

Table of Contents

	Page
Executive Summary	ES-1
ES.1 Purpose of the Draft Environmental Impact Report	ES-1
ES.2 Project Background	ES-1
ES.3 Project Goal and Objectives	ES-5
ES.4 Environmental Review Process	ES-5
ES.5 Alternatives Considered	ES-6
ES.6 Summary of Environmental Evaluation.....	ES-7
ES.6.1 Significant and Unavoidable Impacts.....	ES-7
ES.6.2 Impacts and Mitigations Measures.....	ES-7
ES.7 Public Outreach	ES-49
ES.8 Areas of Controversy and Issues to be Resolved	ES-49
Chapter 1 Introduction.....	1-1
1.1 Overview.....	1-1
1.2 Background.....	1-1
1.3 Project Goals and Objectives.....	1-4
1.4 Environmental Review Process	1-4
1.4.1 California Environmental Quality Act	1-4
1.4.2 Purpose of this Draft Environmental Impact Report	1-5
1.5 Scope and Content of this Draft Environmental Impact Report	1-5
1.5.1 Notice of Preparation and Scoping Meetings.....	1-5
1.5.2 Consultation and Coordination.....	1-6
1.5.3 Resource Topics	1-6
1.6 Notification and Circulation of Draft EIR	1-8
1.7 Environmental Impact Report Organization	1-9
Chapter 2 Project Description	2-1
2.1 Project Location.....	2-1
2.2 Project Description	2-4
2.2.1 Project Components	2-4
2.2.2 Platforms.....	2-5
2.2.3 Trackwork	2-6
2.2.4 Bridges	2-6
2.2.5 Overhead Contact System and Traction Power Substation.....	2-6
2.2.6 Parking Expansion	2-7

- 2.2.7 Station Building Expansion..... 2-7
- 2.2.8 Culverts 2-7
- 2.2.9 Wildlife Crossings..... 2-8
- 2.2.10 Relocation of Pacific Gas and Electric Company Transmission Line 2-8
- 2.3 Operations and Maintenance..... 2-9
 - 2.3.1 Conceptual Service Plan..... 2-9
 - 2.3.2 Ridership 2-10
 - 2.3.3 Energy Consumption..... 2-10
 - 2.3.4 Maintenance Activities 2-11
- 2.4 Construction 2-11
 - 2.4.1 Construction Methods 2-11
 - 2.4.2 Construction Schedule and Durations 2-14
- 2.5 Costs 2-14
 - 2.5.1 Capital Costs..... 2-14
- 2.6 Permits and Approvals 2-14
- Chapter 3 Environmental Impact Analysis 3-1**
 - Introduction..... 3-1
 - Chapter Organization 3-1
 - Approach to Impact Analysis..... 3-2
 - Significance Criteria 3-2
 - Impact Identification and Levels of Significance..... 3-3
 - Mitigation Measures..... 3-3
 - 3.1 Agriculture 3.1-1
 - 3.1.1 Introduction 3.1-1
 - 3.1.2 Regulatory Setting 3.1-1
 - 3.1.2.1 Federal Regulations..... 3.1-1
 - 3.1.2.2 State Regulations..... 3.1-1
 - 3.1.2.3 Regional and Local Regulations 3.1-4
 - 3.1.3 Environmental Setting 3.1-5
 - 3.1.3.1 Regional Agriculture 3.1-5
 - 3.1.3.2 Agriculture in Project Footprint 3.1-6
 - 3.1.4 Impact Analysis 3.1-9
 - 3.1.4.1 Methods for Analysis..... 3.1-9
 - 3.1.4.2 Thresholds of Significance 3.1-9
 - 3.1.4.3 Impacts and Mitigation Measures 3.1-9
 - 3.2 Air Quality..... 3.2-1
 - 3.2.1 Introduction 3.2-1

