforms and, if adopted, would apply only to Alternative 4. The second, referred to as the TDV, is located at the two tunnels east of Gilroy and through the Pacheco Pass and would apply to all four alternatives. (See Chapter 2, Alternatives, for more detail.)

Analysts used many sources to prepare this document. Chapter 12, References, lists these sources.

3.1.5 Chapter 3 Organization

Chapter 3 presents each environmental resource topic in its own section, as follows:

- Section 3.2, Transportation*
- Section 3.3, Air Quality and Greenhouse Gases*
- Section 3.4, Noise and Vibration*
- Section 3.5, Electromagnetic Fields and Electromagnetic Interference
- Section 3.6, Public Utilities and Energy
- Section 3.7, Biological and Aquatic Resources *
- Section 3.8, Hydrology and Water Resources*
- Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources*
- Section 3.10, Hazardous Materials and Wastes*
- Section 3.11, Safety and Security
- Section 3.12, Socioeconomics and Communities*
- Section 3.13, Station Planning, Land Use, and Development
- Section 3.14, Agricultural Farmland*
- Section 3.15, Parks, Recreation, and Open Space
- Section 3.16, Aesthetics and Visual Quality*
- Section 3.17, Cultural Resources*
- Section 3.18, Regional Growth
- Section 3.19, Cumulative Impacts

The above asterisks (*) in the list of Chapter 3 sections indicate topics that are supported by a technical report providing additional detailed technical analyses and data. Technical reports are available in electronic form by request on the Authority's website. In addition to the technical reports, Volume 2, Technical Appendices, provides detailed, resource-specific background information, data, and other evidence supporting the analyses and conclusions in this chapter. Appendix 3.1-A, Parcels within the HSR Project Footprint, in Volume 2 provides detailed mapping of the project footprint and parcels intersected by each of the project alternatives. As shown in the text box, analyses of impacts associated with schools are presented in multiple sections in Chapter 3.

Effects on Schools

The analysis of the potential impacts of project alternatives on schools can be found in the following sections:

- 3.2, Transportation
- 3.3, Air Quality and Greenhouse Gases
- 3.4, Noise and Vibration
- 3.5, Electromagnetic Fields and Electromagnetic Interference
- 3.10, Hazardous Materials and Waste
- 3.11, Safety and Security
- 3.12, Socioeconomics and Communities
- 3.13, Station Planning, Land Use, and Development
- 3.15, Parks, Recreation, and Open Space
- 3.16, Aesthetics and Visual Quality

3.1.6 Chapter 3 Content

To the extent possible, resource topics have been treated in a structurally consistent fashion; however, the particulars of some resources necessitate organizational variation. In general, each resource topic in Chapter 3 includes the sections discussed below.

3.1.6.1 Introduction

The introduction presents an overview of the resource topic and the issues considered in the analysis, with definitions of the relevant resource issues as appropriate. This section also identifies technical reports and appendices that support the analysis, and it lists other environmental resource sections with bearing on the subject.

3.1.6.2 Laws, Regulations, and Orders

This section identifies the federal and state regulatory framework relevant to project approvals or decisions for the resource topic. An inventory of pertinent regional and local plans and policies considered in the preparation of the analysis for each resource topic appears in Volume 2, Appendix 2-J, Regional and Local Plans and Policies.

3.1.6.3 Consistency with Plans and Laws

This section addresses CEQA and NEPA requirements to describe a proposed project's consistency or conflicts with applicable federal, state, and local land use and other plans and laws. CEQA Guidelines require that an EIR discuss any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans (CEQA Guidelines, § 15125(d)⁵). The CEQ regulations require a discussion of conflicts between a proposed undertaking and the objectives of federal, regional, state, local, and tribal⁶ land use plans, policies, and laws, as well as a description of the extent to which the Authority would reconcile the inconsistencies (CEQ Regulations §§ 1502.16(c), 1506.2(d)).⁷ A complete inventory of the inconsistencies between the project and adopted regional or local plans and policies, as well as a description of how the Authority has attempted to reconcile the inconsistencies, is documented by resource in Appendix 2-K, Policy Consistency Analysis.

3.1.6.4 Methods for Evaluating Impacts

This section defines the resource study areas (RSAs) for each topic (some topics require more than one RSA) and describes the methods used to evaluate the impacts of implementing the project alternatives. It also discusses the methods to evaluate impacts under NEPA and determine the significance of impacts under CEQA.

