

3 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

3.1 Introduction

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 Francisco to San Jose Project Section (Project Section, or project) on environmental resources. This chapter examines each resource in a separate subsection. Section 3.1, Introduction, describes the federal and state requirements to address potential environmental impacts, the purpose of the chapter, the environmental resources considered, and the organization and content of each resource subsection.

The California High-Speed Rail Authority (Authority) is preparing this Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). 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 Draft 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 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 Draft EIR/EIS in compliance with Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [C.F.R.] Parts 1500 to 1508) implementing NEPA and the FRA's Procedures for Considering Environmental Impacts (64 *Federal Register* 28545) (FRA and State of California 2019).¹

CEQA (California Public Resources Code § 21000 et seq.) and the CEQA Guidelines require state and local agencies, including the Authority, to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, when feasible. California Public Resources Code Section 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 CEQA and NEPA, the Project Section is subject to additional federal and state environmental statutes and regulations, which also require analyses that must be incorporated into this Draft 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 Draft EIR/EIS has been prepared in compliance with the more stringent or inclusive set of requirements, whether federal or state.

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

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 Federal Railroad Administration and the State of California.

EIR/EIS process, including the adopted mitigation strategies.² The project alternatives described in Chapter 2, Alternatives, and analyzed in this chapter incorporate as part of their description means to avoid and minimize impacts through design (Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features), as well as compliance with applicable laws and regulations and with established industry standards (Volume 2, Appendix 2-D, Applicable Design Standards). The project-level environmental analysis conducted for this Draft EIR/EIS and described in this chapter also 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. When necessary, this chapter identifies site-specific mitigation measures to further minimize potential project impacts, including those specific to each alternative alignment, proposed stations, and 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) 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 will 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 California Executive Order S-3-05, Assembly Bill 32, and Senate Bill 375, which are described in Section 1.2.4.4, Deterioration of Air Quality and Impact on Greenhouse Gas Emissions. Executive Order S-3-05 and Assembly Bill 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 Assembly Bill 32 by requiring regional transportation agencies to develop a *sustainable communities strategy* to reduce GHG emissions from auto trips. In July 2017, the Association of Bay Area Governments and Metropolitan Transportation Commission adopted the final regional transportation plan/sustainable communities strategy known as *Plan Bay Area 2040* for the nine-county region of the San Francisco Bay Area (Bay Area)—Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties (Association of Bay Area Governments and Metropolitan Transportation Commission 2017).

In this Draft EIR/EIS, 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, this Project Section may not be consistent with some 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 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 Section and adopted regional or local plans or policies. 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. Volume 2,

² The Authority’s program-level commitments are set forth in *Resolution No. 05-01 Certification of Final Program Environmental Impact Report and Approval of High Speed Train System Program* (Authority 2005) and the CEQA findings for the *Bay Area to Central Valley High-Speed Train (HST) Partially Revised Final Program EIR and the Mitigation, Monitoring, and Reporting Program*, both published on April 19, 2012 (Authority 2012a, 2012b). The FRA’s program-level commitments are set forth in the November 18, 2005, *Record of Decision California High-Speed Train System* (FRA 2005) and the December 2, 2008, *Record of Decision for the Bay Area to Central Valley High-Speed Train Final Program EIR/EIS* (FRA 2008).

Appendix 2-J, Policy Consistency Analysis, documents the consistency analysis for all pertinent regional and local plans or policies. Volume 2, Appendix 3.1-B, San Francisco Bay Conservation and Development Commission Bay Plan Consistency Analysis, documents the consistency analysis for the Bay Plan.

3.1.3 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 to reduce impacts where they cannot be otherwise avoided or minimized through project features and design standards, best management practices during construction, or project operation.

The analyses address the impacts of the alternative alignments, stations, and other related HSR facilities as described in Chapter 2 and identify key differences among the impacts associated with the two project alternatives evaluated in this Draft EIR/EIS. This chapter analyzes mitigation, impacts resulting from mitigation, and feasibility of mitigation. Sources used to prepare this document are listed in Chapter 12, References.

