

# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>ES-1</b>
<b>1.0 BACKGROUND AND PURPOSE AND NEED FOR PROPOSED ACTION.....</b>	<b>1-1</b>
1.1 Introduction.....	1-1
1.2 Document Structure .....	1-1
1.3 Project Background.....	1-2
1.3.1 Existing Facilities and Operation.....	1-2
1.4 Purpose and Need for the Project/Action.....	1-3
1.5 Project Objectives .....	1-10
1.6 Management Goals .....	1-10
1.7 Decisions to be Made.....	1-11
1.8 Summary of Public Scoping Process .....	1-12
1.8.1 Public Scoping .....	1-12
1.8.2 Issues and Concerns Addressed in this Document.....	1-12
1.8.3 Issues and Concerns Not Addressed in this Document.....	1-13
1.9 EA/IS Joint Document and Role of Agencies.....	1-14
1.9.1 State and Federal Lead Agencies.....	1-14
1.9.2 Relationship to Other Plans .....	1-14
1.9.3 Planning Context.....	1-15
<b>2.0 PROPOSED PROJECT/ACTION AND ALTERNATIVES.....</b>	<b>2-1</b>
2.1 Introduction.....	2-1
2.2 Composite Facilities Comprising the Proposed Project/Preferred Alternative.....	2-2
2.2.1 Overall Construction Phasing and Schedule.....	2-36
2.2.2 Construction Methods and Equipment.....	2-36
2.3 Proposed Project Components .....	2-37
2.3.1 New Sites .....	2-37
2.4 Overview of the Alternatives .....	2-53
2.4.1 Alternative 1 – No Action.....	2-53
2.4.2 Alternative 2 – Preferred Alternative: Poopenaut Pass Site 9, Burnout Ridge, Cherry Tower Site .....	2-54
2.4.3 Alternative 3 –Poopenaut Pass, Site 7 .....	2-55
2.5 Alternatives Considered But Dismissed .....	2-55
2.5.1 Alternative Site Locations .....	2-55
2.5.2 Duckwall Mountain .....	2-56
2.5.3 North Mountain.....	2-56
2.5.4 Woods Ridge .....	2-56
2.5.5 Inspiration Point.....	2-56
2.5.6 Poopenaut Pass Sites.....	2-57
2.5.7 Alternative Communication Systems/Technology .....	2-60
2.5.8 Alternative Tower Designs .....	2-60
2.6 Comparison of Alternatives .....	2-60
2.7 Environmentally Preferable Alternative .....	2-69
2.8 Actions Common to All Action Alternatives.....	2-71
2.9 Mitigation Measures Common to All Alternatives.....	2-71
2.10 Mitigation Measures Specific to Alternatives.....	2-71

<b>3.0</b>	<b>AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES...</b>	<b>3-1</b>
3.1	Introduction.....	3-1
	3.1.1 Cumulative Impacts .....	3-1
	3.1.2 Impairment.....	3-2
3.2	Resource Topics Considered in this Environmental Assessment/Initial Study .....	3-2
	3.2.1 Natural Resources .....	3-2
	3.2.2 Cultural Resources .....	3-3
	3.2.3 Social Resources .....	3-3
	3.2.4 CEQA Specific .....	3-4
3.3	Impact Topics Dismissed From Further Analysis.....	3-4
	3.3.1 Wilderness Experience .....	3-4
	3.3.2 Environmental Justice.....	3-4
	3.3.3 Socioeconomics .....	3-4
	3.3.4 Wetlands .....	3-5
	3.3.5 Wind and Shadow.....	3-5
3.4	Regional Setting.....	3-5
3.5	Local Setting.....	3-5
3.6	Impact Analysis .....	3-9
	3.6.1 NEPA Thresholds .....	3-9
	3.6.2 CEQA Significance Criteria .....	3-10
3.7	Compatibility With Existing Zoning and Plans .....	3-10
	3.7.1 Regulatory Framework .....	3-11
	3.7.2 Applicable Plans and Policies.....	3-12
	3.7.3 Impacts.....	3-16
	3.7.4 Plan Consistency Evaluation .....	3-17
3.8	Natural Resources .....	3-18
	3.8.1 Geology, Geohazards and Soils .....	3-19
	3.8.2 Hydrology, Floodplains, and Water Quality Affected Environment .....	3-35
	3.8.3 Vegetation.....	3-48
	3.8.4 Wildlife .....	3-58
	3.8.5 Rare, Threatened and Endangered Species .....	3-77
	3.8.6 Air Quality .....	3-105
	3.8.7 Noise .....	3-118
3.9	Cultural Resources.....	3-143
3.10	Social Resources .....	3-176
	3.10.1 Land Use/Relationship to Other Plans.....	3-176
	3.10.2 Visual/Scenic Resources.....	3-191
	3.10.3 Visitor Experience and Recreation .....	3-269
	3.10.4 Transportation.....	3-276
	3.10.5 Population and Housing.....	3-285
	3.10.6 Utilities and Service Systems .....	3-289
	3.10.7 Public Services.....	3-293
	3.10.8 Hazards and Hazardous Materials .....	3-296
	3.10.9 Mineral and Energy Resources .....	3-303
	3.10.10 Agricultural Resources .....	3-306
3.11	Mandatory Findings of Significance.....	3-310
<b>4.0</b>	<b>MITIGATION MEASURES.....</b>	<b>4-1</b>
4.1	Geology.....	4-1
4.2	Hydrology .....	4-1
4.3	Vegetation.....	4-2