Definition of Resource Study Area

RSAs are the geographic boundaries in which the environmental investigations specific to each resource topic are conducted to determine the resource characteristics and project impacts. A resource topic may have more than one RSA depending on the types of resources present and the types of impacts being analyzed. The RSAs pertinent to each resource topic are described in each resource section (Sections 3.2 through 3.18) and for cumulative impacts (Section 3.19). Figure 3.1-1 illustrates the conceptual components of a typical RSA.

Each RSA covers a geography that includes:

- Area necessary to define characteristics and context of the resource

Content of Resource Sections

Each resource section in Chapter 3 includes the following sections:

1. Introduction
2. Laws, Regulations, and Orders
3. Consistency with Plans and Laws
4. Methods for Evaluating Impacts
5. Affected Environment
6. Environmental Consequences
7. Mitigation Measures
8. Impacts Summary for NEPA Comparison of Alternatives
9. CEQA Significance Conclusions

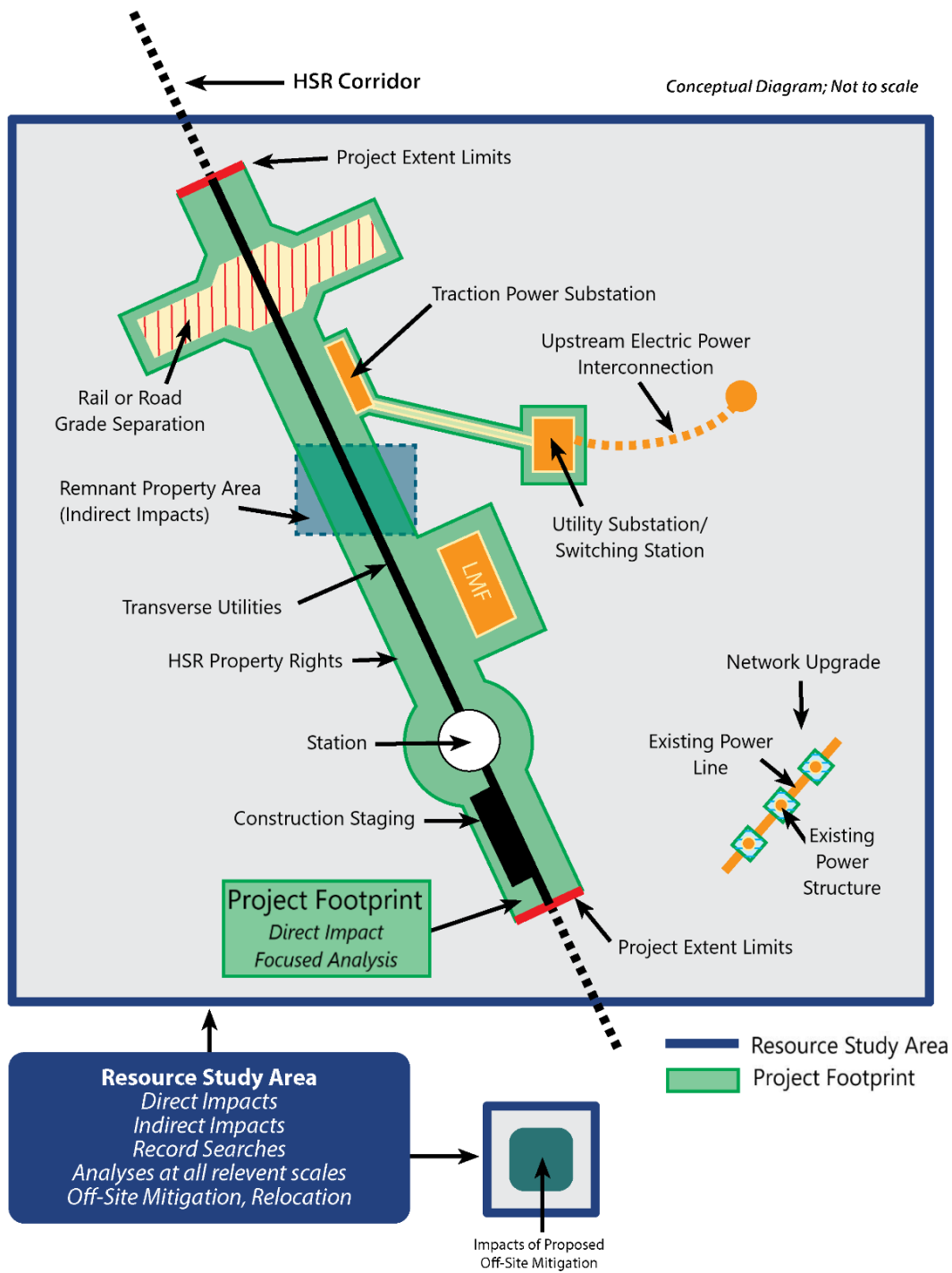
⁵ All citations in this document to the "CEQA Guidelines" are references to the California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387.