3.1.4 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, Parks, Recreation, and Open Space
- Section 3.15, Aesthetics and Visual Quality*
- Section 3.16, Cultural Resources*
- Section 3.17, Regional Growth
- Section 3.18, Cumulative Impacts
- Section 3.19, Design Variant to Optimize Speed

An analysis of impacts on agricultural lands is not included in Chapter 3 because no farmland or agricultural operations are known to occur along the Project Section that could be affected by construction or operation of the project alternatives. The asterisks (*) in this list of Chapter 3 sections indicate topics that are supported by technical reports providing additional detailed

technical analyses and data. Technical reports for the San Francisco to San Jose Project Section evaluate the portions of the Project Section between 4th and King Street Station in San Francisco and Scott Boulevard in Santa Clara, while technical reports for the adjacent San Jose to Merced Project Section evaluate the HSR alignment south of Scott Boulevard to the Project Section terminus at West Alma Avenue south of the San Jose Diridon Station. Electronic copies of associated technical reports are available at the repository locations listed in Chapter 10, Distribution List, and at the Authority's Northern California Regional Office at 100 Paseo de San Antonio, Suite 300, San Jose, CA 95113 and the Authority's Headquarters at 770 L Street, Suite 620 MS-1, Sacramento, CA 95814. Copies of the technical reports can be requested via the Authority's website (www.hsr.ca.gov) or by calling (800) 435-8670. 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. Volume 2, Appendix 3.1-A, Parcels within the HSR Project Footprint, provides detailed mapping of the project footprint and parcels intersected by each of the project alternatives. As identified in the text box, analyses of impacts associated with schools are presented in several sections this chapter.

3.1.5 Chapter 3 Content

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

3.1.5.1 Introduction

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

3.1.5.2 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-I, Regional and Local Plans and Policies.

3.1.5.3 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,

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 Wastes
- 3.11, Safety and Security
- 3.12, Socioeconomics and Communities
- 3.14, Parks, Recreation, and Open Space
- 3.15, Aesthetics and Visual Quality

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

§ 15125(d)).³ The CEQ regulations require a discussion of conflicts between a proposed undertaking and the objectives of federal, regional, state, local, and tribal⁴ 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)).⁵ 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 Volume 2, Appendix 2-J.

3.1.5.4 Methods for Evaluating Impacts

This section defines the resource study areas (RSA) for each resource 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 3.17) and for cumulative impacts (Section 3.18). Section 3.19 uses the same RSAs pertinent to the resource topic analyses in Sections 3.2 through 3.17. Figure 3.1-1 illustrates the components of a typical RSA.

Each RSA covers a geography that includes:

- Area necessary to define characteristics and context of the resource
- Facilities or features in 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

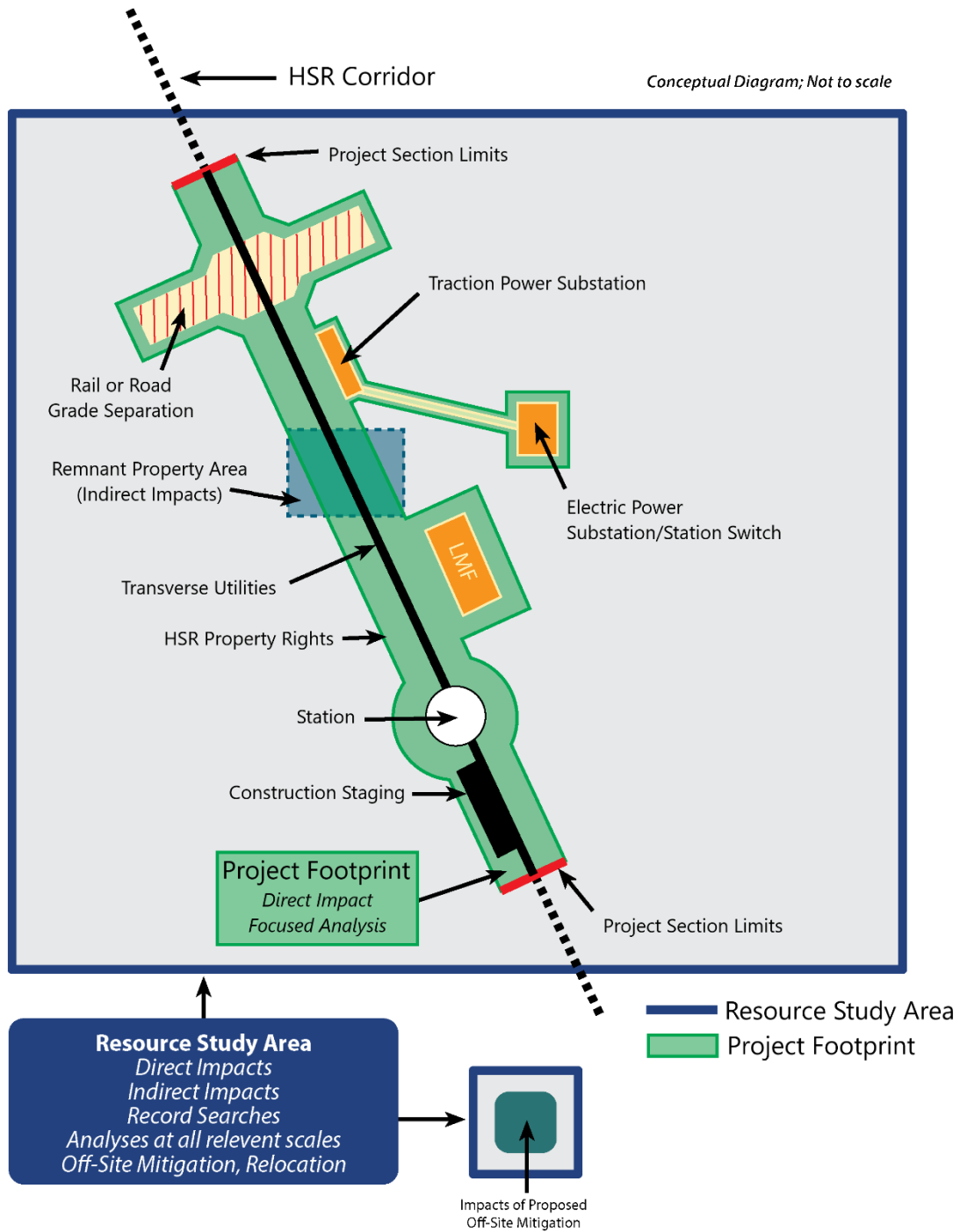
All RSAs encompass the project footprint, which includes the following components and rights-of-way needed to construct and operate the project:

