

# TABLE OF CONTENTS

PREFACE .....	i
What is this Document? .....	i
How Do I Use this Document? .....	iii
What Has Changed? .....	v
Summary of Changes .....	v
Summary of Environmental Analysis Changes .....	ix
Evaluation of Need for CEQA Recirculation or NEPA Supplementation .....	ix
What Happens Next? .....	x
Bakersfield to Palmdale Milestone Schedule .....	x
SUMMARY .....	S-1
S.1 Introduction and Background .....	S-1
S.2 Summary of Changes Between Draft and Final EIR/EIS .....	S-6
S.2.1 Summary of Design Refinements Made in Response to Comments on the Draft EIR/EIS .....	S-6
S.2.2 Design Revisions to Reduce Environmental Impacts .....	S-10
S.2.3 Other Minor Design Revisions .....	S-11
S.2.4 Selection of Preferred Maintenance Facility Location .....	S-11
S.2.5 Summary of Environmental Analysis Revisions .....	S-12
S.2.6 Evaluation of Need for CEQA Recirculation or NEPA Supplementation .....	S-12
S.3 Tiered Environmental Review—California High-Speed Rail Authority Final Statewide Program EIR/EIS and Bakersfield to Palmdale Project Section EIR/EIS .....	S-13
S.4 Issues Raised during the Scoping Process .....	S-14
S.5 Purpose and Need for the High-Speed Rail System and the Bakersfield to Palmdale Project Section .....	S-15
S.5.1 Purpose of the High-Speed Rail System .....	S-15
S.5.2 Purpose of the Bakersfield to Palmdale Project Section .....	S-15
S.5.3 CEQA Project Objectives of the High-Speed Rail System in California and in the Bakersfield to Palmdale Project Section Vicinity .....	S-15
S.5.4 Need for the High-Speed Rail System, Statewide and in the Bakersfield to Palmdale Region .....	S-16
S.6 Alternatives .....	S-17
S.6.1 No Project Alternative .....	S-18
S.6.2 Bakersfield to Palmdale Project Section Build Alternatives .....	S-18
S.6.3 Station Sites .....	S-29
S.6.4 Maintenance Facilities .....	S-29
S.7 Impact Avoidance and Minimization Features .....	S-30
S.8 No Project Alternative Impacts .....	S-30
S.9 Bakersfield to Palmdale Project Section Build Alternatives Evaluation .....	S-33
S.9.1 Bakersfield to Palmdale Project Section Alternatives Benefits and Impacts .....	S-33
S.9.2 Comparison of Bakersfield to Palmdale Project Section Build Alternatives .....	S-45
S.9.3 Preferred Alternative .....	S-45
S.9.4 Comparison of High-Speed Rail Stations .....	S-47
S.9.5 Comparison of Maintenance Facility Alternatives .....	S-47
S.9.6 Capital and Operational Costs .....	S-48
S.10 Section 4(f) .....	S-49
S.11 Section 6(f) .....	S-50
S.12 Environmental Justice .....	S-50

- S.12.1 Bakersfield to Palmdale Project Section Build Alternatives ..... S-51
- S.12.2 Bakersfield Station —Fresno to Bakersfield Locally Generated Alternative from the Intersection of 34th Street and L Street to Oswell Street..... S-51
- S.12.3 Palmdale Station Site..... S-51
- S.12.4 Maintenance Facilities ..... S-51
- S.12.5 Beneficial Effects ..... S-51
- S.13 Areas of Controversy..... S-52
- S.14 Draft EIR/EIS Circulation and Review..... S-53
  - S.14.1 Public and Agency Comment Summary ..... S-53
- S.15 Revised Draft EIR/Supplemental Draft EIS Circulation and Review..... S-54
  - S.15.1 Comments on the Revised Draft EIR/Supplemental Draft EIS..... S-54
- S.16 Next Steps in the Environmental Process..... S-55
  - S.16.1 California High-Speed Rail Authority Decision-Making ..... S-55
  - S.16.2 Federal Railroad Administration Decision-Making..... S-56
  - S.16.3 Surface Transportation Board Decision Making ..... S-56
  - S.16.4 Project Implementation ..... S-56
- 1 PROJECT PURPOSE, NEED, AND OBJECTIVES ..... 1-1
  - 1.1 Introduction..... 1-1
    - 1.1.1 The High-Speed Rail System ..... 1-1
    - 1.1.2 Decision to Develop a Statewide High-Speed Rail System..... 1-3
    - 1.1.3 Implementation of the Statewide High-Speed Rail System ..... 1-4
    - 1.1.4 Lead Agencies, Cooperating Agencies, and Responsible Agencies..... 1-9
    - 1.1.5 Compatibility with Federal Transportation Policy..... 1-10
  - 1.2 Purpose of and Need for the High-Speed Rail System and the Bakersfield to Palmdale Project Section ..... 1-10
    - 1.2.1 Purpose of the High-Speed Rail System ..... 1-10
    - 1.2.2 Purpose of the Bakersfield to Palmdale Project Section ..... 1-11
    - 1.2.3 CEQA Project Objectives of the High-Speed Rail System in California and in the Bakersfield to Palmdale Project Section Vicinity..... 1-11
    - 1.2.4 Statewide and Regional Need for the High-Speed Rail System in the Bakersfield to Palmdale Project Section Vicinity ..... 1-12
  - 1.3 Relationship to Other Agency Plans, Policies, and Programs ..... 1-34
    - 1.3.1 San Joaquin Corridor Strategic Plan and Corridor Service Development Plan..... 1-34
    - 1.3.2 San Joaquin Valley Blueprint..... 1-35
    - 1.3.3 Kern Council of Governments Regional Transportation Plan..... 1-35
    - 1.3.4 Southern California Association of Governments 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy ..... 1-35
    - 1.3.5 State Route 58 Corridor System Management Plan ..... 1-35
    - 1.3.6 District 6 System Management Plan..... 1-35
    - 1.3.7 State Route 14 Transportation Concept Report ..... 1-36
    - 1.3.8 California Transportation Plan 2040 ..... 1-36
    - 1.3.9 Measure R (Los Angeles County)..... 1-36
    - 1.3.10 2020–2045 Southern California Association of Governments Regional Transportation Plan/Sustainable Communities Strategy..... 1-37
    - 1.3.11 Los Angeles Metropolitan Transportation Authority Antelope Valley Line Infrastructure Improvement Strategy ..... 1-38
    - 1.3.12 Metrolink 5-Year Short-Range Transit Plan..... 1-38
    - 1.3.13 Metrolink 10-Year Strategic Plan ..... 1-38
  - 1.4 Relationship to Other Transportation Projects in the Project Vicinity ..... 1-39
    - 1.4.1 High Desert Corridor ..... 1-39
    - 1.4.2 XpressWest..... 1-39
    - 1.4.3 Measure M (Los Angeles County) ..... 1-39

2	ALTERNATIVES .....	2-1
2.1	Introduction.....	2-1
2.1.1	Independent Utility .....	2-4
2.2	Background .....	2-4
2.2.1	California High-Speed Rail System Background .....	2-4
2.2.2	Bakersfield to Palmdale Project Section EIR/EIS Background .....	2-4
2.3	High-Speed Rail System Infrastructure.....	2-5
2.3.1	System Design Performance, Safety, and Security.....	2-6
2.3.2	Vehicles .....	2-7
2.3.3	Stations .....	2-9
2.3.4	Infrastructure Components .....	2-11
2.3.5	Grade Separations.....	2-19
2.3.6	Access Roads.....	2-23
2.3.7	Traction Power Distribution.....	2-24
2.3.8	Signaling and Train-Control Elements.....	2-28
2.3.9	Track Structure .....	2-28
2.3.10	Maintenance Facilities .....	2-29
2.3.11	High-Speed Rail Project-Level Alternatives Development Process .....	2-33
2.3.12	Range of Potential Alternatives Considered and Findings .....	2-34
2.4	Alignment, Station Sites, Light Maintenance Facility, and Maintenance of Infrastructure Alternatives Evaluated in This Project EIR/EIS .....	2-64
2.4.1	No Project Alternative—Existing and Planned Improvements .....	2-64
2.4.2	Bakersfield to Palmdale Project Section Build Alternatives.....	2-73
2.5	Travel Demand and Ridership Forecasts .....	2-107
2.5.1	Ridership and High-Speed Rail System Design .....	2-108
2.5.2	Ridership and Environmental Impact Analysis .....	2-109
2.5.3	Ridership and Station-Area Parking .....	2-109
2.6	Operations and Service Plan .....	2-110
2.6.1	High-Speed Rail Service.....	2-110
2.6.2	Maintenance Activities .....	2-111
2.7	Additional High-Speed Rail Development Considerations.....	2-112
2.7.1	High-Speed Rail, Land Use Patterns, and Development around High-Speed Rail Stations.....	2-112
2.7.2	Right-of-Way Acquisition for Construction, Operation, and Maintenance of the High-Speed Rail System.....	2-116
2.8	Construction Plan and Phased Implementation Strategy .....	2-119
2.8.1	Design-Build Project Delivery .....	2-119
2.8.2	Phased Implementation Strategy.....	2-121
2.8.3	General Approach.....	2-121
2.8.4	Pre-Construction Activities.....	2-123
2.8.5	Major Construction Activities .....	2-129
2.9	Permits and Approvals .....	2-135
3	AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES .....	3-1-1
3.1	Introduction.....	3-1-1
3.1.1	Chapter 3 Purpose.....	3-1-2
3.1.2	Chapter 3 Organization.....	3-1-3
3.1.3	Chapter 3 Content.....	3-1-3
3.1.4	Outreach to Local Agencies.....	3-1-13
3.1.5	Legal Authority to Implement Off-Site Mitigation .....	3-1-13
3.2	Transportation .....	3-2-1
3.2.1	Introduction .....	3-2-2
3.2.2	Laws, Regulations, and Orders .....	3-2-3
3.2.3	Regional and Local Policy Analysis .....	3-2-11
3.2.4	Methods for Evaluating Impacts .....	3-2-11

3.2.5	Affected Environment.....	3.2-23
3.2.6	Environmental Consequences.....	3.2-48
3.2.7	Mitigation Measures.....	3.2-70
3.2.8	NEPA Impact Summary.....	3.2-79
3.2.9	CEQA Significance Conclusions.....	3.2-81
3.3	Air Quality and Global Climate Change.....	3.3-1
3.3.1	Introduction.....	3.3-2
3.3.2	Laws, Regulations, and Orders.....	3.3-2
3.3.3	Regional and Local Policy Analysis.....	3.3-15
3.3.4	Methods for Evaluating Impacts.....	3.3-17
3.3.5	Affected Environment.....	3.3-46
3.3.6	Environmental Consequences.....	3.3-71
3.3.7	Compliance with Conformity Rules.....	3.3-140
3.3.8	Mitigation Measures.....	3.3-143
3.3.9	NEPA Impact Summary.....	3.3-145
3.3.10	CEQA Significance Conclusions.....	3.3-149
3.4	Noise and Vibration.....	3.4-1
3.4.1	Introduction.....	3.4-4
3.4.2	Laws, Regulations, and Orders.....	3.4-4
3.4.3	Regional and Local Policy Analysis.....	3.4-9
3.4.4	Methods for Evaluating Impacts.....	3.4-11
3.4.5	Affected Environment.....	3.4-19
3.4.6	Environmental Consequences.....	3.4-23
3.4.7	Mitigation Measures.....	3.4-52
3.4.8	NEPA Impact Summary.....	3.4-73
3.4.9	CEQA Significance Conclusions.....	3.4-78
3.5	Electromagnetic Interference and Electromagnetic Fields.....	3.5-1
3.5.1	Introduction.....	3.5-2
3.5.2	Laws, Regulations, and Orders.....	3.5-4
3.5.3	Regional and Local Policy Analysis.....	3.5-7
3.5.4	Methods for Evaluating Impacts.....	3.5-8
3.5.5	Affected Environment.....	3.5-11
3.5.6	Environmental Consequences.....	3.5-15
3.5.7	Mitigation Measures.....	3.5-26
3.5.8	NEPA Impact Summary.....	3.5-28
3.5.9	CEQA Significance Conclusions.....	3.5-32
3.6	Public Utilities and Energy.....	3.6-1
3.6.1	Introduction.....	3.6-1
3.6.2	Laws, Regulations, and Orders.....	3.6-2
3.6.3	Regional and Local Policy Analysis.....	3.6-6
3.6.4	Methods for Evaluating Impacts.....	3.6-8
3.6.5	Affected Environment.....	3.6-18
3.6.6	Environmental Consequences.....	3.6-27
3.6.7	Mitigation Measures.....	3.6-57
3.6.8	NEPA Impact Summary.....	3.6-57
3.6.9	CEQA Significance Conclusions.....	3.6-63
3.7	Biological and Aquatic Resources.....	3.7-1
	Summary of Results.....	3.7-1
3.7.1	Introduction.....	3.7-3
3.7.2	Laws, Regulations, and Orders.....	3.7-6
3.7.3	Regional and Local Policy Analysis.....	3.7-11
3.7.4	Methods for Evaluating Impacts.....	3.7-15
3.7.5	Affected Environment.....	3.7-36
3.7.6	Environmental Consequences.....	3.7-49
3.7.7	Mitigation Measures.....	3.7-105
3.7.8	NEPA Impacts Summary.....	3.7-162