⁶ No designated tribal lands exist in the vicinity of the project alternatives and no analysis of tribal land use policies is provided.

⁷ All citations to the CEQ Regulations are references to 40 C.F.R Part 1500.

- Facilities or features within the project footprint of each alternative and associated activities that could affect the resource
- Area necessary to determine the direct and indirect impacts (both beneficial and adverse) of the project alternatives

All RSAs encompass the project footprint, which includes the components and rights-of-way needed to construct and operate the project. Project footprint components include the proposed right-of-way and associated facilities, such as automatic train control, communications, and switching facilities, as well as the shifts in roadway rights-of-way associated with those facilities—including overcrossings and interchanges—that would be modified or shifted to accommodate the project, as described in Chapter 2.



Source: Adapted from Authority 2017

JUNE 2017

Figure 3.1-1 Typical Resource Study Area

The project footprint includes the following:

- **Right-of-way**—Alternatives 1, 2, and 3 would predominantly operate as a fully dedicated two-track system, requiring acquisition of right-of-way for operation and maintenance. The exception is the northernmost portion of the project extent, where, depending on the selected alternative, the system would maintain blended operations with Caltrain, predominantly using the existing Caltrain right-of-way. Alternative 4 would operate as a blended at-grade alignment, predominantly using the existing Caltrain and Union Pacific Railroad rights-of-way between San Jose and Gilroy, beyond which the system would be a fully dedicated two-track system.
- **Guideway**—The project would travel on different track types with varying profiles: low, near-the-ground tracks are at grade; higher tracks would be elevated in a viaduct or on an embankment; and below-grade tracks would be in retained cuts or tunnels. Types of water crossings that might be built include culverts such as box culverts and pipes, bridges with full channel spans, and for some wider river crossings, bridges with limited piers within the ordinary high-water channel.
- **Grade separations**—An optimal operating HSR system consists of a fully grade-separated and access-controlled guideway. Grade separations may occur in several scenarios: roadway overcrossings or undercrossings and elevated HSR road crossings.
- **Traction power substations**—Each traction power substation would encompass approximately 32,000 square feet (200 by 160 feet) at approximately 30-mile intervals adjacent to the HSR alignment.
- **Traction power switching and paralleling stations**—Each traction power switching station would need a site of approximately 14,400 square feet (160 by 90 feet), and each traction power paralleling station would need a site of approximately 9,600 square feet (120 by 80 feet) adjacent to the proposed HSR.
- **Utility switching stations**—Utility switching stations would encompass approximately 35,200 square feet (220 by 160 feet).
- **Communications facilities**—Within a fenced area of approximately 20 by 15 feet, 100-foot radio towers would be installed at intervals of approximately 1.5 to 3 miles. Where possible, communications equipment would be co-located with traction power substations or other HSR facilities.
- **Network upgrades**—Network upgrades to support the project's electrical load requirements would involve reconductoring existing 115-kilovolt power lines.
- **Utility connections**—The right-of-way required for new power transmission lines to provide a utility connection between electrical power substations and station switching facilities would be included in the project footprint. Fiber optic lines would also be required to support the electrical interconnections connecting the traction power substations to a new utility switching station and to existing PG&E facilities, typically within tie-line/utility corridors.
- **Utility relocations**—Project construction may require the relocation of existing utility lines. The additional right-of-way required to accommodate these relocations would be included in the project footprint.
- **HSR stations**—The existing San Jose Diridon Station and Gilroy Station would require modifications to accommodate HSR trains and additional passenger services. One new station could be built in east Gilroy.
- **Maintenance facilities**—The project would include two types of maintenance facilities: a maintenance of way facility and a maintenance of way siding.