4.4	Rare, Threatened and Endangered Species .....	4-2
4.5	Noise .....	4-4
4.6	Cultural Resources .....	4-4
4.7	Land Use .....	4-7
4.8	Visual .....	4-7
4.9	Visitor Experience and Recreation .....	4-7
4.10	Transportation .....	4-8
4.11	Hazards and Hazardous Materials .....	4-8
<b>5.0</b>	<b>WILD AND SCENIC RIVER ACT COMPLIANCE.....</b>	<b>5-1</b>
5.1	Introduction.....	5-1
5.2	Wild and Scenic Rivers Act.....	5-1
5.2.1	Tuolumne River Wild and Scenic River .....	5-2
5.2.2	Consistency with Management Elements of the Tuolumne River Wild and Scenic River Management Plan .....	5-3
5.2.3	Wild and Scenic Rivers Act Section 7 Determination.....	5-3
<b>6.0</b>	<b>CONSULTATION AND COORDINATION.....</b>	<b>6-1</b>
6.1	Compliance with Federal Executive Orders .....	6-1
6.2	Regulatory Compliance Requirements .....	6-2
6.2.1	Federal Laws.....	6-2
6.2.2	State Laws.....	6-5
6.3	NEPA Project Scoping History.....	6-6
6.4	Public Review .....	6-7
6.5	Agency and Government Coordination .....	6-8
6.6	Future Information.....	6-10
<b>7.0</b>	<b>LIST OF PREPARERS AND REVIEWERS.....</b>	<b>7-1</b>
<b>8.0</b>	<b>GLOSSARY AND ACRONYMS .....</b>	<b>8-1</b>
8.1	Glossary of Terms.....	8-1
8.2	Acronyms.....	8-10
<b>9.0</b>	<b>BIBLIOGRAPHY .....</b>	<b>9-1</b>

## APPENDICES

- Appendix A – Cumulative Projects List
- Appendix B – CEQA Initial Study Checklist
- Appendix C – Tuolumne W&SR Section 7 Determination
- Appendix D – Communication Systems Technical Requirements