- **Right-of-way**—Both project alternatives would predominantly use the existing Caltrain right-of-way, with the exception of an approximately 2-mile stretch of alignment south of the San Jose Diridon Station under Alternative B. As necessary, the Authority would acquire additional right-of-way for operations and maintenance of the project.
- **Guideway**—HSR trains operating within the blended system would travel predominantly on existing Caltrain track with varying profiles: low, near-the-ground tracks are at grade; higher tracks are on embankment; and below-grade tracks are in tunnels. Modification of existing track would be required in some areas to achieve higher speeds, and a limited amount of new guideway would be built to support project facilities and operation. Construction of Alternative B would require more new guideway than Alternative A because the southernmost portion of its alignment consists of a fully dedicated two-track system for HSR.

³ 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.

⁴ No designated tribal lands exist in the vicinity of the project alternatives, and no analysis of tribal land use policies is provided.

⁵ All citations in this document to the “CEQ Regulations” are references to 40 C.F.R. Parts 1500 to 1508.



Source: Adapted from Authority and FRA 2017

JUNE 2017

Figure 3.1-1 Typical Resource Study Area

- **Grade separations**—Both project alternatives would be partially grade-separated within the extent of the blended system. The southernmost portion of Alternative B would be fully grade-separated within the extent of the fully dedicated two-track system. Grade separations may occur in several scenarios: roadway overcrossings or undercrossings and elevated HSR road crossings.
- **Passing track**—Alternative B would include an approximately 6-mile-long four-track passing track extending from San Mateo to Redwood City at grade and on embankment.
- **Light maintenance facility**—The project would include an approximately 100- to 110-acre light maintenance facility (LMF) in Brisbane.
- **HSR stations**—Existing Caltrain stations located at 4th and King Street, Millbrae, and San Jose Diridon would require modifications to accommodate HSR trains and additional passenger services.
- **Safety modifications**—The Authority would implement safety improvements as part of the project, including installing fencing, four-quadrant gates, and median separators at at-grade crossings within the blended system and completing the fencing along the perimeter of the rail corridor.
- **Traction power substations**—Traction power substations would encompass 32,000 square feet (200 by 160 feet) at approximately 30-mile intervals adjacent to the fully dedicated two-track system.
- **Traction power switching and paralleling stations**—Each traction power switching station would require 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). These facilities would be required for operation of the fully dedicated two-track system at the southern end of Alternative B.
- **Communications facilities**—Within a fenced area of approximately 20 by 15 feet, 100-foot-tall radio towers would be installed at intervals of approximately 2.5 miles. Where possible, communications equipment would be co-located with traction power substations, switching stations, paralleling stations, and existing stations.
- **Utility relocations**—HSR 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.
- **Project roadway modifications**—Roadway modifications and realignments would have varying rights-of-way and would include modifications to roadway undercrossings and overcrossings of the project guideway.
- **Temporary Construction Areas**—The project footprint would also include areas needed during construction, such as construction staging and temporary construction easements, as well as areas necessary for temporary relocation of facilities during the construction process, such as shoofly tracks.