- **Project-related roadway modifications**—Roadway modifications would have varying rights-of-way and would include new roadway undercrossings and overcrossings of the project guideway.
- **Temporary construction areas**—Areas needed during construction, such as construction staging and temporary construction easements, as well as areas that may be necessary for temporary relocation of facilities during the construction process, such as shoofly tracks.

The project would require property acquisition necessary for project operation. When the remnant portion of an acquired parcel beyond the right-of-way is too small to sustain current use without other modifications, or where access to a property cannot be provided, it would also be acquired. An example of a remnant portion of a property is shown in Figure 3.1-1. These remnant parcels may be used temporarily for construction and would be considered for sale after project construction if the Authority determines it has no long-term need for them. They would not be part of the finished project, nor would they be within the HSR right-of-way limits. However, the Authority may conduct various management and maintenance activities (e.g., vegetation management, site security) on such parcels. Property management activities would be designed to avoid impacts; if, once the actual site conditions are known and there would be potential for an impact, a separate environmental evaluation would be triggered.

The Authority would not acquire temporary construction staging areas through the right-of-way acquisition process. It would be the responsibility of the design-build contractor to negotiate with property owners to secure access and temporary use of the properties for staging or laydown areas.

The maintenance of way facility, maintenance of way siding, and other identified sites along the alignment would be considered for construction staging. Volume 2, Appendix 3.1-A, provides a map series of the project footprint for each project alternative.

Impact Avoidance and Minimization Features

IAMFs are project features that are considered to be part of the project and are included as applicable under all four project alternatives for purposes of the environmental impact analysis. The full text of each IAMF is provided in Appendix 2-E. Each resource section in Chapter 3 provides a list of applicable IAMFs relevant to the resource in the Environmental Consequences section, and the mechanisms by which the IAMFs will avoid and minimize impacts are described briefly in the individual impact discussions.

Methods for Impact Analysis

Each resource section describes the methods and data sources used for evaluating impacts on that resource. The methods for analysis vary by resource and rely on both quantitative and qualitative techniques. Where appropriate to evaluating the impacts, the Authority conducted fieldwork to collect data. These methods apply to both NEPA and CEQA analyses unless otherwise indicated.

Method for Evaluating Impacts under NEPA

In accordance with CEQ regulations (40 C.F.R. Parts 1500–1508), the analysis considers context and intensity to describe project effects. *Context* refers to the affected environment in which a proposed project occurs and may include affected interests or resources (e.g., residents, special-status species); the specific locality; the region; or society as a whole, depending on the resource. *Intensity* refers to the severity of the impact. The analysis of intensity encompasses the type (direct/indirect), extent (local, regional), and duration (temporary or permanent) of the impact; whether the action threatens a violation of federal or state law or requirements imposed for the protection of the environment; and other intensity considerations, as set forth in the CEQ NEPA regulations. Context and intensity are considered together when determining the severity of the change introduced by the project comparison with conditions under the No Project Alternative.

Method for Determining Significance under CEQA

CEQA requires an EIR to identify the significant environmental impacts of a project (CEQA Guidelines § 15126). One of the primary differences between NEPA and CEQA is that CEQA requires a threshold-based impact analysis. The Authority has established thresholds based predominantly on the CEQA Guidelines to determine the level of significance of impacts under CEQA and, where appropriate, the requirement for mitigation measures to reduce the magnitude and severity of impacts. If a threshold is exceeded, the impact is considered significant under CEQA. If mitigation does not reduce an impact below the threshold, the impact remains significant and unavoidable after mitigation. The thresholds of significance under CEQA are presented in each resource section.

3.1.6.5 *Affected Environment*

The description of the affected environment summarizes existing, baseline conditions of sensitive or protected resources that could be affected by the project, including their regional context. This section provides the basis and context for the environmental analysis and evaluation of impacts. The affected environment discussion identifies key resources, any resources specific to a given subsection, and their general location in the project extent, with supporting figures and tables showing the extent of each resource by subsection. The description is based on the most recent data available through public sources or collected during fieldwork.

3.1.6.6 *Environmental Consequences*

This section describes the potential environmental impacts of the No Project Alternative and the project alternatives. The explanations of impacts include the context, intensity, and duration of an impact. Each impact is identified by a name and number (e.g., Impact LU#1: Impacts on Land Use Patterns). Impacts are organized by construction and operations according to when and under what conditions impacts are expected to occur. As described in Chapter 2, the project alternatives are similar because of their geographic proximity and uniform design features; consequently, in many cases they would result in similar impacts. Figures illustrating the impacts and summary tables that convey the key differences among the end-to-end alternatives supplement the impact narrative.