## LIST OF FIGURES

Figure 1-1	Existing Microwave System .....	1-5
Figure 1-2	Regional Project Area .....	1-8
Figure 2-1	Site Location Key .....	2-5
Figure 2-2	Conceptual System Configuration .....	2-7
Figure 2-3	Conceptual System Configuration (New Sites Subsystem) .....	2-8
Figure 2-4	Oakdale Area .....	2-16
Figure 2-5	Oakdale Area (Aerial) .....	2-17
Figure 2-6	Moccasin Area .....	2-18
Figure 2-7	Moccasin Area – West (Aerial) .....	2-19
Figure 2-8	Moccasin Area – East (Aerial) .....	2-20
Figure 2-9	Duckwall Mountain .....	2-21
Figure 2-10	Duckwall Mountain (Aerial) .....	2-22
Figure 2-11	Early Intake & Tuolumne River Area .....	2-23
Figure 2-12	Tuolumne/Intake – West Area (Aerial) .....	2-24
Figure 2-13	Tuolumne/Intake – Cherry Creek (Aerial) .....	2-25
Figure 2-14	Tuolumne/Intake – Upstream Area (Aerial) .....	2-26
Figure 2-15	Cherry Lake & Lake Eleanor Area .....	2-27
Figure 2-16	Cherry Lake/Lake Eleanor Area – South (Burnout Ridge Site Aerial) .....	2-28
Figure 2-17	Cherry Lake – Dam Area (Aerial) .....	2-29
Figure 2-18	Cherry Lake – East Shore (Aerial) .....	2-30
Figure 2-19	Lake Eleanor Area (Aerial) .....	2-31
Figure 2-20	Poopenaut Pass & O’Shaughnessy Area .....	2-32
Figure 2-21	Poopenaut Pass (Aerial) .....	2-33
Figure 2-22	Poopenaut Valley (Aerial) .....	2-34
Figure 2-23	O’Shaughnessy Dam Area (Aerial) .....	2-35
Figure 2-24	Poopenaut Pass Sites .....	2-59
Figure 3.8.7-1	Typical Noise Levels .....	3-120
Figure 3.10.2-1	North-facing view of Warnerville Switchyard from Warnerville Road .....	3-193
Figure 3.10.2-2	Southeast-facing view of Moccasin Powerhouse .....	3-193
Figure 3.10.2-3	View of Cherry Lake from shore .....	3-195
Figure 3.10.2-4	South-facing view from Cherry Lake Dam .....	3-195
Figure 3.10.2-5	Northeast-facing view from Intake Radio Site .....	3-197
Figure 3.10.2-6	North-facing view of Cherry Lake from Burnout Ridge .....	3-197
Figure 3.10.2-7	North-facing view of Lake Eleanor from Lake Eleanor Dam .....	3-198
Figure 3.10.2-8	South-facing view from Lake Eleanor Dam .....	3-198
Figure 3.10.2-9	Northwest-facing view of Hetch Hetchy from Poopenaut Pass .....	3-199
Figure 3.10.2-10	Examples of typical terrain at Poopenaut Pass .....	3-200
Figure 3.10.2-11a	Photo Simulation Viewpoints Warnerville Switchyard .....	3-204
Figure 3.10.2-11b	Photo Simulation Viewpoints Lake Eleanor Dam Level Gauge and Lake Eleanor-Cherry Lake Tunnel .....	3-205
Figure 3.10.2-11c	Photo Simulation Viewpoints Poopenaut Pass .....	3-206
Figure 3.10.2-11d	Photo Simulation Viewpoints Cherry Pump Station .....	3-207

Figure 3.10.2-11e	Photo Simulation Viewpoints Cherry Lake Tower Site .....	3-208
Figure 3.10.2-11f	Photo Simulation Viewpoints Intake Radio Site .....	3-209
Figure 3.10.2-11g	Photo Simulation Viewpoints Burnout Ridge .....	3-210
Figure 3.10.2-12	Simulated View of Warnerville Switchyard (Viewpoint WSY-1) .....	3-214
Figure 3.10.2-13	Simulated View of Lake Eleanor Dam Level Gauge (Viewpoint EDS-1) .....	3-216
Figure 3.10.2-14	Simulated View of Lake Eleanor-Cherry Lake Tunnel (Viewpoint ECT-1) .....	3-218
Figure 3.10.2-15	Simulated View of Lake Eleanor-Cherry Lake Tunnel (Viewpoint ECT-2) .....	3-220
Figure 3.10.2-16	Simulated View of Poopenaut Pass (Viewpoint PPP-1) .....	3-224
Figure 3.10.2-17	Simulated View of Poopenaut Pass (Viewpoint PPP-2) .....	3-226
Figure 3.10.2-18	Simulated View of Poopenaut Pass (Viewpoint PPP-3) .....	3-228
Figure 3.10.2-19	Simulated View of Poopenaut Pass (Viewpoint PPP-4) .....	3-230
Figure 3.10.2-20	Simulated View of Cherry Pump Station (Viewpoint CPS-1) .....	3-234
Figure 3.10.2-21	Simulated View of Cherry Pump Station (Viewpoint CPS-2) .....	3-236
Figure 3.10.2-22	Simulated View of Cherry Tower Site (Viewpoint CTS-1) .....	3-240
Figure 3.10.2-23	Simulated View of Cherry Tower Site (Viewpoint CTS-2) .....	3-242
Figure 3.10.2-24	Simulated View of Intake Radio Site (Viewpoint IRS-1) .....	3-246
Figure 3.10.2-25	Simulated View of Intake Radio Site (Viewpoint IRS-2) .....	3-248
Figure 3.10.2-26	Simulated View of Burnout Ridge (Viewpoint BOR-1) .....	3-250
Figure 3.10.2-27	Simulated View of Burnout Ridge (Viewpoint BOR-2) .....	3-252
Figure 3.10.2-28	Simulated View of Burnout Ridge (Viewpoint BOR-3) .....	3-254
Figure 3.10.2-29	Simulated View of Burnout Ridge (Viewpoint BOR-4) .....	3-256
Figure 3.10.2-30	Simulated View of Poopenaut Pass Alternative Site (Viewpoint PPP Alt 3) .....	3-260
Figure 3.10.2-31	Simulated View of Poopenaut Pass Alternative Site (Viewpoint PPP Alt 3) .....	3-262
Figure 3.10.2-32	Simulated View of Poopenaut Pass Alternative Site (Viewpoint PPP Alt 3) .....	3-264
Figure 3.10.2-33	Simulated View of Poopenaut Pass Alternative Site (Viewpoint PPP Alt 3) .....	3-266