The project would require property acquisition necessary for operation. When the remnant portion of an acquired parcel beyond the right-of-way is too small to sustain current use without other modifications, it would also be acquired. An example of a remnant portion of a property is shown in Figure 3.1-1. These remnant parcels would not be used 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. Rather, it would be the responsibility of the design-build contractor to negotiate with property owners to secure access and temporary use of their properties for staging or laydown areas. To provide the design-build contractor with sufficient potential staging areas, this Draft EIR/EIS identifies temporary construction staging areas on the LMF and other identified sites along the alignment. This Draft EIR/EIS then evaluates the impacts from all the potential construction staging areas. The resulting analysis is conservative because it assumes all staging areas would be used. Volume 2, Appendix 3.1-A, provides a map series of the project footprint for each project alternative.

Impact Avoidance and Minimization Features

Impact avoidance and minimization features (IAMF) are project features that are considered to be part of the project and are included as applicable under both project alternatives for purposes of the environmental impact analysis. The full text of each IAMF is provided in Volume 2, Appendix 2-E. Each resource section provides a list of applicable IAMFs relevant to the resource in the Environmental Consequences section, and the mechanisms by which the IAMFs would 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 understand 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 or indirect), extent (local or regional), and duration of the impact (temporary or permanent); 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 in 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.

3.1.5.5 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 unique to a subsection, and their general location, with supporting figures and tables showing the extent of each resource by subsection. The description is based on the most recent data available at the start of the analysis through public sources or collected during field work.

Where appropriate, existing conditions reflect the electrification of the Caltrain corridor from San Francisco to San Jose in 2022. As described in Section 2.6.1.5, Planned Intercity Transit Improvements, the Caltrain Peninsula Corridor Electrification Project would improve the rail infrastructure to serve the combined needs of Caltrain and HSR as a blended system. Because electrification of the Caltrain corridor would be completed prior to construction of the project, these improvements provide a baseline against which the potential impacts of the project alternatives can be compared. For other analyses that are not directly influenced by the construction of the Caltrain Peninsula Corridor Electrification Project, such as current population or employment, the existing condition reflects conditions in 2015.

3.1.5.6 *Environmental Consequences*

The environmental consequences discussion describes the potential environmental impacts of the project alternatives and the No Project Alternative.⁶ 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; Temporary Alteration of Land Use Patterns from Land Use Conversion and Introduction of Incompatible Land Uses). Impacts are organized by construction and operations according to when and under what conditions impacts would be expected to occur. As described in Chapter 2, the project alternatives are similar to each other 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 between the end-to-end alternatives supplement the impact narrative.

The evaluation of impacts reflects the integration of IAMFs into the project alternatives, as described in Section 2.6.2.3, High-Speed Rail Project Impact Avoidance and Minimization Features. The Authority would implement IAMFs during design and construction. This Draft 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 minimize impacts on air quality, or they may require or restrict an action, such as limiting delivery hours of construction materials to avoid impacts on traffic during peak travel times.

This Draft EIR/EIS evaluates the impacts of the project alternatives on the existing environmental conditions in the project vicinity. The Draft EIR/EIS also evaluates the impacts of the project alternatives and the No Project Alternative on the projected 2029 and 2040 future environmental conditions.⁷ Projected future environmental conditions without the project alternatives are described under the heading “No Project Alternative” in the Environmental Consequences portion of each resource section. Some topic areas (e.g., transportation, air quality, and energy) include

⁶ The *Draft Brisbane Baylands Specific Plan* (City of Brisbane 2011) was one of several alternatives proposed for development of the site that was evaluated in the Draft EIR (City of Brisbane 2013). While Brisbane City Council certified the EIR in July 2018, it did not approve the *Draft Brisbane Baylands Specific Plan*. At the November 2018 general election, the City approved a General Plan Amendment for the Baylands area that designated locations and densities for residential, commercial and hotel development. A revised Specific Plan is under preparation to reflect the approved General Plan Amendment. Because a decision on a Specific Plan is still pending, it has not been included in the analysis under the No Project Alternative in the Draft EIR/EIS for the San Francisco to San Jose Project Section. The cumulative impacts discussion (Section 3.18, Cumulative Impacts, of this Draft EIR/EIS), however, does consider the proposed changes to zoning and land use designations, consistent with the 2018 approved General Plan Amendment, when assessing the potential contribution of the project to cumulative impacts.

⁷ The CEQA Guidelines 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 Draft EIR/EIS to provide a basis for decision-makers and the public to compare the impacts of approving one of the San Francisco to San Jose Project alternatives to the impacts of not approving any of the San Francisco to San Jose Project alternatives. For a detailed description of the No Project Alternative, refer to Section 2.6.1, No Project Alternative—Planned Improvements.