The evaluation of impacts reflects integration of IAMFs that have been incorporated into the project alternatives, as described in Section 2.6.2.3, HSR Project Impact Avoidance and Minimization Features. This Final EIR/EIS labels and numbers IAMFs. For example, LU-IAMF#1, HSR Station Area Development: General Principles and Guidelines, applies to land use resources. IAMFs are required practices and project features that protect sensitive resources from project construction or operational activities. IAMFs may involve the development of a plan or program, such as a dust control plan to reduce impacts on air quality; or they may require or restrict an action, such as limiting delivery hours of construction materials to minimize impacts on traffic during peak travel times.

This Final EIR/EIS evaluates the impacts of the project alternatives on the existing environmental conditions in the project vicinity. The Final EIR/EIS also evaluates the impacts of the alternatives on the projected 2040 future environmental conditions without the project (No Project Alternative).⁸ Projected future environmental conditions without the project are described under the heading “No Project Alternative” in the Environmental Consequences portion of each resource section. Some topic areas (transportation, air quality, and energy) include additional

⁸ The CEQA Guidelines also require that an EIR examine “what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community service” (CEQA Guidelines § 15126.6(e)(2)). Similarly, NEPA requires that the alternatives analysis in an EIS “include the alternative of no action” (CEQ regulations 1502.14(d)). Accordingly, the No Project Alternative is included in this Final EIR/EIS to provide a basis for decision-makers and the public to compare the impacts of approving one of the San Jose to Merced project alternatives to the impacts of not approving any of the San Jose to Merced project alternatives. For a detailed description of the No Project Alternative, refer to Section 2.6.

discussion of the impacts of the project alternatives in the opening year of HSR operations, as described more specifically in the individual sections.

Each impact discussion that addresses a CEQA threshold also includes a subsection entitled CEQA Conclusion. The CEQA Conclusion sections identify the relevant CEQA threshold and describes how the project impacts would either exceed or not exceed the threshold. CEQA impacts are categorized as significant, less than significant, or no impact before mitigation.

NEPA and CEQA also require examination of a project's cumulative impacts (i.e., a project's impacts considered in conjunction with impacts of other past, present, and reasonably foreseeable projects causing related impacts). Section 3.19 evaluates cumulative impacts for each resource and considers the project's contribution to any cumulative impact.

Ridership Forecasts and Impacts Analysis

The ridership forecasts used in this environmental analysis correspond to forecasts in the 2016 Business Plan and are based on probability of occurrence. The annual *medium* forecast (42.8 million passengers) is lower than the *high* forecast (56.8 million passengers) but has a higher likelihood of occurrence (Authority 2016). For impact analyses that are related to the level of ridership on the HSR system, the medium- and high-ridership forecasts provide conservative estimates that have been applied as follows.

The high-ridership forecast (56.8 million passengers) provides for a conservative assessment of adverse impacts in these areas:

- Section 3.2, Transportation—Analysis of transportation effects from increased traffic around station areas
- Section 3.3, Air Quality and Greenhouse Gases—Analysis of localized air quality effects from increased traffic around station areas
- Section 3.4, Noise and Vibration—Analysis of noise effects from increased traffic around station areas
- Section 3.6, Public Utilities and Energy—Analysis of the electrical demands of train propulsion, stations, storage depots, and maintenance facilities

The use of the high-ridership forecast for these analyses yields a conservative disclosure of a higher level of adverse environmental impacts that could occur if ridership reaches the 2040 forecast of 56.8 million passengers. If HSR ridership proves to be lower than the 56.8 million forecast, adverse environmental impacts would also be lower. However, while a lower level of ridership would reduce adverse environmental impacts, it would also reduce the environmental benefits of the HSR system (e.g., transportation, air quality, energy).