	3.7.9	CEQA Significance Conclusions.....	3.7-171
3.8		Hydrology and Water Resources .....	3.8-1
	3.8.1	Introduction .....	3.8-2
	3.8.2	Laws, Regulations, and Orders .....	3.8-3
	3.8.3	Regional and Local Policy Analysis .....	3.8-9
	3.8.4	Methods for Evaluating Impacts .....	3.8-11
	3.8.5	Affected Environment.....	3.8-20
	3.8.6	Environmental Consequences.....	3.8-46
	3.8.7	Mitigation Measures.....	3.8-93
	3.8.8	NEPA Impact Summary.....	3.8-97
	3.8.9	CEQA Significance Conclusions.....	3.8-102
3.9		Geology, Soils, Seismicity, and Paleontological Resources .....	3.9-1
	3.9.1	Introduction .....	3.9-3
	3.9.2	Laws, Regulations, and Orders .....	3.9-4
	3.9.3	Regional and Local Policy Analysis .....	3.9-6
	3.9.4	Methods for Evaluating Impacts .....	3.9-8
	3.9.5	Affected Environment.....	3.9-21
	3.9.6	Environmental Consequences.....	3.9-61
	3.9.7	Mitigation Measures.....	3.9-81
	3.9.8	NEPA Impact Summary.....	3.9-82
	3.9.9	CEQA Significance Conclusions.....	3.9-91
3.10		Hazardous Materials and Wastes .....	3.10-1
	3.10.1	Introduction .....	3.10-2
	3.10.2	Laws, Regulations, and Orders .....	3.10-3
	3.10.3	Regional and Local Policy Analysis .....	3.10-6
	3.10.4	Methods for Evaluating Impacts .....	3.10-7
	3.10.5	Affected Environment.....	3.10-11
	3.10.6	Environmental Consequences.....	3.10-21
	3.10.7	Mitigation Measures.....	3.10-29
	3.10.8	NEPA Impact Summary.....	3.10-30
	3.10.9	CEQA Significance Conclusions.....	3.10-33
3.11		Safety and Security .....	3.11-1
	3.11.1	Introduction .....	3.11-2
	3.11.2	Laws, Regulations, and Orders .....	3.11-5
	3.11.3	Methods for Evaluating Impacts .....	3.11-13
	3.11.4	Affected Environment.....	3.11-28
	3.11.5	Environmental Consequences.....	3.11-47
	3.11.6	Mitigation Measures.....	3.11-71
	3.11.7	NEPA Impact Summary.....	3.11-74
	3.11.8	CEQA Significance Conclusions.....	3.11-78
3.12		Socioeconomics and Communities .....	3.12-1
	3.12.1	Introduction .....	3.12-3
	3.12.2	Laws, Regulations and Orders .....	3.12-6
	3.12.3	Regional and Local Policy Analysis .....	3.12-12
	3.12.4	Methods for Evaluating Impacts .....	3.12-12
	3.12.5	Affected Environment.....	3.12-23
	3.12.6	Environmental Consequences.....	3.12-67
	3.12.7	Mitigation Measures.....	3.12-183
	3.12.8	NEPA Impact Summary.....	3.12-186
	3.12.9	CEQA Significance Conclusions.....	3.12-192
3.13		Station Planning, Land Use, and Development.....	3.13-1
	3.13.1	Introduction .....	3.13-2
	3.13.2	Laws, Regulations and Orders .....	3.13-3
	3.13.3	Regional and Local Policy Analysis .....	3.13-4
	3.13.4	Methods for Evaluating Impacts .....	3.13-8
	3.13.5	Affected Environment.....	3.13-13

3.13.6	Environmental Consequences .....	3.13-17
3.13.7	Mitigation Measures .....	3.13-39
3.13.8	NEPA Impact Summary .....	3.13-39
3.13.9	CEQA Significance Conclusions .....	3.13-41
3.14	Agricultural Farmland and Forest Land .....	3.14-1
3.14.1	Introduction .....	3.14-3
3.14.2	Laws, Regulations, and Orders .....	3.14-4
3.14.3	Regional and Local Policy Analysis .....	3.14-7
3.14.4	Methods for Evaluating Impacts .....	3.14-9
3.14.5	Affected Environment .....	3.14-15
3.14.6	Environmental Consequences .....	3.14-34
3.14.7	Mitigation Measures .....	3.14-53
3.14.8	NEPA Impacts Summary .....	3.14-55
3.14.9	CEQA Significance Conclusions .....	3.14-61
3.15	Parks, Recreation, and Open Space .....	3.15-1
3.15.1	Introduction .....	3.15-2
3.15.2	Laws, Regulations, and Orders .....	3.15-2
3.15.3	Regional and Local Policy Analysis .....	3.15-6
3.15.4	Methods for Evaluating Impacts .....	3.15-6
3.15.5	Affected Environment .....	3.15-10
3.15.6	Environmental Consequences .....	3.15-22
3.15.7	Mitigation Measures .....	3.15-42
3.15.8	NEPA Impact Summary .....	3.15-54
3.15.9	CEQA Significance Conclusions .....	3.15-61
3.16	Aesthetics and Visual Quality .....	3.16-1
3.16.1	Introduction .....	3.16-2
3.16.2	Laws, Regulations, and Orders .....	3.16-2
3.16.3	Regional and Local Policy Analysis .....	3.16-4
3.16.4	Methods for Evaluating Impacts .....	3.16-4
3.16.5	Affected Environment .....	3.16-10
3.16.6	Environmental Consequences .....	3.16-40
3.16.7	Mitigation Measures .....	3.16-142
3.16.8	NEPA Impact Summary .....	3.16-149
3.16.9	CEQA Significance Conclusions .....	3.16-151
3.17	Cultural Resources .....	3.17-1
3.17.1	Introduction .....	3.17-4
3.17.2	Laws, Regulations, and Orders .....	3.17-5
3.17.3	Regional and Local Policy Analysis .....	3.17-12
3.17.4	Coordination of Section 106 Process with NEPA and CEQA Compliance .....	3.17-14
3.17.5	Methods for Evaluating Impacts .....	3.17-31
3.17.6	Affected Environment .....	3.17-41
3.17.7	Environmental Consequences .....	3.17-71
3.17.8	Mitigation Measures .....	3.17-83
3.17.9	NEPA Impact Summary .....	3.17-93
3.17.10	CEQA Significance Conclusions .....	3.17-103
3.18	Regional Growth .....	3.18-1
3.18.1	Introduction .....	3.18-2
3.18.2	Laws, Regulations, and Orders .....	3.18-3
3.18.3	Methods for Evaluating Impacts .....	3.18-8
3.18.4	Affected Environment .....	3.18-13
3.18.5	Environmental Consequences .....	3.18-18
3.18.6	Mitigation Measures .....	3.18-29
3.18.7	Impact Summary .....	3.18-29
3.18.8	CEQA Significance Conclusions .....	3.18-30



3.19	Cumulative Impacts.....	3.19-1
3.19.1	Introduction .....	3.19-4
3.19.2	Laws, Regulations, and Orders .....	3.19-4
3.19.3	Methods for Evaluating Impacts .....	3.19-5
3.19.4	Affected Environment.....	3.19-13
3.19.5	Environmental Consequences.....	3.19-26
3.19.6	Mitigation Measures (for Any Newly Identified Significant Cumulative Impacts).....	3.19-69
3.19.7	Impacts Summary .....	3.19-71
4	FINAL SECTION 4(F)/6(F) EVALUATIONS.....	4-1
4.1	Introduction.....	4-2
4.1.1	Laws, Regulations, and Orders .....	4-3
4.1.2	Study Area .....	4-5
4.1.3	Section 4(f) Applicability.....	4-9
4.1.4	Section 4(f) Use Definitions .....	4-10
4.2	Coordination .....	4-11
4.2.1	Section 4(f) Consultation.....	4-14
4.3	Purpose and Need .....	4-15
4.4	Alternatives.....	4-15
4.4.1	No Project Alternative for the Bakersfield to Palmdale Project Section .....	4-16
4.4.2	Alternative 1 .....	4-16
4.4.3	Alternative 2 .....	4-19
4.4.4	Alternative 3 .....	4-19
4.4.5	Alternative 5.....	4-19
4.4.6	Design Options .....	4-19
4.4.7	Station Sites.....	4-20
4.4.8	Maintenance Facilities .....	4-21
4.5	Section 4(f) Applicability Analysis .....	4-22
4.5.1	Public Parks and Recreation Resources .....	4-34
4.5.2	Cultural Resources .....	4-45
4.5.3	Resources Evaluated and Determined Not to Be Subject to Protection under Section 4(f).....	4-53
4.6	Section 4(f) Use Assessment.....	4-55
4.6.1	Public Park and Recreation Resources.....	4-55
4.6.2	Cultural Resources .....	4-66
4.6.3	Section 4(f) Analysis of La Paz as a Historic Property and Public Park and Recreation Resource.....	4-74
4.7	Avoidance Alternatives.....	4-94
4.7.1	Introduction .....	4-94
4.7.2	Bakersfield to Palmdale Project Section Supplemental Alternatives Analysis.....	4-95
4.7.3	No Project Alternative .....	4-96
4.7.4	Individual Resource Avoidance Assessments.....	4-96
4.8	Measures to Minimize Harm .....	4-98
4.9	Section 4(f) Least-Harm Analysis.....	4-117
4.9.1	Least-Harm Analysis for Alternatives 1, 2, 3, and 5.....	4-117
4.10	Section 6(f).....	4-125
5	ENVIRONMENTAL JUSTICE .....	5-1
5.1	Introduction.....	5-3
5.2	Laws, Regulations, and Orders.....	5-5
5.2.1	Federal.....	5-5
5.2.2	State.....	5-6
5.2.3	Regional and Local .....	5-7

5.3	Methodology .....	5-9
5.3.1	Data Collection and Analysis .....	5-9
5.3.2	Environmental Justice Engagement .....	5-13
5.4	Affected Environment .....	5-13
5.4.1	Reference Community and Resource Study Area Definition .....	5-13
5.4.2	Reference Community Demographics .....	5-13
5.4.3	Resource Study Area Demographics .....	5-15
5.5	Environmental Justice Engagement .....	5-18
5.5.1	Affected Populations and Communities .....	5-18
5.5.2	Issues and Concerns .....	5-19
5.6	Environmental Consequences .....	5-23
5.6.1	No Project Alternative .....	5-23
5.6.2	Bakersfield to Palmdale Project Section Build Alternatives .....	5-25
5.6.3	Bakersfield Station—Fresno to Bakersfield Locally Generated Alternative from the Intersection of 34th Street and L Street to Oswell Street .....	5-62
5.6.4	Palmdale Station .....	5-71
5.6.5	Lancaster North B Maintenance-of-Way Facility .....	5-85
5.6.6	Avenue M Light Maintenance Facility/Maintenance-of-Way Facility .....	5-86
5.6.7	Electric Power Utility Improvements .....	5-88
5.7	Summary of Effects .....	5-88
5.7.1	Bakersfield to Palmdale Project Section Build Alternatives .....	5-88
5.7.2	Bakersfield Station—Fresno to Bakersfield Locally Generated Alternative from the Intersection of 34th Street and L Street to Oswell Street .....	5-95
5.7.3	Palmdale Station .....	5-96
5.7.4	Lancaster North B Maintenance-of-Way Facility .....	5-100
5.7.5	Avenue M Light Maintenance Facility/Maintenance-of-Way Facility .....	5-100
5.7.6	Electric Power Utility Improvements .....	5-101
5.8	Measures to Minimize Harm .....	5-101
5.8.1	Avoidance .....	5-101
5.8.2	Mitigation .....	5-109
5.8.3	Environmental Justice Community Engagement .....	5-110
5.9	California High-Speed Rail Authority’s Environmental Justice Determination .....	5-110
5.9.1	Community Cohesion .....	5-113
5.9.2	Noise .....	5-114
5.9.3	Residential and Business Displacements and Relocation .....	5-115
5.9.4	Maintenance Facilities, Electric Power Utility Improvements, and Station Locations .....	5-117
5.9.5	Beneficial Effects .....	5-120
5.9.6	Determination .....	5-120
6	PROJECT COSTS AND OPERATIONS .....	6-1
6.1	Introduction .....	6-1
6.2	Capital Costs .....	6-1
6.2.1	Bakersfield to Palmdale Project Section Build Alternatives .....	6-2
6.2.2	Maintenance Facilities .....	6-4
6.3	Operations and Maintenance Costs .....	6-4
6.3.1	Operating Speeds .....	6-5
6.3.2	Development of Operations and Maintenance Costs .....	6-5
7	OTHER CEQA/NEPA CONSIDERATIONS .....	7-1
7.1	Significant and Unavoidable Adverse Impacts .....	7-1
7.2	Project Benefits .....	7-4
7.3	Relationship between Short-term Use of the Environment and the Enhancement of Long-term Productivity .....	7-4