- 3.2.2 Regulatory Setting 3.2-1
 - 3.2.2.1 Federal Regulations 3.2-1
 - 3.2.2.2 State Regulations 3.2-4
 - 3.2.2.3 Regional and Local Regulations 3.2-5
- 3.2.3 Environmental Setting 3.2-8
 - 3.2.3.1 Pollutants of Concerns 3.2-8
 - 3.2.3.2 Regional Climate and Meteorology 3.2-12
 - 3.2.3.3 Existing Air Quality Conditions 3.2-13
 - 3.2.3.4 Emissions Inventories 3.2-15
 - 3.2.3.5 Sensitive Receptors 3.2-16
- 3.2.4 Impact Analysis 3.2-16
 - 3.2.4.1 Methods for Analysis 3.2-16
 - 3.2.4.2 Thresholds of Significance 3.2-18
 - 3.2.4.3 Impacts and Mitigation Measures 3.2-20
- 3.3 Biological Resources 3.3-1
 - 3.3.1 Introduction 3.3-1
 - 3.3.2 Regulatory Setting 3.3-1
 - 3.3.2.1 Federal Regulations 3.3-1
 - 3.3.2.2 State Regulations 3.3-6
 - 3.3.2.3 Regional and Local Regulations 3.3-7
 - 3.3.3 Environmental Setting 3.3-9
 - 3.3.3.1 Land Cover Types and Associated Wildlife 3.3-9
 - 3.3.3.2 Special-Status Species 3.3-15
 - 3.3.3.3 Non-Special-Status Migratory Birds and Other Birds of Prey 3.3-29
 - 3.3.3.4 Sensitive Natural Communities 3.3-29
 - 3.3.3.5 Potential Jurisdictional Waters, Wetlands, and Other Habitats 3.3-29
 - 3.3.3.6 Wildlife Corridors 3.3-29
 - 3.3.4 Impact Analysis 3.3-30
 - 3.3.4.1 Methods for Analysis 3.3-30
 - 3.3.4.2 Thresholds of Significance 3.3-30
 - 3.3.4.3 Impacts and Mitigation Measures 3.3-31
- 3.4 Cultural Resources 3.4-1
 - 3.4.1 Introduction 3.4-1
 - 3.4.2 Regulatory Setting 3.4-1
 - 3.4.2.1 Federal Regulations 3.4-1
 - 3.4.2.2 State Regulations 3.4-1
 - 3.4.3 Environmental Setting 3.4-5

- 3.4.3.1 Cultural Resource Data Sources 3.4-5
- 3.4.3.2 Precontact, Ethnographic, and Historic Conditions 3.4-10
- 3.4.3.3 Summary of Known California Environmental Quality Act
Historical Resources and Unevaluated Resources 3.4-15
- 3.4.4 Impact Analysis 3.4-18
 - 3.4.4.1 Methods for Analysis 3.4-18
 - 3.4.4.2 Thresholds of Significance 3.4-18
 - 3.4.4.3 Impacts and Mitigation Measures 3.4-19
- 3.5 Geology, Soils, and Paleontological Resources 3.5-1
 - 3.5.1 Introduction 3.5-1
 - 3.5.2 Regulatory Setting 3.5-1
 - 3.5.2.1 Federal Regulations 3.5-1
 - 3.5.2.2 State Regulations 3.5-1
 - 3.5.2.3 Regional and Local Regulations 3.5-3
 - 3.5.2.4 Industry Design Standards and Guidelines 3.5-4
 - 3.5.3 Environmental Setting 3.5-5
 - 3.5.3.1 Geology 3.5-5
 - 3.5.3.2 Soils 3.5-6
 - 3.5.3.3 Paleotological Resources 3.5-12
 - 3.5.4 Impact Analysis 3.5-13
 - 3.5.4.1 Methods for Analysis 3.5-13
 - 3.5.4.2 Thresholds of Significance 3.5-14
 - 3.5.4.3 Impacts and Mitigation Measures 3.5-14
- 3.6 Hazards and Hazardous Materials 3.6-1
 - 3.6.1 Introduction 3.6-1
 - 3.6.2 Regulatory Setting 3.6-1
 - 3.6.2.1 Federal Regulations 3.6-1
 - 3.6.2.2 State Regulations 3.6-2
 - 3.6.2.3 Regional and Local Regulations 3.6-5
 - 3.6.3 Environmental Setting 3.6-7
 - 3.6.3.1 Definition 3.6-7
 - 3.6.3.2 Hazard versus Risk 3.6-7
 - 3.6.3.3 On-site and Adjacent Uses 3.6-7
 - 3.6.3.4 Records Search 3.6-8
 - 3.6.3.5 Other Potential On-site Hazardous Materials 3.6-9
 - 3.6.4 Impact Analysis 3.6-10
 - 3.6.4.1 Methods for Analysis 3.6-10