The medium-ridership forecast (42.8 million) provides for a conservative assessment of environmental benefits in these areas:

- Section 3.2, Transportation—Analysis of traffic effects (vehicle miles traveled) on the regional highway network from reducing automobile trips
- Section 3.3, Air Quality and Greenhouse Gases—Analysis of air quality and GHG effects from reducing vehicle miles traveled, air travel, and energy use
- Section 3.6, Public Utilities and Energy—Analysis of energy effects from reducing fossil fuel consumption for automobile, air, and conventional rail travel

The use of the medium-ridership forecast for these analyses yields a conservative disclosure of a lower level of environmental benefit that could occur if ridership reaches the 2040 forecast of 42.8 million passengers rather than the higher forecast of 56.8 million riders. If HSR ridership proves to be higher than the 42.8 million forecast, environmental benefits would also be higher, but this scenario would also bring a higher level of impact.

Since the 2016 Business Plan forecasts were developed, the Authority adopted a 2018 Business Plan, which was accompanied by updated forecasts documented in Ridership & Revenue Forecasting Technical Supporting Documents (Authority 2016, 2018). The 2016 and 2018 Business Plan ridership forecasts were developed using the same travel forecasting model; the forecasts differ because of changes in the model's inputs, including the HSR service plan, demographic forecasts, estimates of automobile operating costs and travel times, and fares. The medium ridership forecast for 2040 decreased by 6.5 percent, from 42.8 million to 40 million passengers, and the high ridership forecast decreased by 10.1 percent, from 56.8 million to 51.6 million passengers. In addition, the 2018 Business Plan assumes an opening year of 2033 rather than 2029 for the full Phase 1 system (Authority 2016, 2018).

The Authority released the *Draft 2020 Business Plan: Delivering the Vision* in February 2020 (Authority 2020). Subsequently, due to the ongoing COVID-19 pandemic uncertainty, the Draft 2020 Business Plan final adoption was extended to April 15, 2021. A Revised Draft 2020 Business Plan was issued on February 9, 2021, for public review and comment. The 2020 Business Plan was adopted by the Authority Board of Directors on March 25, 2021, and submitted to the state legislature on April 12, 2021. The 2020 Business Plan forecasts were developed using the same travel forecasting model as the 2016 and 2018 Business Plans, updated for population and employment forecasts. The 2020 Business Plan Phase 1 medium ridership forecast for 2040 is 38.6 million, and the high ridership forecast is 50.0 million (Authority 2021).

To the extent that the lower ridership levels projected in the 2018 Business Plan or the 2020 Business Plan would result in fewer trains operating in 2040, the adverse environmental impacts associated with the train operations in 2040 would be somewhat less than the impacts presented in this Final EIR/EIS, and the benefits accruing to the project (e.g., reduced vehicle miles traveled, reduced GHG emissions, reduced energy consumption) also would be somewhat less than the benefits presented in this Final EIR/EIS. As with the impacts, the benefits would continue to build and accrue over time and would eventually reach the levels discussed in this Final EIR/EIS for the Phase 1 system.

3.1.6.7 Mitigation Measures

This section identifies and describes proposed mitigation measures to avoid, minimize, rectify, reduce, eliminate, or compensate for impacts. NEPA requires federal agencies to identify potentially adverse effects and identify measures to mitigate those effects. CEQA requires that each significant impact of a project be identified and feasible mitigation measures be stated and implemented. Mitigation measures are identified for significant impacts from construction and operational activities that will not be sufficiently avoided or minimized through the IAMFs or by refining project design. The mitigation measures are based on the mitigation strategies presented in the *Final Program EIR/EIS for the Proposed California High-Speed Train System* (Authority and FRA 2005), *San Francisco Bay Area (Bay Area) to Central Valley High-Speed Train Final Program EIR/EIS* (Authority and FRA 2008), and *Bay Area to Central Valley High-Speed Train Partially Revised Final Program EIR* (Authority 2012), as they may apply to the project. The programmatic mitigation strategies in these program EIR/EISs provided a foundation for crafting mitigation measures in this project section, and additional mitigation measures were identified where appropriate. The mitigation measures that would be applied to the HSR project are abbreviated "MM" and numbered. For example, the first mitigation measure for air quality impacts is AQ-MM#1, and for aesthetics and visual quality it is AVQ-MM#1.

A discussion of potential secondary impacts resulting from implementation of each mitigation measure is provided after the full text of each measure. If, during project implementation changing facts or circumstances render mitigation infeasible, additional environmental review may be required. Should mitigation occur on property not owned by the Authority, coordination with the property owners involved, or with jurisdiction that regulates the property, will be required as described in Section 3.1.8, Legal Authority to Implement Off-Site Mitigation, for more information.