7.4	Significant Irreversible Environmental Changes that Would Result from the Project if Implemented .....	7-5
8	PREFERRED ALTERNATIVE AND STATION SITES .....	8-1
8.1	Introduction.....	8-1
8.1.1	Alignment Route .....	8-2
8.1.2	Maintenance Facilities .....	8-4
8.1.3	Project Characteristics .....	8-5
8.2	Summary of Public Comments.....	8-5
8.2.1	Areas of Concern Raised in Scoping Comments .....	8-6
8.2.2	Areas of Concern Raised in Comments on the Draft EIR/EIS .....	8-8
8.3	Alternatives Considered .....	8-10
8.3.1	Preferred Alternative .....	8-10
8.3.2	Environmentally Superior Alternative.....	8-23
8.3.3	Environmentally Preferable Alternative.....	8-24
8.3.4	Least Environmentally Damaging Practicable Alternative .....	8-24
9	PUBLIC AND AGENCY INVOLVEMENT .....	9-1
9.1	Fresno to Bakersfield Locally Generated Alternative from the Intersection of 34th Street and L Street to Oswell Street Public and Agency Involvement.....	9-2
9.1.1	Environmental Justice Outreach.....	9-3
9.1.2	Public Agency Scoping .....	9-3
9.1.3	Notification and Circulation of the Draft Supplemental EIR/EIS .....	9-3
9.1.4	Outreach Leading up to Publication of the Final Supplemental EIR and Final Supplemental EIS .....	9-3
9.2	Environmental Justice Outreach .....	9-3
9.3	Public and Agency Scoping .....	9-4
9.3.1	Notices of Preparation, Notices of Intent, and Public Information Materials .....	9-4
9.3.2	Scoping Meetings .....	9-5
9.3.3	Scoping Comments.....	9-5
9.4	Alternatives Analysis Process .....	9-6
9.4.1	Scoping and Identifying Potential Alternative Alignments .....	9-6
9.4.2	Public Outreach during Refinement of Alternatives .....	9-7
9.4.3	Public Information Meetings and Materials during the Alternatives Analysis Process.....	9-9
9.4.4	Stakeholder Working Group Meetings during the Alternatives Analysis Process.....	9-10
9.4.5	Environmental Resource Agency Meetings During the Alternatives Analysis Process.....	9-11
9.5	Outreach during Development of the Draft EIR/EIS .....	9-11
9.5.1	Public Information Materials and Meetings.....	9-12
9.5.2	Stakeholder Working Group Meetings.....	9-12
9.5.3	Agreements and Memoranda of Understanding.....	9-12
9.5.4	Tribal Coordination Meetings.....	9-13
9.5.5	Agency Meetings and Consultation .....	9-14
9.5.6	Section 106 Consultation, National Historic Preservation Act.....	9-15
9.5.7	Section 404 Clean Water Act.....	9-16
9.5.8	Section 7 Consultation, Federal Endangered Species Act.....	9-16
9.6	Notification and Circulation of the Draft EIR/EIS.....	9-17
9.7	Publication and Review of the Draft EIR/EIS .....	9-19
9.7.1	Public and Agency Open Houses and Hearings .....	9-19
9.7.2	Comments on the Draft EIR/EIS .....	9-19
9.7.3	Responses to Comments on the Draft EIR/EIS.....	9-20
9.7.4	Engineering and Design Refinements after Publication of the Draft EIR/EIS .....	9-21
9.7.5	Ongoing Outreach Leading Up to Publication of the Final EIR/EIS .....	9-21

9.8	Publication and Review of the Revised Draft EIR/Supplemental Draft EIS .....	9-21
9.8.1	Notification and Circulation of the Revised Draft EIR/Supplemental Draft EIS.....	9-22
9.8.2	Comments on the Revised Draft EIR/Supplemental Draft EIS.....	9-23
9.8.3	Responses to Comments on the Revised Draft EIR/Supplemental Draft EIS.....	9-23
9.9	Preferred Alternative and Authority Decision-Making Process .....	9-23
9.10	Log of Public and Agency Outreach Meetings.....	9-23
10	FINAL EIR/EIS DISTRIBUTION.....	10-1
10.1	Repository Locations.....	10-1
10.1.1	Bakersfield .....	10-1
10.1.2	Lancaster .....	10-2
10.1.3	Mojave.....	10-2
10.1.4	Palmdale .....	10-2
10.1.5	Quartz Hill .....	10-2
10.1.6	Rosamond.....	10-2
10.1.7	Tehachapi .....	10-2
10.1.8	Los Angeles .....	10-3
10.1.9	Sacramento.....	10-3
10.2	Federal Agencies .....	10-3
10.3	State Agencies .....	10-4
10.4	Elected Officials.....	10-6
10.4.1	Federal Elected Officials.....	10-6
10.4.2	State Elected Officials.....	10-6
10.4.3	Regional County Board of Supervisors.....	10-6
10.4.4	Mayors .....	10-7
10.4.5	City Council Members.....	10-7
10.4.6	Agricultural Commissions .....	10-8
10.5	Regional/Local Agencies.....	10-8
10.6	Organizations and Businesses.....	10-8
10.7	Native American Contacts.....	10-10
10.8	Schools and Districts.....	10-11
11	LIST OF PREPARERS .....	11-1
12	REFERENCES/SOURCES USED IN DOCUMENT PREPARATION .....	12-1
12.1	General.....	12-1
12.2	References/Sources by Chapter .....	12-2
	Executive Summary .....	12-2
	Chapter 1: Project Purpose, Need, and Objectives .....	12-3
	Chapter 2: Alternatives.....	12-8
	Chapter 3: Affected Environment, Environmental Consequences, and Mitigation Measures.....	12-14
	Chapter 4: Section 4(f) and Section 6(f) Evaluations.....	12-81
	Chapter 5: Environmental Justice .....	12-83
	Chapter 6: Project Costs and Operations .....	12-86
	Chapter 7: Other CEQA/NEPA Considerations .....	12-86
	Chapter 8: Preferred Alternative and Station Site(s).....	12-87
	Chapter 9: Public and Agency Involvement .....	12-87
13	GLOSSARY OF TERMS.....	13-1
14	INDEX .....	14-1
15	ACRONYMS AND ABBREVIATIONS.....	15-1

## Figures

Figure S-1 California High-Speed Rail System Alignments and Stations.....	S-2
Figure S-2 Bakersfield to Palmdale Project Section Alignment Alternatives .....	S-4
Figure S-3 Maintenance Facility Alternatives .....	S-7
Figure S-4 Bakersfield Station Detail Map.....	S-20
Figure S-5 Edison Area Detail Map .....	S-21
Figure S-6 Keene Area Detail Map.....	S-22
Figure S-7 Mojave Area Detail Map.....	S-23
Figure S-8 Lancaster Area Detail Map.....	S-24
Figure S-9 Palmdale Station Area Detail Map .....	S-25
Figure 1-1 Statewide High-Speed Rail System—Implementation Phases .....	1-2
Figure 1-2 Statewide High-Speed Rail System, Phase 1 and Phase 2—Project Sections .....	1-7
Figure 1-3 Bakersfield to Palmdale Project Section .....	1-8
Figure 1-4 Current and Future California Population (in millions) .....	1-13
Figure 1-5 Intercity Trips in California (in millions).....	1-17
Figure 1-6 Major Intercity Travel Routes and Airports .....	1-18
Figure 1-7 Regional Freight/Passenger Network.....	1-22
Figure 1-8 Project Vicinity Amtrak Thruway Bus Routes .....	1-23
Figure 2-1 Bakersfield to Palmdale Project Section—Alignment Alternatives.....	2-3
Figure 2-2 State Route 58 and Union Pacific Railroad Corridor .....	2-5
Figure 2-3 Examples of Japanese <i>Shinkansen</i> High-Speed Trains .....	2-7
Figure 2-4 Example of an At-Grade Profile Showing Contact Wire System and Vertical Arms of the Pantograph Power Pickups.....	2-8
Figure 2-5 Examples of Existing Stations .....	2-9
Figure 2-6 Simulated and Plan Views of a Functional Station and Its Various Components .....	2-10
Figure 2-7 Typical At-Grade Cross Section .....	2-12
Figure 2-8 Typical Fill Cross Section .....	2-13
Figure 2-9 Typical Cut Cross Section .....	2-13
Figure 2-10 Dual-Bore Tunnel Typical Cross Section .....	2-14
Figure 2-11 Single Tunnel Typical Cross Section.....	2-14
Figure 2-12 Cut-and-Cover Tunnel Typical Cross Section .....	2-15
Figure 2-13 Tunnel Portal .....	2-16
Figure 2-14 Elevated Twin-Structure Typical Cross Sections .....	2-18
Figure 2-15 Elevated Single-Structure Typical Cross Sections .....	2-18
Figure 2-16 Straddle Bent Typical Cross Section.....	2-19
Figure 2-17 Replacing Local Surface Crossings with New Overheads above the High-Speed Rail Guideway and Existing Railroad Trackway .....	2-20

Figure 2-18 Adding Local Roadway Overheads above the High-Speed Rail Guideway.....	2-20
Figure 2-19 Typical Roadway Overhead .....	2-21
Figure 2-20 Typical Cross Section of Roadway Grade-Separated beneath the High-Speed Rail Guideway .....	2-21
Figure 2-21 Typical Cross Section of Wildlife Crossing Structure .....	2-22
Figure 2-22 Typical Plan View of Wildlife Crossing Structure.....	2-23
Figure 2-23 Traction Power Facility Typical Cross Section .....	2-24
Figure 2-24 Traction Power Substation .....	2-25
Figure 2-25 Traction Power Substation Overhead Contact System Gantry .....	2-25
Figure 2-26 Switching Station .....	2-26
Figure 2-27 Paralleling Station.....	2-26
Figure 2-28 Paralleling Station Overhead Contact System Gantry .....	2-27
Figure 2-29 Typical Cross Section of At-Grade Profile with Traction Power, Signaling, and Train-Control Features .....	2-28
Figure 2-30 Typical Maintenance-of-Way Facility Layout.....	2-30
Figure 2-31 Typical Double-Ended Light Maintenance Facility Layout Alternatives Considered during Alternatives Screening Process .....	2-32
Figure 2-32 Bakersfield to Los Angeles Corridor Alignments and Stations Carried Forward (2005 Statewide Program EIR/EIS) .....	2-36
Figure 2-33 2005 Statewide Program EIR/EIS Alignments Considered.....	2-37
Figure 2-34 Statewide Program EIR/EIS—Preferred Alignment .....	2-39
Figure 2-35 Bakersfield to Palmdale Project Section—2010 PAA Alignment Subsections.....	2-41
Figure 2-36 Edison Subsection—2010 PAA Alignment Alternatives Considered .....	2-42
Figure 2-37 Tehachapi Subsection—2010 PAA Alignment Alternatives Considered.....	2-43
Figure 2-38 Vertical Profiles of Tehachapi Subsection Alternatives—2010 PAA Alignment Alternatives Considered .....	2-44
Figure 2-39 Antelope Valley Subsection—2010 PAA Alignment Alternatives Considered .....	2-45
Figure 2-40 Quantm Alignment Options—2010 PAA .....	2-46
Figure 2-41 2010 PAA Alignment Alternatives Carried Forward .....	2-50
Figure 2-42 2012 SAA Alignment Alternatives Carried Forward .....	2-52
Figure 2-43 Evolution of Alternatives .....	2-54
Figure 2-44 Edison Subsection—2016 SAA Alignment Options .....	2-55
Figure 2-45 Keene Subsection—2016 SAA Alignment Options .....	2-56
Figure 2-46 Tehachapi Subsection—2016 SAA Alignment Options.....	2-57
Figure 2-47 Lancaster Subsection—2016 SAA Alignment Options.....	2-58
Figure 2-48 2016 SAA Alignment Alternatives Considered (Alternatives 1, 2, 3, and 5, Carried Forward to Project EIR/EIS) .....	2-60
Figure 2-49 Planned Transportation Improvements in Kern and Los Angeles Counties .....	2-69
Figure 2-50 Bakersfield Station.....	2-80

Figure 2-51 Bakersfield Station—F Street (Locally Generated Alternative) .....	2-81
Figure 2-52 Palmdale Station Alternative .....	2-83
Figure 2-53 Maintenance Facility Site Alternatives.....	2-84
Figure 2-54 Bakersfield to Palmdale Project Section—State Highway Modifications .....	2-88
Figure 2-55 Bakersfield Area Detail Map .....	2-93
Figure 2-56 Edison Area Detail Map .....	2-94
Figure 2-57 Keene Area Detail Map .....	2-94
Figure 2-58 Tehachapi Area Detail Map .....	2-96
Figure 2-59 Mojave Area Detail Map .....	2-97
Figure 2-60 Rosamond Area Detail Map .....	2-98
Figure 2-61 Lancaster Area Detail Map .....	2-99
Figure 2-62 Palmdale Area Detail Map.....	2-100
Figure 2-63 La Paz Cross Section .....	2-105
Figure 2-64 Refined CCNM Design Option On-Site Stockpile Site .....	2-106
Figure 2-65 Bakersfield to Palmdale Transit Connectivity Map .....	2-114
Figure 2-66 Right-of-Way Process.....	2-120
Figure 2-67 Typical Pre-Casting Yard Layout.....	2-129
Figure 2-68 Edison Area Detour Map .....	2-132
Figure 2-69 Lancaster Area Detour Map .....	2-132
Figure 3.1-1 Typical Resource Study Area.....	3.1-5
Figure 3.1-2 Typical Shifts of Roadways and Other Infrastructure .....	3.1-7
Figure 3.2-1 Transportation Resource Study Area .....	3.2-13
Figure 3.2-2 Major Roadways and Rail Lines.....	3.2-26
Figure 3.2-3 Haul Routes .....	3.2-56
Figure 3.3-1 Projected National Mobile-Source Air Toxics Emission Trends (2010–2050) for Vehicles Operating on Roadways Using the U.S. Environmental Protection Agency’s MOVES2010b Model .....	3.3-32
Figure 3.3-2 Air Quality Monitoring Stations Closest to the California High-Speed Rail Project.....	3.3-48
Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity .....	3.3-60
Figure 3.4-1 Noise Impact Criteria for High-Speed Rail Projects .....	3.4-15
Figure 3.5-1 EMI/EMF Measurement Site Locations.....	3.5-12
Figure 3.6-1 Electric Transmission Lines and Substations.....	3.6-29
Figure 3.6-2 Natural Gas Pipelines.....	3.6-30
Figure 3.6-3 Petroleum and Fuel Pipelines.....	3.6-31
Figure 3.6-4 Sewer Pipelines, Storm Drains, and Proposed Stormwater Retention Basins ...	3.6-32
Figure 3.6-5 Water Pipelines and Irrigation Canals .....	3.6-33
Figure 3.6-6 Communication Facilities and Sites .....	3.6-34