3.6.4.2	Thresholds of Significance.....	3.6-10
3.6.4.3	Impacts and Mitigation Measures	3.6-10
3.7	Hydrology and Water Quality.....	3.7-1
3.7.1	Introduction	3.7-1
3.7.2	Regulatory Setting	3.7-1
3.7.2.1	Federal Regulations.....	3.7-1
3.7.2.2	State Regulations.....	3.7-3
3.7.2.3	Regional and Local Regulations.....	3.7-6
3.7.3	Environmental Setting	3.7-8
3.7.3.1	Regional Hydrology	3.7-8
3.7.3.2	Local Hydrology	3.7-8
3.7.3.3	Floodplains	3.7-10
3.7.4	Impact Analysis	3.7-11
3.7.4.1	Methods for Analysis.....	3.7-11
3.7.4.2	Thresholds of Significance.....	3.7-11
3.7.4.3	Impacts and Mitigation Measures	3.7-12
3.8	Noise.....	3.8-1
3.8.1	Fundamentals of Environmental Noise	3.8-1
3.8.1.1	Overview of Noise and Sound	3.8-1
3.8.2	Regulatory Setting	3.8-3
3.8.2.1	Federal Regulations.....	3.8-3
3.8.2.2	State Regulations.....	3.8-6
3.8.2.3	Regional and Local Regulations.....	3.8-6
3.8.3	Environmental Setting	3.8-7
3.8.4	Impact Analysis	3.8-9
3.8.4.1	Methods for Analysis.....	3.8-9
3.8.4.2	Thresholds of Significance.....	3.8-9
3.8.4.3	Impacts and Mitigation Measures	3.8-10
3.9	Transportation.....	3.9-1
3.9.1	Introduction	3.9-1
3.9.2	Regulatory Setting	3.9-1
3.9.2.1	Federal Regulations.....	3.9-1
3.9.2.2	State Regulations.....	3.9-2
3.9.2.3	Regional and Local Regulations.....	3.9-3
3.9.3	Environmental Setting	3.9-4
3.9.3.1	Public Transit	3.9-4
3.9.3.2	Bicycle and Pedestrian Facilities.....	3.9-5

3.9.3.3	Roadways	3.9-5
3.9.3.4	Rail	3.9-5
3.9.4	Impact Analysis	3.9-6
3.9.4.1	Methods for Analysis.....	3.9-6
3.9.4.2	Thresholds of Significance.....	3.9-7
3.9.4.3	Impacts and Mitigation Measures	3.9-7
3.10	Tribal Cultural Resources.....	3.10-1
3.10.1	Introduction	3.10-1
3.10.2	Regulatory Setting	3.10-1
3.10.2.1	Federal Regulations.....	3.10-1
3.10.2.2	State Regulations.....	3.10-1
3.10.3	Environmental Setting	3.10-5
3.10.4	Impact Analysis	3.10-7
3.10.4.1	Methods for Analysis.....	3.10-7
3.10.4.2	Thresholds of Significance.....	3.10-8
3.10.4.3	Impacts and Mitigation Measures	3.10-8
3.10	Cumulative Impacts.....	3.11-1
3.11.1	Introduction	3.11-1
3.11.2	CEQA Requirements.....	3.11-1
3.11.3	Approach and Methodology.....	3.11-1
3.11.4	Projections/Regional Growth Characteristics.....	3.11-2
3.11.5	Projects Considered	3.11-3
3.11.5.1	Rail Projects Planned within the Project Corridor.....	3.11-3
3.11.5.2	Other Regional Transportation Improvements.....	3.11-5
3.11.5.3	Land Development Projects	3.11-5
3.11.6	Cumulative Impacts Analysis	3.11-5
3.11.7	Impact Summary	3.11-7
3.11.7.1	Aesthetics	3.11-7
3.11.7.2	Agriculture.....	3.11-9
3.11.7.3	Air Quality and Greenhouse Gas Emissions	3.11-10
3.11.7.4	Biological Resources	3.11-13
3.11.7.5	Cultural Resources.....	3.11-16
3.11.7.6	Energy.....	3.11-17
3.11.7.7	Geology and Soils	3.11-19
3.11.7.8	Hazards and Hazardous Materials.....	3.11-22
3.11.7.9	Hydrology and Water Quality.....	3.11-24
3.11.7.10	Land Use and Planning	3.11-26