3.1.6.8 Impact Summary for NEPA Comparison of Alternatives

This section summarizes the environmental consequences specific to NEPA requirements for each resource. The NEPA impact summaries focus on any adverse effects using summary tables and narrative discussions to briefly describe the impact, the impact mechanism, a comparison of intensity—either qualitative or quantitative—between alternatives, the ameliorating influence of IAMFs, and any additional mitigation necessary. Table 3.1-2 shows an example of a NEPA summary table and its structure.

Table 3.1-2 Comparison of Project Alternative Impacts for Air Quality and Greenhouse Gases (Example)

Impacts	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Impact AQ#1: Temporary Direct and Indirect Impacts on Air Quality within the SFBAAB	Temporary construction activity would generate NO _x emissions in excess of the General Conformity <i>de minimis</i> threshold. Maximum annual NO _x emissions of 106 tons would occur in 2024. Annual construction emissions peak in 2024 due to concurrent construction of all four subsections within the SFBAAB, as well as construction of the Gilroy MOWF, San Jose Diridon Station, and Downtown Gilroy Station. Emissions of all other pollutants would be below the respective General Conformity <i>de minimis</i> thresholds.	Same as Alternative 1. Maximum annual NO _x emissions of 155 tons would occur in 2024, which is the year with the greatest amount of total construction activity in the SFBAAB.	Same as Alternative 1. Maximum annual NO _x emissions of 114 tons would occur in 2024, which is the year with the greatest amount of total construction activity in the SFBAAB.	Same as Alternative 1. Maximum annual NO _x emissions of 156 tons would occur in 2024, which is the year with the greatest amount of total construction activity in the SFBAAB.

NO_x = nitrogen oxides
 SFBAAB = San Francisco Bay Area Air Basin

3.1.6.9 CEQA Significance Conclusions

This discussion summarizes the construction and operational impacts identified in the Environmental Consequences section and reports CEQA significance determinations. For each project alternative, this section uses summary tables and narrative discussion to identify mitigation measures that are available to reduce significant impacts and report the level of significance after mitigation. Table 3.1-3 shows an example of the information and table layout presented in this section.

Table 3.1-3 CEQA Significance Conclusions and Mitigation Measures for Air Quality and Greenhouse Gases (Example)

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Impact AQ#1: Temporary Direct and Indirect Impacts on Air Quality within the SFBAAB	Significant for all alternatives. Construction-related VOC and NOX emissions would exceed BAAQMD's thresholds.	AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust AQ-MM#2: Construction Emissions Reductions – Requirements for use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and off-road equipment AQ-MM#3: Offset Project Construction Emissions in the SFBAAB	Less than Significant

CEQA = California Environmental Quality Act
 BAAQMD = Bay Area Air Quality Management District
 NO_x = nitrogen oxides
 SFBAAB = San Francisco Bay Area Air Basin
 VOC = volatile organic compound

3.1.7 Outreach to Local Agencies

Meetings and other outreach activities were conducted with the staff of local public agencies throughout preparation of the EIR/EIS. These meetings and other outreach activities have helped the Authority understand the on-the-ground conditions and the local environmental issues, understand the concerns of local agencies and the public, facilitate reconciliation of substantive concerns, and design effective and feasible mitigation measures. Chapter 9, Public and Agency Involvement, describes the stakeholder involvement efforts undertaken during preparation of the Final EIR/EIS. Specific resource-related issues identified during this outreach are also discussed in the respective resource sections of the Final EIR/EIS.

3.1.8 Legal Authority to Implement Off-Site Mitigation

Chapter 3 analyzes the project's potential physical environmental impacts on various resource areas. If a potential significant impact is found, mitigation measures are proposed. Most mitigation measures identified are within the Authority's jurisdiction and control. Some of the proposed mitigation measures, however, will occur outside the project footprint on property the Authority would not own as part of its right-of-way acquisitions. These are sometimes referred to as *off-site mitigation measures*. Mitigation that will occur on property not owned by the Authority will require working with the property owners involved or with the jurisdiction that regulates the property to accomplish that mitigation.

The Authority has not identified any off-site mitigation measures that it believes are infeasible or unlikely to occur. The Authority will continue its current practice of developing memoranda of understanding and funding agreements with local governments to facilitate agreement on implementation of off-site mitigation measures on property owned at the local agency level, where required.