Figure 3.6-7 Oil Wells and Pipelines.....	3.6-35
Figure 3.6-8 Wind Turbines.....	3.6-36
Figure 3.6-9 Solar Farm Impacts .....	3.6-48
Figure 3.7-1 Bureau of Land Management Parcels with Desert Renewable Energy Conservation Plan Information .....	3.7-14
Figure 3.7-2 Resource Study Areas.....	3.7-16
Figure 3.7-3 Species Modeling Study Areas.....	3.7-25
Figure 3.7-4 Springs near Tunnel #4 .....	3.7-82
Figure 3.7-5 Zoomed View of Springs near Tunnel #4 .....	3.7-83
Figure 3.7-6 Springs near Tunnel #8 .....	3.7-84
Figure 3.7-7 Zoomed View of Springs near Tunnel #8 .....	3.7-85
Figure 3.8-1 Watersheds and Surface Waters.....	3.8-21
Figure 3.8-2 Hydrologic Units, Areas, and Subareas .....	3.8-24
Figure 3.8-3 Floodplains .....	3.8-36
Figure 3.8-4 California Department of Water Resources Awareness Flood Zone Areas .....	3.8-39
Figure 3.8-5 Groundwater Basins .....	3.8-41
Figure 3.9-1 California Geomorphic Provinces .....	3.9-22
Figure 3.9-2 Surficial Geology within the Resource Study Area.....	3.9-25
Figure 3.9-3 Aggregate Mines .....	3.9-30
Figure 3.9-4 Soil Associations in the Resource Study Area .....	3.9-31
Figure 3.9-5 Expansive Soils in the Resource Study Area .....	3.9-37
Figure 3.9-6 Soils Corrosive to Concrete.....	3.9-38
Figure 3.9-7 Soils Corrosive to Steel .....	3.9-39
Figure 3.9-8 Erodible Soils.....	3.9-41
Figure 3.9-9 Landslides, Liquefaction, Seismic Hazards, and Steep Slopes .....	3.9-42
Figure 3.9-10 Subsidence in the San Joaquin Valley .....	3.9-44
Figure 3.9-11 Subsidence in the Antelope Valley .....	3.9-45
Figure 3.9-12 Fault Hazard Zones in the Resource Study Area.....	3.9-47
Figure 3.9-13 Historic Earthquakes and Magnitudes within 62 Miles of the Project Vicinity ...	3.9-50
Figure 3.9-14 Calculated Peak Ground Acceleration .....	3.9-51
Figure 3.9-15 Inundation Areas in the Resource Study Area Due to Catastrophic Dam Failures .....	3.9-53
Figure 3.9-16 Oil, Gas, and Geothermal Fields .....	3.9-56
Figure 3.9-17 Oil Wells.....	3.9-57
Figure 3.10-1 Oil and Gas Wells and Pipelines in the Resource Study Area.....	3.10-16
Figure 3.10-2 Educational Facilities in the Resource Study Area.....	3.10-19
Figure 3.11-1 Safety and Security Existing Conditions.....	3.11-15
Figure 3.11-2 Lancaster Police Station Impacts .....	3.11-64



Figure 3.11-3 U.S. Air Force Plant 42 Flight Zones .....	3.11-66
Figure 3.12-1 Bakersfield to Palmdale Project Subsections .....	3.12-14
Figure 3.12-2 Minority Group Representation (2000) .....	3.12-30
Figure 3.12-3 Minority Group Representation (2009–2013 American Community Survey) ..	3.12-31
Figure 3.12-4 Summary of Minority Group Representation (2000 Census and 2009–2013 American Community Survey) .....	3.12-31
Figure 3.12-5 Population Age Distribution (2009–2013 American Community Survey) .....	3.12-35
Figure 3.12-6 Median Annual Household Income (2009–2013 American Community Survey) .....	3.12-36
Figure 3.12-7 Linguistic Isolation (2009–2013 American Community Survey) .....	3.12-41
Figure 3.12-8 Disability Status (2009–2013 American Community Survey) .....	3.12-42
Figure 3.14-1 Project Segments .....	3.14-17
Figure 3.14-2 Important Farmland and Grazing Land .....	3.14-18
Figure 3.14-3 Williamson Act Contract Land .....	3.14-24
Figure 3.14-4 Land Zoned for Agriculture .....	3.14-27
Figure 3.14-5 Important Farmland Mitigation Ratios .....	3.14-54
Figure 3.15-1 Resource Study Area for Alternatives 1, 2, 3, and 5, including the CCNM Design Option and the Refined CCNM Design Option .....	3.15-11
Figure 3.15-2 Impacts at Pacific Crest Trail .....	3.15-24
Figure 3.15-3 Impacts at Resources in Lancaster and Palmdale .....	3.15-25
Figure 3.15-4 Proposed Pacific Crest Trail Realignment .....	3.15-50
Figure 3.16-1 Overview of the East Bakersfield and Edison/Rural Valley Landscape Units	3.16-12
Figure 3.16-2 Visual Resources, Viewer Groups, and Key Viewpoints in the East Bakersfield Landscape Unit .....	3.16-15
Figure 3.16-3 Visual Resources, Viewer Groups, and Key Viewpoints in the Edison/Rural Valley Landscape Unit .....	3.16-17
Figure 3.16-4 Overview of Tehachapi Mountains East and West and Tehachapi Valley Landscape Units .....	3.16-19
Figure 3.16-5 Visual Resources, Viewer Groups, and Key Viewpoints in the Tehachapi Mountains West Landscape Unit .....	3.16-21
Figure 3.16-6 Tehachapi West Landscape Unit, La Paz, and Tehachapi Loop .....	3.16-22
Figure 3.16-7 Visual Resources, Viewer Groups, and Key Viewpoints in the Tehachapi Valley Landscape Unit .....	3.16-25
Figure 3.16-8 Visual Resources, Viewer Groups, and Key Viewpoints in the Tehachapi Mountains East Landscape Unit .....	3.16-27
Figure 3.16-9 Detailed View of Pacific Crest Trail .....	3.16-28
Figure 3.16-10 Overview of West Mojave, Rosamond Rural, and Lancaster-Palmdale Landscape Units .....	3.16-29
Figure 3.16-11 Visual Resources, Viewer Groups, and Key Viewpoints in the West Mojave Landscape Unit .....	3.16-31

Figure 3.16-12 Visual Resources, Viewer Groups, and Key Viewpoints in the Rosamond Rural Landscape Unit .....	3.16-33
Figure 3.16-13 Visual Resources, Viewer Groups, and Key Viewpoints in the Lancaster-Palmdale Landscape Unit—Northern Subsection .....	3.16-36
Figure 3.16-14 Visual Resources, Viewer Groups, and Key Viewpoints in the Lancaster-Palmdale Landscape Unit—Southern Subsection .....	3.16-39
Figure 3.16-15 Key Viewpoint 1: Existing and Simulated Views of Alternative 1 Looking South from Sterling Road .....	3.16-51
Figure 3.16-16 Key Viewpoint 2: Existing and Simulated Views of Alternative 1 Looking South from State Route 148/Morning Drive .....	3.16-53
Figure 3.16-17 Key Viewpoint 3: Existing and Simulated Views of Alternative 1 Looking Southwest from School Street .....	3.16-55
Figure 3.16-18 Key Viewpoint 4: Existing and Simulated Views of Alternative 1 from Jacober Avenue Looking South .....	3.16-57
Figure 3.16-19 Key Viewpoint 5: Existing and Simulated Views of Alternative 1 from State Route 58 Looking East-Southeast .....	3.16-59
Figure 3.16-20 Key Viewpoint 6: Existing and Simulated Views of Alternative 1 Looking North from Bena Road .....	3.16-61
Figure 3.16-21 Key Viewpoint 7: Existing and Simulated Views of Alternative 1 Looking East-Northeast from State Route 58 .....	3.16-62
Figure 3.16-22 Key Viewpoint 8: Existing and Simulated Views of Alternative 1 Looking Northeast from the Bakersfield National Cemetery .....	3.16-64
Figure 3.16-23 Key Viewpoint 9: Existing and Simulated Views of Alternative 1 Looking Northwest from State Route 58 .....	3.16-65
Figure 3.16-24 Key Viewpoint 10: Existing and Simulated Views of Alternative 1 Looking East from Hart Flat Road .....	3.16-67
Figure 3.16-25 Key Viewpoint 11a: Existing and Simulated Views of Alternative 1 from La Paz—Villa La Paz Conference Center Looking North .....	3.16-69
Figure 3.16-26 Key Viewpoint 11b: Existing and Simulated Views of Alternative 1 from La Paz—Villa La Paz Conference Center Looking Northeast .....	3.16-70
Figure 3.16-27 Key Viewpoint 11c: Existing and Simulated Views of Alternative 1 from La Paz—Memorial Garden and César Chávez’s Gravesite Looking North .....	3.16-71
Figure 3.16-28 Key Viewpoint 11d: Existing and Simulated Views of Alternative 1 from La Paz—Peace Rocks Looking Northeast .....	3.16-72
Figure 3.16-29 Key Viewpoint 11e: Existing and Simulated Views of Alternative 1 from La Paz—Road to Villa La Paz Looking North .....	3.16-73
Figure 3.16-30 Key Viewpoint 12: Existing and Simulated Views of Alternative 1 from State Route 58 Looking Southeast .....	3.16-76
Figure 3.16-31 Key Viewpoint 13: Existing and Simulated Views of Alternative 1 from Tehachapi Loop Looking North-Northwest .....	3.16-77
Figure 3.16-32 Key Viewpoint 14: Existing and Simulated Views of Alternative 1 from Mill Street Overpass Looking North-Northeast .....	3.16-80
Figure 3.16-33 Key Viewpoint 15: Existing and Simulated Views of Alternative 1 from State Route 58 Looking Southeast .....	3.16-82

Figure 3.16-34 Key Viewpoint 16: Existing and Simulated Views of Alternative 1 from Arabian Drive Looking South-Southwest..... 3.16-84

Figure 3.16-35 Key Viewpoint 17: Existing and Simulated Views of Alternative 1 from Dennison Road Looking East-Northeast..... 3.16-85

Figure 3.16-36 Key Viewpoint 18a: Existing and Simulated Views of Alternative 1 from the Existing Alignment of the Pacific Crest Trail Looking West..... 3.16-87

Figure 3.16-37 Key Viewpoint 18b: Existing and Simulated Views of Alternative 1 from the Existing Alignment of the Pacific Crest Trail Looking Southwest..... 3.16-88

Figure 3.16-38 Key Viewpoint 19: Existing and Simulated Views of Alternative 1 from Rosamond Boulevard Looking West-Northwest..... 3.16-92

Figure 3.16-39 Key Viewpoint 20: Existing and Simulated Views of Alternative 1 from Gobi Avenue Looking West..... 3.16-94

Figure 3.16-40 Key Viewpoint 21: Existing and Simulated Views of Alternative 1 from 40th Street Looking Southwest..... 3.16-95

Figure 3.16-41 Key Viewpoint 24: Existing and Simulated Views of Alternative 1 from Sierra Highway Bike Path Looking North..... 3.16-101

Figure 3.16-42 Key Viewpoint 25: Existing and Simulated Views of Alternative 1 from Avenue L Overpass Looking Northwest..... 3.16-103

Figure 3.16-43 Key Viewpoint 26: Existing and Simulated Views of Alternative 1 from Desert Sands Park Looking East..... 3.16-105

Figure 3.16-44 Key Viewpoint 27: Existing and Simulated Views of Alternative 1 from East Avenue Q Looking Northeast..... 3.16-107

Figure 3.16-45 Key Viewpoint 29: Existing and Simulated Views of Alternative 1 from Avenue Q7 Looking West..... 3.16-109

Figure 3.16-46 Key Viewpoint 30: Existing and Simulated Views of Alternative 1 from E Palmdale Boulevard Looking West..... 3.16-111

Figure 3.16-47 Key Viewpoint 3: Existing and Simulated Views of Alternative 2 from School Street Looking Southwest..... 3.16-113

Figure 3.16-48 Key Viewpoint 4 Existing and Simulated Views of Alternative 2 from Jacober Avenue Looking South..... 3.16-114

Figure 3.16-49 Key Viewpoint 18a: Existing and Simulated Views of Alternative 3 from the Pacific Crest Trail Looking West..... 3.16-118

Figure 3.16-50 Key Viewpoint 18b: Existing and Simulated Views of Alternative 3 from the Pacific Crest Trail Looking Southwest..... 3.16-119

Figure 3.16-51 Key Viewpoint 22: Existing and Simulated Views of Alternative 5 from Whit Carter Park..... 3.16-122

Figure 3.16-52 Key Viewpoint 23: Existing and Simulated Views of Alternative 5 from Lancaster Town Center..... 3.16-125

Figure 3.16-53 Key Viewpoint 11b: Existing and Simulated Views of CCNM Design Option from La Paz—Villa la Paz Conference Center Looking Northeast..... 3.16-129

Figure 3.16-54 Key Viewpoint 11d: Existing and Simulated Views of CCNM Design Option from La Paz—Peace Rocks Looking Northeast..... 3.16-130

Figure 3.16-55 Key Viewpoint 11e: Existing and Simulated Views of CCNM Design Option from La Paz—Road to Villa la Paz Looking North..... 3.16-131