- 3.11.7.11 Mineral Resources 3.11-27
- 3.11.7.12 Noise and Vibration 3.11-28
- 3.11.7.13 Population and Housing 3.11-29
- 3.11.7.14 Public Services 3.11-30
- 3.11.7.15 Transportation..... 3.11-31
- 3.11.7.16 Tribal Cultural Resources..... 3.11-33
- 3.11.7.17 Utilities and Service Systems..... 3.11-34
- 3.11.7.18 Wildfire..... 3.11-36
- 3.11.8 Cumulative Impact Summary..... 3.11-37
- Chapter 4 Other CEQA-Required Analysis 4-1**
- 4.1 Introduction..... 4-1
- 4.2 Impacts Determined to Not be Significant 4-1
- 4.2.1 Less Than Significant Impacts 4-1
- 4.2.1.1 Aesthetics..... 4-1
- 4.2.1.2 Air Quality and Greenhouse Gas Emissions 4-5
- 4.2.1.3 Biological Resources 4-15
- 4.2.1.4 Energy 4-16
- 4.2.1.5 Geology, Seismicity, and Soils..... 4-18
- 4.2.1.6 Hazards and Hazardous Materials 4-23
- 4.2.1.7 Hydrology and Water Quality 4-27
- 4.2.1.8 Land Use and Planning..... 4-33
- 4.2.1.9 Mineral Resources 4-34
- 4.2.1.10 Noise and Vibration 4-36
- 4.2.1.11 Population and Housing..... 4-38
- 4.2.1.12 Public Services..... 4-40
- 4.2.1.13 Transportation 4-42
- 4.2.1.14 Utilities and Service Systems 4-44
- 4.2.1.15 Wildfire 4-48
- 4.2.2 No Impacts 4-49
- 4.2.2.1 Aesthetics..... 4-49
- 4.2.2.2 Forestry Resources 4-50
- 4.2.2.3 Geology, Seismicity, Soils, and Paleotology..... 4-51
- 4.2.2.4 Hazards and Hazardous Materials 4-51
- 4.2.2.5 Land Use and Planning..... 4-54
- 4.2.2.6 Noise and Vibration 4-55
- 4.2.2.7 Population and Housing..... 4-56
- 4.2.2.8 Public Services 4-56