## LIST OF TABLES

Table 2-1 Project Site Information and Proposed Changes .....	2-9
Table 2-1 Summary of Environmental Consequences .....	2-61
Table 3.5-1 Location of Proposed Sites .....	3-6
Table 3.8.4-1 Stanislaus National Forest Management Indicator Species and Selection of Management Indicator Species for Project-Level Analysis for the Hetch Hetchy Communication System Upgrade Project .....	3-60
Table 3.8.5-1 Rare, Threatened and Endangered Plant Species with Potential to Occur at Project Sites .....	3-83
Table 3.8.5-2 Rare, Threatened and Endangered Animal Species Known or with Potential to Occur at or Near the Project Sites.....	3-83
Table 3.8.5-3 Rare, Threatened and Endangered Animal Species Excluded from Further Analysis .....	3-87
Table 3.8.6-1 Summary of Modeled Worst-Case Construction-Related Criteria Air Pollutant and Precursor Emissions .....	3-110
Table 3.8.7-1 Subjective Reaction to Changes in Noise Levels of Similar Sources.....	3-121
Table 3.8.7-2 Human Response to Groundborne Vibration Levels.....	3-123
Table 3.8.7-3 Summary of Land Use Noise Compatibility Guidelines .....	3-126
Table 3.8.7-4 Stanislaus County General Plan Noise Level Performance Standards Shown (dBA).....	3-127
Table 3.8.7-5 Stanislaus County General Plan Maximum Allowable Noise Exposure – Stationary Sources (dBA).....	3-127
Table 3.8.7-6 Maximum Allowable Noise Exposure Stationary Noise Sources .....	3-128
Table 3.8.7-7 Significance Standards for Cumulative Increases in Ambient Noise Levels .....	3-128
Table 3.8.7-8 Typical Construction Equipment Noise Levels.....	3-131
Table 3.8.7-9 Typical Vibration Levels for Construction Equipment .....	3-137
Table 3.9-1. Cultural Resources in the Moccasin Site Vicinity .....	3-152
Table 3.9-2. Cultural Resources in the O’Shaughnessy Site Vicinity .....	3-152
Table 3.9-3. Cultural Resources in the Cherry, Lake Eleanor, Burnout Ridge, and Duckwall Mountain Site Vicinities .....	3-153
Table 3.9-4. Cultural Resources in the Duckwall Mountain, Holm, Jones Point, Intake Switchyard, and Kirkwood Site Vicinities .....	3-153
Table 3.10.1-1 Stanislaus National Forest Management Area Descriptions by Project Sites.....	3-181
Table 3.10.1-2 Consistency with Policies in Yosemite National Park Management Plan.....	3-185
Table 3.10.1-3 Consistency with Forestwide Standards and Guidelines .....	3-189