Figure 3.16-56 Key Viewpoint 11b: Existing and Simulated Views of Refined CCNM Design Option from La Paz—Villa la Paz Conference Center Looking Northeast.....	3.16-135
Figure 3.16-57 Key Viewpoint 12: Existing and Simulated Views of the Refined CCNM Design Option from State Route 58 Looking Southeast .....	3.16-137
Figure 3.16-58 Key Viewpoint 28: Existing and Simulated Views of Palmdale Station from E Avenue Q3 Looking Northeast.....	3.16-140
Figure 3.16-59 Summary of Aesthetics and Visual Quality Impacts.....	3.16-158
Figure 3.17-1 Historic Properties Within the Area of Potential Effects .....	3.17-63
Figure 3.18-1 Resource Study Area .....	3.18-9
Figure 3.19-1 Historic Population Data for Bakersfield, Tehachapi, Lancaster, and Palmdale.....	3.19-14
Figure 4-1 Resource Study Area for Section 4(f).....	4-6
Figure 4-2 Ramon Garza Elementary School and Sierra Middle School .....	4-23
Figure 4-3 Big Creek Hydroelectric System Historic District and Foothill High School .....	4-24
Figure 4-4 Keene Fire Station and La Paz.....	4-25
Figure 4-5 Pacific Crest Trail.....	4-26
Figure 4-6 First Los Angeles Aqueduct.....	4-27
Figure 4-7 Willow Springs Main Race Track.....	4-28
Figure 4-8 Lancaster Section 4(f) Resources .....	4-29
Figure 4-9 Palmdale Section 4(f) Resources .....	4-33
Figure 4-10 Alternatives 1, 2, and 5 Proposed Mitigation Measure for Pacific Crest Trail Realignment.....	4-56
Figure 4-11 Key Viewpoint 18a: Existing and Simulated Views of Alternative 1 from the Pacific Crest Trail Looking West.....	4-59
Figure 4-12 Key Viewpoint 18b: Existing and Simulated Views of Alternative 1 from the Pacific Crest Trail Looking Southwest.....	4-60
Figure 4-13 La Paz, View Facing North toward Character-Defining View of Three Peaks from Water Tank, Existing Site .....	4-75
Figure 4-14 La Paz, View Facing North toward Character-Defining View of Three Peaks from Water Tank, Visual Simulation of Alternatives 1, 2, 3, and 5 .....	4-75
Figure 4-15 La Paz, View Facing North toward Character-Defining View of Three Peaks from Water Tank, Visual Simulation of CCNM Design Option.....	4-76
Figure 4-16 La Paz, View from Water Tank, Facing Northeast, Existing Site.....	4-77
Figure 4-17 La Paz, View from Water Tank, Facing Northeast, Visual Simulation of Refined CCNM Design Option.....	4-77
Figure 4-18 La Paz, View Facing Northwest toward Character-Defining View along Entrance Road, Existing Site .....	4-78
Figure 4-19 La Paz, View Facing Northwest toward Character-Defining View along Entrance Road (Project Not Visible), Visual Simulation of Alternatives 1, 2, 3, and 5 .....	4-78
Figure 4-20 La Paz, View Facing Northwest toward Character-Defining View along Entrance Road (Project Not Visible), Visual Simulation CCNM Design Option/Refined CCNM Design Option.....	4-79

Figure 4-21 La Paz, View Facing Northeast from North Unit Conference Room, Existing Site..... 4-80

Figure 4-22 La Paz, View Facing Northeast from North Unit Conference Room, Visual Simulation of Alternatives 1, 2, 3, and 5..... 4-80

Figure 4-23 La Paz, View from Parking Lot, Existing Site..... 4-81

Figure 4-24 La Paz, View from Parking Lot, Visual Simulation of Refined CCNM Design Option ..... 4-81

Figure 4-25 La Paz, View from State Route 58, Facing Northeast, Existing Site ..... 4-82

Figure 4-26 La Paz, View from State Route 58, Facing Northeast, Visual Simulation of Refined CCNM Design Option..... 4-82

Figure 4-27 La Paz, View Facing Northeast from North Unit Conference Room, Visual Simulation of CCNM Design Option ..... 4-87

Figure 4-28 La Paz, Road Leading to Villa La Paz, View Facing North, Existing Site..... 4-87

Figure 4-29 La Paz, Road Leading to Villa La Paz, View Facing North, Visual Simulation of Alternatives 1, 2, 3, and 5..... 4-88

Figure 4-30 La Paz, Road Leading to Villa La Paz, View Facing North, Visual Simulation of CCNM Design Option..... 4-88

Figure 4-31 Recreational Resources at La Paz..... 4-91

Figure 5-1 Minority Populations ..... 5-16

Figure 5-2 Low-Income Populations ..... 5-17

Figure 8-1 Bakersfield to Palmdale Project Section Alternative 2 Alignment with the Refined CCNM Design Option..... 8-3

Figure 9-1 Public Outreach during the Environmental and Alternatives Analysis Processes..... 9-7

**Tables**

Table S-1 Summary of Bakersfield to Palmdale Project Section Design Features .....S-19

Table S-2 Bakersfield to Palmdale Project Section Build Alternatives Differentiators.....S-46

Table S-3 Capital Costs of the B-P Build Alternatives from Bakersfield Station to Palmdale Station (2020\$ in millions) .....S-48

Table S-4 Annual Operations and Maintenance Costs Apportioned to the Bakersfield to Palmdale Project Section (2015\$ in millions).....S-49

Table S-5 Impact Avoidance and Minimization Features .....S-57

Table S-6 Comparison of Potential Adverse Impacts of Bakersfield to Palmdale Project Section Build Alternatives.....S-65

Table S-7 Comparison of Bakersfield to Palmdale Project Section Build Alternatives.....S-90

Table S-8 Comparison of Potential Adverse Impacts of Station Sites.....S-98

Table S-9 Comparison of Potential Adverse Impacts of Maintenance Facility Alternatives .... S-113

Table 1-1 Population Growth in California, the Bakersfield to Palmdale Project Section Vicinity, and Kern and Los Angeles Counties ..... 1-14

Table 1-2 Agriculture in Kern County.....	1-15
Table 1-3 Travel Time to Work in the Cities of Lancaster and Palmdale .....	1-16
Table 1-4 Unemployment and Income in California and in Kern and Los Angeles Counties.....	1-16
Table 1-5 Current and Projected Vehicle Miles Traveled in the Bakersfield to Palmdale Project Section Vicinity .....	1-19
Table 1-6 Travel Growth for Intercity Highways.....	1-20
Table 1-7 Commercial Air Traffic and Airports Serving the Bakersfield to Palmdale Project Section.....	1-25
Table 1-8 Estimated Total Travel Times (Door-to-Door in Hours and Minutes) between City Pairs by Auto, Air, and Rail (Peak Conditions).....	1-27
Table 1-9 Bakersfield to Burbank Travel Time Comparison .....	1-29
Table 1-10 Monitored Air Quality in the Bakersfield to Palmdale Project Section Vicinity .....	1-32
Table 2-1 High-Speed Rail Performance Criteria .....	2-6
Table 2-2 2010 Preliminary Alignment Alternatives Considered .....	2-48
Table 2-3 2016 Supplemental Alternatives Analysis Alternatives.....	2-59
Table 2-4 Previous and Current Alternatives .....	2-61
Table 2-5 Regional Projected Population, Employment, and Housing.....	2-65
Table 2-6 Planned Residential Development Projects within the Bakersfield to Palmdale Project Section Area by 2040 .....	2-66
Table 2-7 Total Daily Vehicle Miles Traveled—Kern County .....	2-67
Table 2-8 Total Daily Vehicle Miles Traveled—Los Angeles County .....	2-67
Table 2-9 No Project Alternative—Planned Improvements in Kern County (near Project Site) .....	2-70
Table 2-10 No Project Alternative—Planned Improvements in Northern Los Angeles County (near Project Site) .....	2-70
Table 2-11 Passenger Boardings for Bakersfield and Palmdale Airports .....	2-71
Table 2-12 Summary of Design Features .....	2-77
Table 2-13 Proposed Tunnel Portal Facilities and Infrastructure Elements .....	2-77
Table 2-14 Proposed Traction Power Locations.....	2-78
Table 2-15 Bakersfield to Palmdale Project Section Build Alternatives Proposed Modifications to California Department of Transportation State Highway Facilities.....	2-87
Table 2-16 Design Features.....	2-91
Table 2-17 High-Speed Rail System Ridership Forecasts (in millions per year).....	2-107
Table 2-18 High-Speed Rail Service Plan Assumptions for Phase 1 .....	2-111
Table 2-19 Temporary Conversion of Existing Land Uses .....	2-117
Table 2-20 Temporary Conversion of Planned Land Uses.....	2-117
Table 2-21 Permanent Conversion of Existing Land Uses .....	2-118
Table 2-22 Permanent Conversion of Planned Land Uses .....	2-118
Table 2-23 Construction Schedule.....	2-122



Table 2-24 Construction Staging and Pre-Casting Yards by Area for B-P Build Alternatives .....	2-126
Table 2-25 Tunnel Excavation .....	2-133
Table 2-26 Potential Major Environmental Reviews, Permits, and Approvals.....	2-135
Table 3.2-1 Regional Transportation Plans and Programs.....	3.2-7
Table 3.2-2 Local Plans and Applicable Policies .....	3.2-10
Table 3.2-3 Level-of-Service, Average Vehicular Delay, and Volume-to-Capacity Definition for Roadway Segments .....	3.2-19
Table 3.2-4 Level-of-Service and Average Control Delay for Signalized Intersections .....	3.2-20
Table 3.2-5 Level-of-Service and Average Control Delay for Unsignalized Intersections .....	3.2-20
Table 3.2-6 Freeway Segment Peak-Hour Capacity .....	3.2-21
Table 3.2-7 Level-of-Service and Volume-to-Capacity Ratio Definition for Freeway Segments.....	3.2-21
Table 3.2-8 Regionally Significant Roadways within the Resource Study Area.....	3.2-25
Table 3.2-9 Regional Truck Routes within the Resource Study Area .....	3.2-35
Table 3.2-10 Estimated Conventional Rail Travel Times between Cities (Peak Conditions) ..	3.2-37
Table 3.2-11 Golden Empire Transit Bus Routes: Bakersfield .....	3.2-39
Table 3.2-12 Palmdale Transportation Center—Connecting Transit Services.....	3.2-41
Table 3.2-13 Educational Facilities with School Bus Transportation within the Resource Study Area .....	3.2-42
Table 3.2-14 Commercial Air Traffic and Airports.....	3.2-43
Table 3.2-15 Passenger Enplanements for Bakersfield and Palmdale Airports.....	3.2-44
Table 3.2-16 California Outbound and Inbound Freight Shipments, All Modes .....	3.2-45
Table 3.2-17 California Outbound and Inbound Freight Shipments, by Truck and by Rail .....	3.2-46
Table 3.2-18 Existing (2014) Intersection Levels-of-Service—City of Bakersfield: Intersection of 34th Street and L Street to Oswell Street.....	3.2-48
Table 3.2-19 Future Year (2035) No Project Intersections Operating at Levels-of-Service E or F—City of Bakersfield .....	3.2-51
Table 3.2-20 Annual Vehicle Miles Traveled .....	3.2-65
Table 3.2-21 Roadway Levels-of-Service, Existing (2016) and Existing (2016) Plus Construction.....	3.2-67
Table 3.2-22 Roadway Levels-of-Service, Future Year (2040) No Project and Future Year (2040) Plus Project Conditions.....	3.2-71
Table 3.2-23 Intersection and Roadway Segments Mitigation .....	3.2-77
Table 3.2-24 Comparison of Bakersfield to Palmdale Project Section Build Alternatives Impacts for Transportation.....	3.2-80
Table 3.2-25 Summary of CEQA Significance Conclusions and Mitigation Measures for Transportation .....	3.2-82
Table 3.3-1 Ambient Air Quality Standards.....	3.3-5
Table 3.3-2 Policy Consistency Summary .....	3.3-15

Table 3.3-3 Employee Counts .....	3.3-28
Table 3.3-4 Daily Passenger Trips.....	3.3-28
Table 3.3-5 Bakersfield to Palmdale Project Section Build Alternative Alignment Lengths ....	3.3-36
Table 3.3-6 High-Speed Rail Roadway Project Locations.....	3.3-38
Table 3.3-7 General Conformity <i>de minimis</i> Thresholds .....	3.3-42
Table 3.3-8 San Joaquin Valley Air Pollution Control District CEQA Construction and Operational Thresholds of Significance.....	3.3-44
Table 3.3-9 Eastern Kern Air Pollution Control District CEQA Construction Thresholds of Significance .....	3.3-45
Table 3.3-10 Antelope Valley Air Pollution Control District CEQA Construction and Operational Thresholds of Significance.....	3.3-45
Table 3.3-11 Ambient Criteria Pollutant Concentration Data at Air Quality Monitoring Stations Closest to the High-Speed Rail Project.....	3.3-49
Table 3.3-12 Federal and State Attainment Status.....	3.3-51
Table 3.3-13 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District (tons per day).....	3.3-55
Table 3.3-14 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District (tons per day).....	3.3-56
Table 3.3-15 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District (tons per day) .....	3.3-57
Table 3.3-16 2014 California Statewide Greenhouse Gas Emissions Inventory.....	3.3-58
Table 3.3-17 Sensitive Receptors within 1,000 Feet of the Bakersfield to Palmdale Project Section Build Alternatives.....	3.3-59
Table 3.3-18 Bakersfield to Palmdale Project Section Construction Regional Emissions—Total (Tons/Construction Duration) .....	3.3-73
Table 3.3-19 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 1 .....	3.3-74
Table 3.3-20 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 1 .....	3.3-77
Table 3.3-21 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 1 .....	3.3-80
Table 3.3-22 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 2 .....	3.3-82
Table 3.3-23 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 2 .....	3.3-85
Table 3.3-24 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 2 .....	3.3-88
Table 3.3-25 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 3 .....	3.3-90
Table 3.3-26 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 3 .....	3.3-93
Table 3.3-27 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 3.....	3.3-96