4.2.2.9 Recreation..... 4-58

4.2.2.10 Wildfire 4-59

4.3 Significant Environmental Effects of the Project..... 4-62

4.4 Significant Environmental Effects that Cannot Be Avoided if the Project is
Implemented 4-62

4.5 Significant Irreversible Environmental Changes..... 4-62

Chapter 5 Alternatives 5-1

5.1 Introduction..... 5-1

5.2 Analysis of Alternatives 5-2

5.2.1 No Project Alternative 5-2

5.2.2 Build Alternatives to the Project..... 5-3

5.2.2.1 Identification of Project Alternatives..... 5-3

5.2.3 No Project Environmental Impact Analysis..... 5-3

5.2.3.1 Agriculture 5-3

5.2.3.2 Air Quality and Greenhouse Gas..... 5-4

5.2.3.3 Biological Resources 5-4

5.2.3.4 Cultural Resources 5-4

5.2.3.5 Energy 5-4

5.2.3.6 Tribal Cultural Resources 5-5

5.2.3.7 Geology, Soils, and Paleontological Resources..... 5-5

5.2.3.8 Hazards and Hazardous Materials 5-5

5.2.3.9 Transportation 5-5

5.3 Environmentally Superior Alternative 5-6

Chapter 6 Public Outreach 6-1

6.0 Public Participation and Outreach..... 6-1

6.1 Notice of Preparation 6-1

6.2 Public Scoping Process 6-1

6.2.1 Scoping Meeting 6-1

6.2.2 Scoping Comments 6-2

6.3 Ongoing Public Outreach..... 6-2

6.3.1 Tribal Coordination 6-2

6.4 Public and Agency Comment Process 6-3

6.5 Commenting On This Draft Environmental Impact Report 6-3

Chapter 7 References 7-1

Executive Summary..... 7-1

Introduction 7-1

Project Description 7-2

Aesthetics..... 7-2

Agriculture and Forestry Resources..... 7-3

Air Quality and Greenhouse Gas Emissions 7-3

Biological Resources 7-7

Cultural Resources 7-9

Energy 7-12

Geology and Soils..... 7-12

Hazards and Hazardous Materials 7-14

Hydrology and Water Quality 7-16

Land Use and Planning..... 7-17

Mineral Resources 7-18

Noise and Vibration 7-18

Population and Housing..... 7-18

Public Services..... 7-19

Transportation 7-19

Tribal Cultural Resources 7-21

Wildfire 7-21

Cumulative Impacts 7-22

Chapter 8 Abbreviations and Acronyms 8-1

Chapter 9 List of Preparers..... 9-1

 9.1 Lead Agency..... 9-1

 9.1.1 San Joaquin Joint Powers Authority 9-1

 9.2 List of Key Draft Environmental Impact Report Preparers..... 9-1

 9.2.1 RailPros 9-1

 9.2.1.1 Project Management 9-1

 9.2.1.2 Engineering 9-1

 9.2.2 AECOM 9-2

 9.2.2.1 Project Management 9-2

 9.2.2.2 Engineering 9-2

 9.2.2.3 Technical Analyses 9-2

 9.2.3 ICF 9-2

 9.2.3.1 Project Management 9-2

 9.2.3.2 Technical Analyses 9-3

 9.2.4 Kerns and West 9-3

 9.2.4.1 Technical Analyses 9-3

Appendices

Appendix A: Biological Resources Technical Report

Appendix B: Biological Resources Technical Report

 Appendix B-1: Archeological Survey Report

 Appendix B-2: Historic Architectural Survey Report

Appendix C: Noise and Vibration Technical Report

Appendix D: Air Quality and Greenhouse Gas Emission Calculations

Appendix E: Madera HSR Station Full-Build Project Phase 3 Initial Study

Appendix F: Notice of Preparation and Scoping Memorandum

Appendix G: Engineering Plans

Appendix H: Ridership Memorandum

Tables

	Page
Table ES-1. Summary of Environmental Impacts and Required Mitigation Measures.....	ES-8
Table 2.2-1. Summary of Proposed Parking Spaces by Phase for Madera HSR Station	2-7
Table 2.3-1. Summary of Ridership Forecasts for Madera HSR Station.....	2-10
Table 3.1-1. Total Agricultural Land by Type in Madera County	3.1-6
Table 3.1-2. Project Footprint - Important Farmland and Other Land Covers	3.1-7
Table 3.1-3. Important Farmland Acres Permanently Impacted by Project Components	3.1-11
Table 3.2-1. Federal and State Ambient Air Quality Standards	3.2-2
Table 3.2-2. Sources and Potential Health and Environmental Effects of Criteria Pollutants	3.2-9
Table 3.2-3. Localized Air Quality Concentrations for the Past 3 Years Measured at the 28261 Avenue 14 and Madera-Pump Yard Stations	3.2-13
Table 3.2-4. Federal and State Attainment Status of Madera County	3.2-15
Table 3.2-5. Criteria Pollutant Emissions Inventory (2017) for the San Joaquin Valley Air Basin (tons per day).....	3.2-16
Table 3.2-6. San Joaquin Valley Air Pollution Control District Criteria Pollutant and Precursor Thresholds and Screening Criteria	3.2-19
Table 3.2-7. Estimated Criteria Pollutant and Ozone Precursor Emissions from Construction of the Project, Unmitigated	3.2-23
Table 3.2-8. Estimated Criteria Pollutant and Ozone Precursor Emissions from Construction of the Project, Mitigated	3.2-23
Table 3.3-1. Land Cover by Acreage in Project study area and Impact Area	3.3-9
Table 3.3-2. Special-Status Plant Species Potentially Occurring in Vicinity of Project Footprint	3.3-16
Table 3.3-3. Special-Status Animal Species Potentially Occurring in Vicinity of Project Footprint	3.3-21
Table 3.4-1. Previous Cultural Resource Studies In or Adjacent to the Project Footprint.....	3.4-6
Table 3.4-2. Previously Recorded Cultural Resources within 0.25 Miles of the Project.....	3.4-7
Table 3.4-3. Soil Series Type and Associated Landform Age in the Project Footprint.....	3.4-9
Table 3.4-4. Area of Potential Effects Survey Population Summary.....	3.4-16
Table 3.5-1. Soil Types Present within the Project Footprint	3.5-8
Table 3.5-2. Paleontological Sensitivity Ratings	3.5-13
Table 3.8-1. FTA Construction Noise General Assessment Criteria	3.8-3
Table 3.8-2. FTA Land Use Categories and Noise Metrics	3.8-4
Table 3.8-3. Madera County Maximum Allowable Noise Exposure for Non-Transportation Noise Sources .	3.8-6
Table 3.8-4. FTA Land Use Categories and Noise Metrics	3.8-7
Table 3.8-5. Noise Impact Assessment for Construction Activities	3.8-12
Table 3.8-6. Project Operational Station Noise Levels, dBA	3.8-14
Table 3.11-1. Existing and Projected Population and Housing Unit Growth in Madera County	3.11-3
Table 3.11-2. Impacts for which the Project Would Have No Impact and thus would not Contribute to a Cumulative Impact	3.11-5
Table 3.11-3. Exis Summary of Cumulative Impact Analysis	3.11-37
Table 4.2-1. Lifetimes and Global Warming Potentials of Key Greenhouse Gases	4-11
Table 4.2-2. Estimated Greenhouse Gas Emissions from Construction of the Project.....	4-13