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

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 describe 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 3.18 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 *Connecting and Transforming California: 2016 Business Plan* (Authority 2016) 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. 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—Analysis of transportation effects from increased traffic around station areas
- Section 3.3—Analysis of localized air quality effects from increased traffic around station areas
- Section 3.4—Analysis of noise effects from increased traffic around station areas
- Section 3.6—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.

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

- Section 3.2—Analysis of traffic effects (vehicle miles traveled) on the regional highway network from reducing automobile trips
- Section 3.3—Analysis of air quality and GHG effects from reducing vehicle miles traveled, air travel, and energy use
- Section 3.6—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 ensures 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 be higher but this forecast would also bring a higher level of adverse environmental impacts as described above.

Since the 2016 Business Plan forecasts were developed, the Authority has adopted the *2018 Business Plan: Connecting California, Expanding Economy, Transforming Travel*, which was accompanied by updated forecasts documented in Ridership and 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 due to changes in the model's inputs, including the HSR service plan, demographic forecasts, estimates of automobile operating costs and travel times, and airfares. 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* (Draft 2020 Business Plan) in February 2020 for public review and comment. The plan's final adoption is intended at the June 2020 Board meeting for submittal to the California Legislature by July 1, 2020. The Draft 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 Draft 2020 Business Plan Phase 1 medium ridership forecast for 2040 is 38.6 million, and the high is 50.0 million (Authority 2020).

To the extent that the lower ridership levels projected in the 2018 Business Plan or the Draft 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 Draft 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 Draft 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 Draft EIR/EIS for the Phase 1 system.

3.1.5.7 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 operations activities that would not be sufficiently avoided or minimized by project features 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), *Bay Area to Central Valley High-Speed Train (HST) Final Program EIR/EIS* (Authority and FRA 2008), and *Bay Area to Central Valley High-Speed Train (HST) Partially Revised Final Program EIR* (Authority 2012a), as they may apply to the project. The programmatic mitigation strategies in the 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 the 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, would be required as described in Section 3.1.7, Legal Authority to Implement Off-Site Mitigation.

3.1.5.8 Impact Summary for NEPA Comparison of Alternatives

This section summarizes the environmental consequences specific to NEPA requirements for each resource. The NEPA impact summaries use tables and narrative discussions to briefly describe the impact, the impact mechanism, a comparison of intensity—either qualitative or quantitative—between project alternatives, the ameliorating influence of IAMFs, and any additional mitigation necessary. Table 3.1-1 shows an example of a NEPA summary table and its structure.

Table 3.1-1 Comparison of Project Alternative Impacts for Air Quality and Greenhouse Gases (Example)

Impacts	Alternative A	Alternative B
Impact AQ#1: Temporary Direct and Indirect Effects on Air Quality in the SFBAAB	Temporary construction activity would generate emissions of criteria pollutants. Construction-related NO _x emissions would exceed BAAQMD significance thresholds and the General Conformity threshold.	Emissions would be greater than Alternative A because of construction of the passing tracks. Construction-related ROG and NO _x emissions would exceed BAAQMD significance thresholds and NO _x emissions would exceed the General Conformity threshold. Alternative B (Viaduct to Scott Boulevard) would have slightly greater emissions (except for NO _x and fugitive PM) than Alternative B (Viaduct to I-880) because of additional construction activity required for the longer viaduct.

BAAQMD = Bay Area Air Quality Management District

I- = Interstate

NO_x = nitrogen oxides

PM = particulate matter

ROG = reactive organic gas

SFBAAB = San Francisco Bay Area Air Basin

3.1.5.9 CEQA Significance Conclusions

This discussion summarizes the construction and operations 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 available to reduce significant impacts and report the level of significance after mitigation. Table 3.1-2 shows an example of the information and table layout presented in this section.

Table 3.1-2 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 in the SFBAAB	Significant for both alternatives: Construction-related ROG (under Alternative B only) and NO _x emissions would exceed BAAQMD thresholds.	AQ-MM#1: Offset Project Construction Emissions in the SFBAAB	Less than Significant

BAAQMD = Bay Area Air Quality Management District

CEQA = California Environmental Quality Act

NO_x = nitrogen oxides

SFBAAB = San Francisco Bay Area Air Basin

3.1.6 Outreach to Local Agencies

Meetings and other outreach activities were conducted with the staff of local public agencies throughout preparation of the Draft 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 Draft EIR/EIS. Specific resource-related issues identified during this outreach are also discussed in the respective resource sections of the Draft EIR/EIS.

3.1.7 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, would 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 would occur on property not owned by the Authority would 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.