Table 3.3-28 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 5 .....	3.3-98
Table 3.3-29 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 5 .....	3.3-101
Table 3.3-30 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 5 .....	3.3-104
Table 3.3-31 Bakersfield to Palmdale Project Section Carbon Dioxide Equivalent Construction Emissions (Metric Tons per Year).....	3.3-119
Table 3.3-32 Statewide No Project Emissions in Tons per Year (2015) .....	3.3-125
Table 3.3-33 Statewide No Project Emissions in Tons per Year (2040) .....	3.3-126
Table 3.3-34 Estimated Statewide Emissions Burden Changes Due to the High-Speed Rail Project versus No Project (Medium Ridership Scenario) in Tons per Year (2015)..	3.3-126
Table 3.3-35 Estimated Statewide Emissions Burden Changes Due to the High-Speed Rail Project versus No Project (High Ridership Scenario) in Tons per Year (2015).....	3.3-126
Table 3.3-36 Estimated Statewide Emission Burden Changes Due to the High-Speed Rail Project versus No Project (Medium Ridership Scenario) in Tons per Year (2040).....	3.3-127
Table 3.3-37 Estimated Statewide Emission Burden Changes Due to the High-Speed Rail Project versus No Project (High Ridership Scenario) in Tons per Year (2040) .....	3.3-127
Table 3.3-38 Summary of Regional Emissions Changes Existing Year—2015 with Project (Under the Medium Ridership Scenario).....	3.3-128
Table 3.3-39 Summary of Regional Emissions Changes Existing Year—2015 with Project (Under the High Ridership Scenario) .....	3.3-129
Table 3.3-40 Summary of Regional Emissions Changes in Horizon Year—2040 with Project (under the Medium Ridership Scenario) .....	3.3-130
Table 3.3-41 Summary of Regional Emissions in Horizon Year—2040 with Project (under the High Ridership Scenario).....	3.3-131
Table 3.3-42 Estimated Statewide Greenhouse Gas Emissions for the No Project Alternative.....	3.3-132
Table 3.3-43 Estimated Statewide Greenhouse Gas Emission for the High-Speed Rail Project.....	3.3-133
Table 3.3-44 Maximum Modeled Carbon Monoxide Concentrations at Intersections near the Palmdale Station .....	3.3-136
Table 3.3-45 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Air Quality and Global Climate Change.....	3.3-146
Table 3.3-46 Summary of CEQA Significance Conclusions for Air Quality and Global Climate Change.....	3.3-149
Table 3.4-1 Summary of Severe Noise Operations Impacts .....	3.4-3
Table 3.4-2 Regional and Local Plans, Policies, and Ordinances .....	3.4-8
Table 3.4-3 Regional and Local Plans and Policies Inconsistencies.....	3.4-10
Table 3.4-4 Noise Screening Distances for Noise Assessments .....	3.4-13
Table 3.4-5 FRA Screening Distances for Vibration Assessment .....	3.4-14
Table 3.4-6 Bakersfield to Palmdale Project Section Build Alternative Operational and Geometric Assumptions .....	3.4-17

Table 3.4-7 Detailed Assessment Criteria for Construction Noise.....	3.4-18
Table 3.4-8 Construction Vibration Damage Criteria.....	3.4-18
Table 3.4-9 Vibration Impact Screening Distances.....	3.4-22
Table 3.4-10 Distances to Federal Railroad Administration Noise Impact Contours from Construction Activities for the High-Speed Rail Corridor.....	3.4-24
Table 3.4-11 Typical Construction Equipment Noise Levels .....	3.4-25
Table 3.4-12 Distances to Federal Railroad Administration Noise Impact from Construction Activities for the High-Speed Rail Corridor.....	3.4-27
Table 3.4-13 Typical Noise Levels from Construction Activities for Public Works Projects ....	3.4-28
Table 3.4-14 Construction Noise Impact Summary .....	3.4-32
Table 3.4-15 Vibration Source Levels for Construction Equipment.....	3.4-33
Table 3.4-16 Distances of Construction Vibration Annoyance Criteria.....	3.4-34
Table 3.4-17 Distances Within the Construction Vibration Damage Criteria.....	3.4-35
Table 3.4-18 Noise Impact Summary without Mitigation—Fresno to Bakersfield (Locally Generated Alternative) .....	3.4-39
Table 3.4-19 Impact on Schools—Fresno to Bakersfield (Locally Generated Alternative) ....	3.4-39
Table 3.4-20 Noise Impact Summary without Mitigation—Alternative 1—Bakersfield to Palmdale (between Station Areas).....	3.4-41
Table 3.4-21 Noise Impact Summary without Mitigation—Alternative 2—Bakersfield to Palmdale (between Station Areas).....	3.4-41
Table 3.4-22 Noise Impact Summary without Mitigation—Alternative 3—Bakersfield to Palmdale (between Station Areas).....	3.4-41
Table 3.4-23 Noise Impact Summary without Mitigation—Alternative 5—Bakersfield to Palmdale (between Station Areas).....	3.4-41
Table 3.4-24 Impact on Schools—Bakersfield to Palmdale (between Station Areas).....	3.4-42
Table 3.4-25 Noise Impact Summary—Palmdale Station Area.....	3.4-43
Table 3.4-26 Vibration Impacts—Fresno to Bakersfield (Locally Generated Alternative) .....	3.4-45
Table 3.4-27 Distances to Vibration Criterion Level Contours—Bakersfield to Palmdale (between Station Areas).....	3.4-45
Table 3.4-28 Sound Barrier Analysis: Bakersfield Station—Fresno to Bakersfield (Locally Generated Alternative) Alignment .....	3.4-59
Table 3.4-29 Sound Barrier Analysis: Bakersfield to Palmdale (between Station Areas) Alignment—Alternative 1 .....	3.4-60
Table 3.4-30 Sound Barrier Analysis: Bakersfield to Palmdale (between Station Areas) Alignment—Alternative 2 .....	3.4-62
Table 3.4-31 Sound Barrier Analysis: Bakersfield to Palmdale (between Station Areas) Alignment—Alternative 3 .....	3.4-64
Table 3.4-32 Sound Barrier Analysis: Bakersfield to Palmdale (between Station Areas) Alignment—Alternative 5 .....	3.4-66
Table 3.4-33 Sound Barrier Analysis: Palmdale Station Area .....	3.4-68
Table 3.4-34 Bakersfield Station—Fresno to Bakersfield (Locally Generated Alternative) Alignment—Severe Residual Impacts: Mitigation Not Considered .....	3.4-69

Table 3.4-35 Bakersfield to Palmdale (Between Station Areas) Alignment—Severe Residual Impacts: Mitigation Not Considered ..... 3.4-69

Table 3.4-36 Palmdale Station Alignment—Severe Residual Impacts Without Mitigation ..... 3.4-69

Table 3.4-37 Potential Vibration Mitigation Procedures and Descriptions ..... 3.4-71

Table 3.4-38 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Noise and Vibration ..... 3.4-75

Table 3.4-39 Summary of CEQA Significance Conclusions for Noise and Vibration ..... 3.4-78

Table 3.5-1 Institute of Electrical and Electronics Engineers C95.6 Magnetic Field Maximum Permissible Exposure Levels for the General Public ..... 3.5-4

Table 3.5-2 Institute of Electrical and Electronics Engineers C95.6 Electric Field Maximum Permissible Exposure Levels for the General Public ..... 3.5-5

Table 3.5-3 Radio Frequency Emissions Safety Levels Expressed as Maximum Permissible Exposure ..... 3.5-6

Table 3.5-4 Comparison of Measured and Project Calculated 60-Hertz Magnetic Fields ..... 3.5-13

Table 3.5-5 Summary of High-Speed Rail EMF Modeling Results ..... 3.5-18

Table 3.5-6 Potentially Sensitive Facilities ..... 3.5-20

Table 3.5-7 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for EMI/EMF ..... 3.5-29

Table 3.5-8 Summary of CEQA Significance Conclusions and Mitigation Measures for EMI/EMF ..... 3.5-32

Table 3.6-1 General Plan Policy Consistency Analysis Results ..... 3.6-7

Table 3.6-2 Construction Energy Consumption Assumptions for the Bakersfield to Palmdale Project Section ..... 3.6-16

Table 3.6-3 Resource Study Area Utility and Energy Providers ..... 3.6-18

Table 3.6-4 Water Suppliers in the Bakersfield to Palmdale Project Section ..... 3.6-20

Table 3.6-5 Water Treatment Plant Existing Capacity Summary for the Bakersfield to Palmdale Project Section ..... 3.6-22

Table 3.6-6 Wastewater Treatment Plant Existing Average Flow and Capacity Summary for the Bakersfield to Palmdale Project Section ..... 3.6-22

Table 3.6-7 Landfill Facility Summary for the Bakersfield to Palmdale Project Section ..... 3.6-24

Table 3.6-8 2015 Electricity Consumption in Kern and Los Angeles Counties ..... 3.6-25

Table 3.6-9 Fuel Sources for Electric Power in California in 2015 ..... 3.6-25

Table 3.6-10 Construction Water Demand Summary for the Bakersfield to Palmdale Project Section ..... 3.6-39

Table 3.6-11 Bakersfield to Palmdale Project Section Impacts to High-Risk and Major Utilities ..... 3.6-41

Table 3.6-12 Bakersfield to Palmdale Project Section Impacts to Other Significant Utility Facilities ..... 3.6-42

Table 3.6-13 Bakersfield to Palmdale Project Section Impacts to Low-Risk Utilities ..... 3.6-43

Table 3.6-14 Estimated Existing Water Use and Anticipated Water Demand for the Bakersfield to Palmdale Project Section ..... 3.6-49

Table 3.6-15 Wastewater Capacity and Estimated Wastewater (Sewage) Generation for the Bakersfield to Palmdale Project Section .....	3.6-50
Table 3.6-16 Construction Energy Payback Period .....	3.6-54
Table 3.6-17 2015 & 2040 Estimated Regional (Bakersfield to Palmdale) Change in Energy Consumption from the High-Speed Rail Build Alternatives .....	3.6-55
Table 3.6-18 2040 Estimated Statewide Change in Energy Consumption from the High-Speed Rail Build Alternatives .....	3.6-55
Table 3.6-19 Comparison of the Bakersfield to Palmdale Project Section Build Alternative Impacts for Public Utilities .....	3.6-59
Table 3.6-20 Comparison of the Bakersfield to Palmdale Project Section Build Alternative Impacts for Energy Resources .....	3.6-62
Table 3.6-21 Summary of CEQA Significance Conclusions and Mitigation Measures for Public Utilities and Energy .....	3.6-63
Table 3.7-1 Regional and Local Policy Consistency Analysis Summary .....	3.7-12
Table 3.7-2 Survey Results: Aquatic Resources in the Aquatic Resource Study Area .....	3.7-47
Table 3.7-3 Biological Resources Impacts in the Fresno to Bakersfield Locally Generated Alternative Area .....	3.7-52
Table 3.7-4 Potential Areas of Section 1600 Jurisdiction in the Fresno to Bakersfield Locally Generated Alternative Area of the Aquatic Resource Study Area .....	3.7-52
Table 3.7-5 Comparison of Estimated Potential Effects on Suitable Habitats for Special-Status Plant Species within the Resource Study Area .....	3.7-55
Table 3.7-6 Comparison of Estimated Potential Effects on Suitable Habitat for Special-Status Wildlife Species within the Resource Study Area .....	3.7-61
Table 3.7-7 Intersection of the Bakersfield to Palmdale Project Section Build Alternatives (Station to Station) and Modeled Federal and State Threatened/Endangered Species Habitat .....	3.7-62
Table 3.7-8 Comparison of Potential Estimated Effects on Aquatic Resources—Ordinary High Water Mark or Edge of Wetland .....	3.7-75
Table 3.7-9 Comparison of Potential Estimated Effects on Aquatic Resources—Top of Bank or Edge of Riparian .....	3.7-76
Table 3.7-10 Potential Areas of Section 1600 Jurisdiction in the Aquatic Resource Study Area .....	3.7-77
Table 3.7-11 Comparison of Impacts on Special-Status Plant Communities .....	3.7-90
Table 3.7-12 Modeled Unshielded Distance to $L_{max}$ Noise Contour for a Train Moving at 220 mph .....	3.7-96
Table 3.7-13 Potential Nonbiological Impacts of Off-Site Mitigation Activities .....	3.7-141
Table 3.7-14 Summary of Effects for Federally Listed Species and Their Critical Habitat .....	3.7-164
Table 3.7-15 Summary of CEQA Significance Conclusions, Mitigation Measures, and Level of Significance after Mitigation .....	3.7-173
Table 3.8-1 Local Plans, Policies, and Ordinances .....	3.8-9
Table 3.8-2 Quantitative and Qualitative Analyses for Hydrology and Water Resources .....	3.8-17
Table 3.8-3 High-Speed Rail Documents Reviewed .....	3.8-17
Table 3.8-4 Evaluation Method by Topic Area .....	3.8-18



Table 3.8-5 Named Surface Waters within the Resource Study Area..... 3.8-26

Table 3.8-6 Surface Water Beneficial Uses in the Tulare Lake Basin and Lahontan Region ..... 3.8-29

Table 3.8-7 Surface Water Quality Objectives for All Surface Waters in the Tulare Lake Basin..... 3.8-31

Table 3.8-8 Surface Water Quality Objectives for All Surface Waters in the Lahontan Region ..... 3.8-33

Table 3.8-9 Federal Emergency Management Agency Flood Hazard Zone Designations in the Resource Study Area..... 3.8-35

Table 3.8-10 Groundwater Beneficial Uses for the Tulare Lake Basin and the Lahontan Region ..... 3.8-44

Table 3.8-11 General Groundwater Objectives for the Tulare Lake Basin..... 3.8-44

Table 3.8-12 General Groundwater Objectives for the Lahontan Region ..... 3.8-45

Table 3.8-13 Floodplains Crossed by the Bakersfield to Palmdale Project Section Build Alternatives ..... 3.8-49

Table 3.8-14 Acres Disturbed during Construction of the Bakersfield to Palmdale Project Section Build Alternatives..... 3.8-54

Table 3.8-15 Groundwater Basins Crossed by the Bakersfield to Palmdale Project Section Build Alternatives..... 3.8-61

Table 3.8-16 Acres of Impervious Surface Area ..... 3.8-67

Table 3.8-17 Proposed Drainage System..... 3.8-68

Table 3.8-18 Named Waterbodies Crossed by the Bakersfield to Palmdale Project Section Build Alternatives..... 3.8-70