Table 4.2-3. Global, National, and State Greenhouse Gas Emissions Inventories..... 4-14

Table 4.2-4. List of Faults near Project 4-19

Table 4.2-5. Population Projections in Madera County..... 4-39

Table 4.2-6. Housing Unit Trends in Madera County..... 4-39

Figures

	Page
Figure ES-1. Phase 1 and Phase 2 Components	ES-4
Figure 1.2-1. Phase 1 and Phase 2 Components.....	1-3
Figure 2.1-1. Project Location	2-2
Figure 2.1-2. Project Footprint.....	2-3
Figure 2.2-1: Station Components - Station Overview	2-4
Figure 2.2-2: Proposed Alignment of PG&E Borden-Gregg Transmission Line Re-Alignment Project	2-9
Figure 2.4-1. Construction Staging Areas.....	2-12
Figure 2.4-2. Construction Staging Areas (Continued)	2-13
Figure 3.1-1: Farmland and Other Land Covers	3.1-8
Figure 3.1-2: Farmland and Agricultural Permanent Impacts – Track North of Station and Across Cottonwood Creek	3.1-12
Figure 3.1-3: Farmland and Agricultural Permanent Impacts – Platform and Pedestrian Bridge	3.1-14
Figure 3.1-4: Farmland and Agricultural Permanent Impacts – Track south of Station and Avenue 12 Grade Separation	3.1-15
Figure 3.1-5: Farmland and Agricultural Permanent Impacts – Track South of Avenue 12 and Area for Potential PG&E Tower Relocation.....	3.1-16
Figure 3.3-1: Land Cover Types (Sheet 1)	3.3-10
Figure 3.3-1: Land Cover Types (Sheet 2)	3.3-11
Figure 3.3-1: Land Cover Types (Sheet 3)	3.3-12
Figure 3.3-1: Land Cover Types (Sheet 4)	3.3-13
Figure 3.5-1: Geologic Unit Mapping	3.5-7
Figure 3.5-2: Soil Type Mapping	3.5-9
Figure 3.8-1: Typical A-Weighted Sound Levels (including High Speed Train Sources)	3.8-2
Figure 3.8-2: FRA/FTA Impact Criteria for Noise.....	3.8-5
Figure 3.8-3: Noise-Sensitive Receivers	3.8-8
Figure 3.9-1: Madera County Connection System Map.....	3.9-8
Figure 3.10-1: Project Footprint	3.10-6
Figure 3.11-1: Related Projects.....	3.11-4