Draft Environmental Impact Statement for the Quartzsite Solar Energy Project and Proposed Yuma Field Office Resource Management Plan Amendment

DOE/EIS – 0440

Lead Agency:

U.S. Department of Energy, Western Area Power Administration

Cooperating Agencies:

U.S. Department of the Interior, Bureau of Land Management , Yuma Field Office
U.S. Army Corps of Engineers
U.S. Army Garrison, Yuma Proving Grounds
Arizona Department of Environmental Quality
Arizona Game and Fish Department

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Western
AREA POWER ADMINISTRATION

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ABSTRACT

Lead Federal Agency: U.S. Department of Energy, Western Area Power Administration (Western)

Cooperating Agencies: Bureau of Land Management (BLM) Yuma Field Office (YFO), U.S. Army Corps of Engineers, U.S. Army Garrison – Yuma Proving Grounds, Arizona Game and Fish Department, and the Arizona Department of Environmental Quality

Title: Draft Environmental Impact Statement for the Quartzite Solar Energy Project and Proposed Yuma Field Office Resource Management Plan, La Paz County, Arizona DOE/EIS – 0440

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Abstract: Quartzsite Solar Energy (QSE) has submitted an application to Western to interconnect the Quartzsite Solar Energy Project (Project), a proposed 100-megawatt concentrating solar power plant, to Western's transmission system at the Bouse-Kofa 161-kilovolt transmission line.

QSE has submitted a right-of-way application to the BLM for the Project facility to be constructed on a total of approximately 1,675 acres of land managed by the BLM. The Project area is in an undeveloped area of Sonoran Desert in La Paz County, Arizona on the east side of State Route 95 approximately 10 miles north of Quartzsite, Arizona.

This Draft EIS includes information pertaining to the construction, operation, and maintenance of the proposed Project and alternatives as well as the RMP amendment under consideration by the BLM YFO. This document was prepared in accordance with the National Environmental Policy Act of 1969, as amended; the Federal Land Policy and Management Act of 1976, as amended; implementing regulations; the BLM's Land Use Planning Handbook (H-1601-1); and other applicable laws and policies.

Comments on this Draft EIS should be sent to Ms. Liana Reilly at the Western address above. Comments must be postmarked no later than the expiration of the 90-day comment period announced in the U.S. Environmental Protection Agency's Notice of Availability for this Draft EIS.

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AAC	Arizona Administrative Code
ACEC	Area of Critical Environmental Concern
ADC	Arizona Department of Commerce
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
amsl	above mean sea level
ANPL	Arizona Native Plant Law
APE	Area of Potential Effect
Applicant	Quartzsite Solar Energy, LLC
ARS	Arizona Revised Statute
ASM	Arizona State Museum
AUM	Animal Unit Month
AZGFD	Arizona Game and Fish Department
AZHGIS	Arizona Heritage Geographic Information System
AZPDES	Arizona Pollution Discharge Elimination System
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CO	carbon monoxide
CO_{2eq}	carbon dioxide equivalent
CSP	concentrating solar power
CWA	Clean Water Act
dBA	A-weighted decibel
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy

DOI	U.S. Department of the Interior
EIS	environmental impact statement
EMT	emergency medical technician
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act of 1976
GHG	greenhouse gas
GIS	geographic information system
gpd/ft	gallons per day per foot
gpm	gallons per minute
HTF	heat transfer fluid
I	Interstate
IPCC	Intergovernmental Panel on Climate Change
IM	Instruction Memorandum
KOP	key observation point
kV	Kilovolt
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
LGIP	Large Generator Interconnection Procedures
LOS	level of service
LTVA	Long-term Visitor Area
MBTA	Migratory Bird Treaty Act
$\mu g/m^3$	microgram per cubic meter
mg/L	milligram per liter
mg/m^3	milligram per cubic meter
mph	miles per hour
MW	megawatt
MWh	megawatt hour

N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1970
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act of 1966
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
OATT	Open Access Transmission Tariffs
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PFYC	Potential Fossil Yield Classification
PHF	peak hour factors
PL	Public Law
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppm	parts per million
Project	Quartzsite Solar Energy Project
PV	photovoltaic
QSE	Quartzsite Solar Energy, LLC
RMP	Resource Management Plan
RO	reverse osmosis
ROD	Record of Decision
ROI	Region of Influence
RV	recreational vehicle
SCF	standard cubic feet
SF_6	sulfur hexafluoride
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office

SLRU	Sensitivity Level Rating Unit
SMA	Special Management Area
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SQRU	Scenic Quality Rating Unit
SR	State Route
SRMA	Special Recreation Management Area
STEL	Short-term Exposure Limit
SWPPP	Stormwater Pollution Prevention Plan
SWTE	Southwest Traffic Engineering
TLV	Threshold Limit Value
TWA	Time Weighted Average
USACE	U.S. Army Corps of Engineers
USAG-YMP	U.S. Army Garrison – Yuma Proving Grounds
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compounds
vph	vehicles per hour
VRI	Visual Resource Inventory
VRM	Visual Resource Management
Western	Western Area Power Administration
WHA	Wildlife Habitat Management Area
WSA	Wilderness Study Area
WSC	Wildlife Species of Concern
YFO	Yuma Field Office