Table 3.8-19 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Hydrology and Water Resources..... 3.8-98

Table 3.8-20 Summary of CEQA Significant Conclusions and Mitigation Measures for Hydrology and Water Resources ..... 3.8-103

Table 3.9-1 Regional and Local Policy Consistency Analysis Summary..... 3.9-7

Table 3.9-2 California Department of Transportation Paleontological Sensitivity Rating Criteria ..... 3.9-19

Table 3.9-3 Summary of Geologic Units Along the Bakersfield to Palmdale Project Section..... 3.9-24

Table 3.9-4 Soil Types in the Resource Study Area..... 3.9-34

Table 3.9-5 Paleontological Sensitivity Evaluation of Geologic Units in the Resource Study Area ..... 3.9-58

Table 3.9-6 Soils with Moderate and High Erosion Potential Disturbed during Construction (acres) ..... 3.9-65

Table 3.9-7 Acreage of Bakersfield to Palmdale Project Section Construction on Oil Fields ..... 3.9-67

Table 3.9-8 Number of Oil Wells within the Bakersfield to Palmdale Project Section Construction Footprint ..... 3.9-67

Table 3.9-9 Soils with Moderate and High Expansive Potential Crossed by the B-P Build Alternatives (acres)..... 3.9-73

Table 3.9-10 Soils with Moderate and High Corrosive Potential Crossed by the B-P Build Alternatives (acres).....	3.9-74
Table 3.9-11 Number of Fault Crossings Within the Bakersfield to Palmdale Project Section.....	3.9-78
Table 3.9-12 Bakersfield to Palmdale Project Section Mileage within Fault Zones.....	3.9-78
Table 3.9-13 Liquefaction Risk Areas Crossed by the B-P Build Alternatives (acres) .....	3.9-80
Table 3.9-14 Dam Inundation Zones Crossed by the B-P Build Alternatives (acres).....	3.9-81
Table 3.9-15 Comparison of B-P Build Alternative Impacts for Geology, Soils, and Seismicity.....	3.9-83
Table 3.9-16 Comparison of B-P Build Alternative Impacts for Paleontological Resources ...	3.9-91
Table 3.9-17 Summary of CEQA Significance Conclusions and Mitigation Measures for Geology, Soils, and Seismicity .....	3.9-92
Table 3.9-18 Summary of CEQA Significance Conclusions and Mitigation Measures for Paleontological Resources .....	3.9-94
Table 3.10-1 Regional and Local Policy Consistency Analysis Summary.....	3.10-6
Table 3.10-2 Ranking Applied to Potential Environmental Concern Sites in the Resource Study Area .....	3.10-8
Table 3.10-3 Summary of Potential Environmental Concern Sites by Ranking and Bakersfield to Palmdale Project Section Build Alternative .....	3.10-14
Table 3.10-4 Summary of Potentially High Potential Environmental Concern Sites Requiring Abatement of Building Materials .....	3.10-14
Table 3.10-5 Oil and Gas Wells in the Resource Study Area by Bakersfield to Palmdale Project Section Build Alternative .....	3.10-15
Table 3.10-6 Educational Facilities in Study Area (Project Footprint + 0.25 mile) .....	3.10-17
Table 3.10-7 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Hazardous Material and Wastes .....	3.10-32
Table 3.10-8 Summary of CEQA Significance Conclusions and Mitigation Measures for Hazardous Materials and Wastes.....	3.10-33
Table 3.11-1 Regional and Local Plans and Policies Analysis Summary .....	3.11-11
Table 3.11-2 Airport Land Use Plans.....	3.11-13
Table 3.11-3 Definition of Safety and Security Resource Study Area .....	3.11-14
Table 3.11-4 Emergency Services within the Resource Study Area for the Light Maintenance Facility/Maintenance of Infrastructure Siding Facilities/Maintenance-of-Way Facility .....	3.11-31
Table 3.11-5 Regional Law Enforcement.....	3.11-33
Table 3.11-6 Crime Rates in the Region.....	3.11-34
Table 3.11-7 Regional Fire Departments and Equipment .....	3.11-35
Table 3.11-8 Wildfire Activity within the Two-County Region .....	3.11-37
Table 3.11-9 B-P Build Alternatives and LMF/MOIS/MOWF in LRA/SRA Fire Severity Zones.....	3.11-37
Table 3.11-10 Pedestrian and Bicyclist Victims Killed or Injured Within Resource Study Area Jurisdictions (2016).....	3.11-39

Table 3.11-11 Adopted Bicycle Master Plans within Resource Study Area Jurisdictions ..... 3.11-39

Table 3.11-12 Airports and Heliports within the Resource Study Area ..... 3.11-41

Table 3.11-13 Educational Facilities (Schools) within 0.25 Mile of Project Footprint ..... 3.11-42

Table 3.11-14 Landfills within the Resource Study Area ..... 3.11-45

Table 3.11-15 Government Buildings within the Resource Study Area..... 3.11-46

Table 3.11-16 Designed Bed Space and Count for the California State Prison (Los Angeles)..... 3.11-46

Table 3.11-17 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Safety and Security..... 3.11-75

Table 3.11-18 Summary of CEQA Significance Conclusions and Mitigation Measures for Safety and Security ..... 3.11-78

Table 3.12-1 Local and Regional Plan Policy Consistency Analysis Summary ..... 3.12-9

Table 3.12-2 Definition of Resource Study Areas..... 3.12-13

Table 3.12-3 Population Growth (2000–2040)..... 3.12-28

Table 3.12-4 Number of Households and Average Household Size (2000)..... 3.12-37

Table 3.12-5 Number of Households and Average Household Size (2009–2013 American Community Survey)..... 3.12-37

Table 3.12-6 Household Composition (2010) ..... 3.12-38

Table 3.12-7 Community Cohesion Indicators..... 3.12-44

Table 3.12-8 Housing Characteristics (2009–2013 American Community Survey) ..... 3.12-46

Table 3.12-9 Housing Unit Tenure (2009–2013 American Community Survey) ..... 3.12-47

Table 3.12-10 Foreclosure Rate (April 2018) ..... 3.12-48

Table 3.12-11 Unemployment (April 2016)..... 3.12-53

Table 3.12-12 City Employment by Industry (2009–2013 American Community Survey) .... 3.12-54

Table 3.12-13 Local Government Revenues in the Indirect Impacts Resource Study Area for Population and Community Impacts ..... 3.12-58

Table 3.12-14 School Districts in the Indirect Impacts Resource Study Area for Population and Community Impacts..... 3.12-59

Table 3.12-15 Residential Displacements in the Palmdale Station Area ..... 3.12-85

Table 3.12-16 Gap Analysis of Residential Displacements in the Palmdale Station Area ... 3.12-85

Table 3.12-17 Business Displacements in the Palmdale Station Area..... 3.12-86

Table 3.12-18 Gap Analysis of Business Displacements in the Palmdale Station Area ..... 3.12-86

Table 3.12-19 Residential and Student Displacements in School Districts in the Palmdale Station Area ..... 3.12-89

Table 3.12-20 School District Revenue Losses in the Palmdale Station Area..... 3.12-90

Table 3.12-21 Estimated Property Tax Loss Associated with the Palmdale Station Site..... 3.12-91

Table 3.12-22 Estimated Changes in Property Tax Revenue Related to the Palmdale Station Site ..... 3.12-91

Table 3.12-23 Estimated Changes in Sales Tax Revenue Associated with the Palmdale Station Site ..... 3.12-92

Table 3.12-24 Construction Sales Tax Revenue per Year for the Palmdale Station Site .....	3.12-94
Table 3.12-25 Employment Impacts during Construction (in annual job years).....	3.12-109
Table 3.12-26 Residential Displacements Under Alternative 1 .....	3.12-111
Table 3.12-27 Gap Analysis of Residential Displacements Under Alternative 1 .....	3.12-112
Table 3.12-28 Residential Displacements Under Alternative 2/Preferred Alternative .....	3.12-114
Table 3.12-29 Gap Analysis of Residential Displacements Under Alternative 2/Preferred Alternative.....	3.12-114
Table 3.12-30 Residential Displacements Under Alternative 3 .....	3.12-115
Table 3.12-31 Gap Analysis of Residential Displacements Under Alternative 3 .....	3.12-116
Table 3.12-32 Residential Displacements Under Alternative 5 .....	3.12-117
Table 3.12-33 Gap Analysis of Residential Displacements Under Alternative 5 .....	3.12-118
Table 3.12-34 Business Displacements Under Alternative 1.....	3.12-118
Table 3.12-35 Gap Analysis of Business Displacements Under Alternative 1 .....	3.12-120
Table 3.12-36 Vacant Commercial/Industrial Land in Lancaster and Palmdale.....	3.12-121
Table 3.12-37 Business Displacements Under Alternative 2/Preferred Alternative .....	3.12-121
Table 3.12-38 Gap Analysis of Business Displacements Under Alternative 2/Preferred Alternative.....	3.12-123
Table 3.12-39 Business Displacements Under Alternative 3.....	3.12-124
Table 3.12-40 Gap Analysis of Business Displacements Under Alternative 3 .....	3.12-125
Table 3.12-41 Business Displacements Under Alternative 5.....	3.12-126
Table 3.12-42 Gap Analysis of Business Displacements Under Alternative 5 .....	3.12-127
Table 3.12-43 Agricultural Displacements Under Alternative 1 .....	3.12-129
Table 3.12-44 Agricultural Displacements Under Alternative 2 .....	3.12-130
Table 3.12-45 Agricultural Displacements Under Alternative 3 .....	3.12-131
Table 3.12-46 Agricultural Displacements under Alternative 5.....	3.12-132
Table 3.12-47 Community Facility Displacements by Bakersfield to Palmdale Project Section Build Alternative.....	3.12-133
Table 3.12-48 Alternatives 1, 2 and 3: Temporary Effects to Community Facilities Within 500 Feet of the Temporary and Permanent Effect Limits During Construction .....	3.12-136
Table 3.12-49 Alternative 5: Temporary Effects on Community Facilities Within 500 Feet of the Temporary and Permanent Effect Limits during Construction .....	3.12-138
Table 3.12-50 Residential and Student Displacements in School Districts for Alternative 1.....	3.12-139
Table 3.12-51 School District Revenue Losses under Alternative 1 .....	3.12-141
Table 3.12-52 Residential and Student Displacements in School Districts for Alternative 2/Preferred Alternative.....	3.12-142
Table 3.12-53 School District Revenue Losses under Alternative 2/Preferred Alternative .	3.12-143
Table 3.12-54 Residential and Student Displacements in School Districts for Alternative 3.....	3.12-145
Table 3.12-55 School District Revenue Losses under Alternative 3 .....	3.12-146

Table 3.12-56 Residential and Student Displacements in School Districts for Alternative 5..... 3.12-147

Table 3.12-57 School District Revenue Losses Under Alternative 5..... 3.12-149

Table 3.12-58 Existing Roads That Would Be Temporarily Closed at the High-Speed Rail Alignment During Construction of Alternatives 1, 3, and 5..... 3.12-150

Table 3.12-59 Locations of Temporary Detours during Construction of Alternative 2..... 3.12-151

Table 3.12-60 Crop Revenue and Job Losses in Kern County Related to Agricultural Production Affected by the Bakersfield to Palmdale Project Section ..... 3.12-152

Table 3.12-61 Estimated Changes in Property Tax Revenue Under Alternative 1 ..... 3.12-154

Table 3.12-62 Estimated Changes in Sales Tax Revenue Under Alternatives 1, 2, and 3. 3.12-155

Table 3.12-63 Estimated Changes in Property Tax Revenue Under Alternative 2/Preferred Alternative..... 3.12-156

Table 3.12-64 Estimated Changes in Property Tax Revenue Under Alternative 3 ..... 3.12-156

Table 3.12-65 Estimated Changes in Property Tax Revenue under Alternative 5 ..... 3.12-158

Table 3.12-66 Estimated Changes in Sales Tax Revenue Under Alternative 5 ..... 3.12-159

Table 3.12-67 Construction Sales Tax Revenue per Year under the Bakersfield to Palmdale Project Section Build Alternatives ..... 3.12-161

Table 3.12-68 Construction Sales Tax Revenue per Year for the Maintenance Facilities .. 3.12-162

Table 3.12-69 Regional Projected and Induced Population and Employment Growth ..... 3.12-166

Table 3.12-70 Direct, Indirect, and Induced Jobs by 2040 ..... 3.12-167

Table 3.12-71 Alternatives 1, 2, and 3: Permanent Effects on Community Facilities Within 500 Feet of the Temporary and Permanent Effect Limits ..... 3.12-171

Table 3.12-72 Alternative 5: Permanent Effects on Community Facilities Within 500 Feet of the Temporary and Permanent Effect Limits..... 3.12-172

Table 3.12-73 Summary of Findings on Effect of Rail Transit on Residential Real Estate Values..... 3.12-177

Table 3.12-74 Summary of Findings on Effect of Rail Transit on Commercial Real Estate Values ..... 3.12-178

Table 3.12-75 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Socioeconomics and Communities ..... 3.12-187

Table 3.12-76 Summary of CEQA Significance Conclusions and Mitigation Measures for Socioeconomics and Communities ..... 3.12-192

Table 3.13-1 Local and Regional Plan Policy Consistency Analysis Summary ..... 3.13-5

Table 3.13-2 Permanent Conversion of Existing Land Uses in the Fresno to Bakersfield Locally Generated Alternative ..... 3.13-19

Table 3.13-3 Permanent Conversion of Planned Land Uses in the Fresno to Bakersfield Locally Generated Alternative ..... 3.13-20

Table 3.13-4 Temporary Conversion of Existing Land Uses ..... 3.13-26

Table 3.13-5 Permanent Conversion of Existing Land Uses ..... 3.13-29

Table 3.13-6 Permanent Conversion of Planned Land Uses ..... 3.13-30

Table 3.13-7 Temporary Conversion of Planned Land Uses..... 3.13-32

Table 3.13-8 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Station Planning, Land Use, and Development.....	3.13-40
Table 3.13-9 Summary of CEQA Significance Conclusions and Mitigation Measures for Station Planning, Land Use, and Development.....	3.13-41
Table 3.14-1 Permanent Conversion of Important Farmland (acres).....	3.14-2
Table 3.14-2 Regional and Local Plans and Policies .....	3.14-7
Table 3.14-3 Policy Consistency Analysis Summary.....	3.14-8
Table 3.14-4 Summary of Bakersfield to Palmdale Project Section Stakeholder Outreach Meetings—Farmland .....	3.14-14
Table 3.14-5 Important Farmland and Grazing Land Acreage in Kern and Los Angeles Counties (2014) (acres).....	3.14-21
Table 3.14-6 Farmland Acres by Category within the Bakersfield to Palmdale Project Section Farmland Resource Study Area .....	3.14-22
Table 3.14-7 Farmland Conversions in Kern and Los Angeles Counties (2004–2016) .....	3.14-22
Table 3.14-8 Protected Farmland Acreage in Kern and Los Angeles Counties (2015) .....	3.14-23
Table 3.14-9 Williamson Act Contract Land Acres by Category within the Bakersfield to Palmdale Project Section Farmland Resource Study Area.....	3.14-23
Table 3.14-10 Affected Environment Summary by Region.....	3.14-31
Table 3.14-11 Important Farmland Temporarily Used for Construction of the Bakersfield to Palmdale Project Section Build Alternatives (Acres).....	3.14-36
Table 3.14-12 Williamson Act Contract Land Temporarily Used for Construction of the Bakersfield to Palmdale Project Section Build Alternatives (Acres).....	3.14-38
Table 3.14-13 Important Farmland Directly and Permanently Converted to Nonagricultural Use by Each Bakersfield to Palmdale Project Section Build Alternative Footprint (acres) .....	3.14-42
Table 3.14-14 Farmland Conversion Impact Rating (points).....	3.14-43
Table 3.14-15 Permanent Impacts to Important Farmland from Direct Impacts and Parcel Severance for the Bakersfield to Palmdale Project Section Build Alternatives (Acres) ..	3.14-44
Table 3.14-16 Important Farmland to Remain in Agricultural Use after Parcel Severance—Step 2 .....	3.14-46
Table 3.14-17 Permanent Impacts to Williamson Act Contract Land and Important Farmland under a Williamson Act Contract for the Bakersfield to Palmdale Project Section Build Alternatives (Acres).....	3.14-47
Table 3.14-18 Williamson Act Contract Land and Important Farmland under a Williamson Act Contract Reduced below the Minimum Parcel Size (Acres) .....	3.14-48
Table 3.14-19 Permanent Impacts to Land Zoned for Agricultural Use and Important Farmland Zoned for Agricultural Use for the Bakersfield to Palmdale Project Section Build Alternatives (Acres) .....	3.14-48
Table 3.14-20 Important Farmland Mitigation Calculations (Acres).....	3.14-54
Table 3.14-21 Comparison of the Bakersfield to Palmdale Project Section Build Alternative Impacts for Important Farmland .....	3.14-56
Table 3.14-22 Summary of CEQA Significance Conclusions and Mitigation Measures for Agricultural Lands .....	3.14-63



Table 3.15-1 Plans and Policies of Local Jurisdictions..... 3.15-5

Table 3.15-2 Parks and Recreation Resources within the Resource Study Areas for Alternatives 1, 2, 3, and 5..... 3.15-14

Table 3.15-3 School Recreation Facilities within the Resource Study Areas for Alternatives 1, 2, 3, and 5..... 3.15-18

Table 3.15-4 Parks, Recreation, and Open-Space Resources and School Play Areas and Recreation Facilities in the Resource Study Area for the Bakersfield Station–Fresno to Bakersfield (Locally Generated Alternative)..... 3.15-21

Table 3.15-5 Construction and Operations Impacts on Parks, Recreation, and School Play Area Resources before and after Mitigation under Alternatives 1, 2, 3, and 5 ..... 3.15-31

Table 3.15-6 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Parks and Recreation Resources..... 3.15-55

Table 3.15-7 Summary of CEQA Significance Conclusions and Mitigation Measures for Parks and Recreation Resources..... 3.15-61

Table 3.16-1 Regional and Local Policy Consistency Analysis Summary..... 3.16-4

Table 3.16-2 Key Visual Components and Affected Populations in the East Bakersfield Landscape Unit..... 3.16-13

Table 3.16-3 Key Visual Components and Affected Populations in the Edison/Rural Valley Landscape Unit..... 3.16-16

Table 3.16-4 Key Visual Components and Affected Populations in the Tehachapi Mountains West Landscape Unit..... 3.16-18

Table 3.16-5 Key Visual Components and Affected Populations in the Tehachapi Valley Landscape Unit..... 3.16-23

Table 3.16-6 Key Visual Components and Affected Populations in the Tehachapi Mountains East Landscape Unit..... 3.16-24

Table 3.16-7 Key Visual Components and Affected Populations in the West Mojave Landscape Unit..... 3.16-30

Table 3.16-8 Key Visual Components and Affected Populations in the Rosamond Rural Landscape Unit..... 3.16-32

Table 3.16-9 Key Visual Components and Affected Populations in the Lancaster-Palmdale Landscape Unit..... 3.16-34

Table 3.16-10 Summary of Visual Quality Changes and Impacts at Key Viewpoints ..... 3.16-45

Table 3.16-11 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Aesthetics and Visual Quality ..... 3.16-150

Table 3.16-12 Summary of CEQA Significance Conclusions and Mitigation Measures for Aesthetics and Visual Quality ..... 3.16-153

Table 3.17-1 Regional and Local Plans and Policies ..... 3.17-11

Table 3.17-2 Regional and Local Policy Consistency Analysis Summary..... 3.17-13

Table 3.17-3 Section 106 Technical Reports and Concurrence ..... 3.17-15

Table 3.17-4 Potentially Interested Parties Contacted Via Letter as of September 11, 2015..... 3.17-17

Table 3.17-5 Public and Agency Meetings (January 2012–September 2017) ..... 3.17-19

Table 3.17-6 Section 106 Consulting Party Meetings..... 3.17-25

Table 3.17-7 Summary of Outreach Efforts to Identify Native American Consulting/ Concurring Parties .....	3.17-27
Table 3.17-8 Consulting Parties in the Preparation of the Memorandum of Agreement .....	3.17-30
Table 3.17-9 Previously Recorded Archaeological Resources within the Area of Potential Effects .....	3.17-51
Table 3.17-10 Newly Identified Archaeological Resources within the Area of Potential Effects and Vicinity .....	3.17-53
Table 3.17-11 National Register of Historic Places-Listed and Eligible Built Resources Within the Area of Potential Effects .....	3.17-57
Table 3.17-12 Previously Identified Historic Properties (National Register of Historic Places) Bakersfield Station—F Street (Locally Generated Alternative) .....	3.17-69
Table 3.17-13 Previously Identified “CEQA-Only” Cultural Resources, Bakersfield Station—F Street (Locally Generated Alternative) .....	3.17-70
Table 3.17-14 Summary of Project Ground-Disturbing Actions with the Potential to Cause Adverse Effects to Archaeological Historic Properties .....	3.17-76
Table 3.17-15 Summary of Section 106 Effects Findings for Built Environment Historic Properties Within the Oswell Street to Palmdale Station Area of Potential Effects Segment .....	3.17-78
Table 3.17-16 Comparison of Bakersfield to Palmdale Project Section Build Alternative Effects on Historic Properties .....	3.17-93
Table 3.17-17 Summary of CEQA Significance Conclusions and Mitigation Measures for Cultural Resources .....	3.17-105
Table 3.18-1 Summary of Project Consistency with Regional and Local Plans and Policies .....	3.18-7
Table 3.18-2 Kern and Los Angeles Counties and Regional Employment by Industry 2000–2022 .....	3.18-14
Table 3.18-3 Regional Long-Range Employment Projections, 2015 and 2040 .....	3.18-15
Table 3.18-4 Labor Force Characteristics .....	3.18-15
Table 3.18-5 Population Increase in the Resource Study Area, 2000–2015 .....	3.18-17
Table 3.18-6 Population Projections in the Resource Study Area, 2015–2040 .....	3.18-17
Table 3.18-7 Existing and Projected Housing Units .....	3.18-18
Table 3.18-8 Employment Effects from B-P Build Alternatives during Construction (in annual job years) .....	3.18-22
Table 3.18-9 Employment Effects from Design Options (in annual job years) .....	3.18-22
Table 3.18-10 Direct, Indirect, and Induced Jobs by 2040 .....	3.18-25
Table 3.18-11 Projected and Induced Employment Growth .....	3.18-25
Table 3.18-12 Regional Projected and Induced Population Growth .....	3.18-27
Table 3.18-13 Regional Projected and Induced Housing Growth .....	3.18-28
Table 3.19-1 Resource Study Areas for Cumulative Impact Analysis .....	3.19-7
Table 3.19-2 Eastern Kern Air Pollution Control District Air Quality Attainment Status .....	3.19-15
Table 3.19-3 San Joaquin Valley Air Basin Air Quality Attainment Status .....	3.19-16

Table 3.19-4 Antelope Valley Air Quality Management District Air Quality Attainment Status.....	3.19-16
Table 3.19-5 Parkland Standards by Jurisdiction .....	3.19-23
Table 3.19-6 Population Projections for Counties and Cities Traversed by the Bakersfield to Palmdale Project Section, 2010–2040 .....	3.19-27
Table 3.19-7 Summary of Mitigation Measures .....	3.19-71
Table 3.19-8 Summary of Cumulative Construction Impacts .....	3.19-72
Table 3.19-9 Summary of Cumulative Operations Impacts .....	3.19-78
Table 4-1 Summary of the Section 4(f) Outreach Meetings, January 2012–March 2021 .....	4-12
Table 4-2 Summary Section 4(f) Consultation with Officials with Jurisdiction .....	4-14
Table 4-3 Public Parks and Recreation Resources Evaluated under Section 4(f) .....	4-34
Table 4-4 Bakersfield Station Alternatives—Public Parks and Recreation Resources Evaluated under Section 4(f) .....	4-45
Table 4-5 Properties Listed in, or Determined Eligible for, the National Register of Historic Places Evaluated under Section 4(f) .....	4-46
Table 4-6 Bakersfield Station Alternatives-Properties Listed in, or Determined or Recommended Eligible for, the National Register of Historic Places Evaluated under Section 4(f) .....	4-52
Table 4-7 Park and Recreation Resources Not Subject to Section 4(f) Requirements.....	4-53
Table 4-8 Summary of Authority Determinations under Section 4(f) at Park and Recreation Resources .....	4-65
Table 4-9 Summary of Section 4(f) Uses of National Register of Historic Places Listed or Eligible Properties.....	4-73
Table 4-10 Summary of Critical Differentiators Analysis from the Supplemental Alternatives Analysis Report.....	4-94
Table 4-11 Measures to Minimize Harm for Public Parks and Recreation Resources Evaluated under Section 4(f).....	4-99
Table 4-12 Measures to Minimize Harm for Built Environment Historic Properties Evaluated under Section 4(f).....	4-104
Table 4-13 Measures to Minimize Harm for Archaeological Historic Properties .....	4-112
Table 4-14 Least-Harm Analysis.....	4-119
Table 5-1 Local and Regional Plan Policy Compatibility Analysis Summary .....	5-8
Table 5-2 Population Within 0.5 Mile of the Bakersfield to Palmdale Project Section Build Alternatives .....	5-11
Table 5-3 Environmental Justice Reference Community and Resource Study Area Demographic Characteristics .....	5-14
Table 5-4 Summary of Areas of Concern during the Bakersfield to Palmdale Project Section Public Outreach Events.....	5-20
Table 5-5 Summary of Adverse Effects during Construction—Bakersfield to Palmdale Project Section Build Alternatives (including the CCNM Design Option and the Refined CCNM Design Option) .....	5-26
Table 5-6 Facilities of Concern for Low-Income Populations in Lancaster.....	5-36

Table 5-7 Summary of Visual Quality Changes and Impacts at Key Viewpoints .....	5-42
Table 5-8 Summary of Adverse Effects during Operation .....	5-48
Table 5-9 Noise Receptor Impacts by Alternative at Sensitive Noise Receptors—Low- Income and/or Minority Populations .....	5-51
Table 5-10 Mitigated Noise Receptor Impacts by Alternative at Sensitive Noise Receptors—Low-income and/or Minority Populations .....	5-52
Table 5-11 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts (including the CCNM Design Option and the Refined CCNM Design Option) During Construction .....	5-89
Table 5-12 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts (including the CCNM Design Option and the Refined CCNM Design Option) during Operation .....	5-93
Table 5-13 Summary of Palmdale Station Impacts during Construction .....	5-96
Table 5-14 Summary of Palmdale Station Impacts during Operation.....	5-98
Table 5-15 Summary of Environmental Justice Determinations .....	5-111
Table 6-1 Capital Costs of the B-P Build Alternatives from Bakersfield Station to Palmdale Station (2020\$ in millions) .....	6-3
Table 6-2 Annual Operations and Maintenance Costs for Phase 1 (2015\$ in millions) .....	6-6
Table 6-3 Annual Operations and Maintenance Costs Apportioned to the Bakersfield to Palmdale Project Section (2015\$ in millions) .....	6-7
Table 8-1 Comparison of Bakersfield to Palmdale Project Section Build Alternatives .....	8-12
Table 8-2 Bakersfield to Palmdale Alignment Alternatives Differentiators .....	8-20
Table 9-1 Summary of Bakersfield to Palmdale Project Section Key Stakeholder Outreach Meetings .....	9-24