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EXECUTIVE SUMMARY

The following summarizes the Draft Environmental Impact Statement for the Quartzsite Solar Energy Project (Project or Applicant's Proposed Project) and Yuma Field Office (YFO) Resource Management Plan (RMP) Amendment. This information is provided as a convenient synopsis, but should not be considered a substitute for review of the complete Draft EIS. This summary provides a general overview of the Applicant's Proposed Project and alternatives, briefly describes the Federal agencies actions, and summarizes impacts for key resources associated with the Applicant's Proposed Project and the alternatives.

Quartzsite Solar Energy, LLC (QSE or Applicant), has applied to Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), to interconnect the Project, a proposed concentrating solar power (CSP) plant, to Western's transmission system at the Bouse-Kofa 161-kilovolt (kV) transmission line.

In addition, QSE has applied to the Bureau of Land Management (BLM) YFO for a right-of-way (ROW) (BLM Serial Number AZA-34666) on Federal land to construct, operate, maintain, and decommission the Project and ancillary linear facilities. The Project would be located on BLM-administered land east of State Route (SR) 95, approximately 10 miles north of Quartzsite, Arizona, in La Paz County.

For the BLM to approve the ROW request for the Applicant's Proposed Project, it must be able to determine that the Project is in conformance with the YFO RMP. As explained in Section 4.16, a visual contrast rating analysis conducted for the Project determined a strong contrast to the landscape, due to the height of the solar receiver tower (653 feet), the receivers' glow during daylight hours, and proximity to SR 95. As such, the Project, as proposed, is not in conformance with the YFO RMP Visual Resource Management (VRM) Class III management objectives. The objective of Class III designation is to partially retain the existing character of the landscape; level of change to the characteristic landscape should be moderate. Therefore, in connection with its processing of QSE's ROW request, the BLM is also considering a concurrent amendment to the YFO RMP, which would change the management of approximately 6,800 acres of the YFO RMP from a VRM Class III to a VRM Class IV designation. As a result of the analysis in this Draft EIS, the BLM could (1) approve the proposed plan amendment to change the VRM designation and grant the ROW; (2) approve the proposed plan amendment and deny QSE's ROW request, which would allow for future activities with a strong visual contrast to occur in that area; or (3) deny the proposed plan amendment and ROW grant. The BLM's proposed plan amendment and plan amendment alternatives, including plan amendment alternatives considered but eliminated from further analysis, are described in Appendix A to this Draft EIS.

The ROW application was submitted for 26,273 acres; however, the footprint of the Project would occupy approximately 1,675 acres of that total application area. Following the necessary environmental impact analyses and the completion of more detailed engineering, the ROW application would be amended to reflect actual acreage needed for Project construction and operations.

This Draft EIS and Proposed YFO RMP Amendment has been prepared under the direction of Western as the lead Federal agency, with the BLM YFO, the U.S. Army Corps of Engineers

(USACE), the U.S. Army Garrison–Yuma Proving Ground (USAG–YPG), Arizona Game and Fish Department (AZGFD), and the Arizona Department of Environmental Quality (ADEQ) as cooperating agencies.

ES-1 PROJECT OVERVIEW

QSE, an affiliate of SolarReserve, LLC, is proposing to construct, own, and operate the Project. The Project would be capable of producing approximately 450 gigawatt-hours of renewable energy annually, with a nominal net generating capacity of 100 megawatts (MW). QSE's proprietary concentrating solar thermal technology uses a field of heliostats (elevated mirrors guided by a tracking system) to focus sunlight onto a receiver erected in the center of the solar field (the central receiver). Each heliostat tracks the sun throughout the day and reflects the solar energy to the central receiver. The Project features thermal energy storage that allows solar energy to be captured throughout the day and retained in a liquid salt heat transfer fluid. When electricity is generated, the hot liquid salt is used to generate electricity in a conventional steam turbine cycle that would utilize an air-cooled condenser to minimize water consumption.

Major Project components include:

- 653-foot-tall central receiver and solar collecting tower (includes a 15-foot-tall maintenance crane on top of the tower)
- Up to 17,500 heliostats (mirrors)
- A conventional steam turbine generator
- Insulated storage tanks for hot and cold liquid (molten) salt
- Ancillary tanks (service/fire water, demineralized water, etc.)
- Evaporation ponds (size would vary, dependent upon the cooling mechanism selected)
- Temporary construction laydown area
- Ancillary buildings (e.g., maintenance, administration, warehouse)
- Water treatment building
- Operations and control building
- Switchyard (at the interconnection point with Western's transmission line)
- Transformers and 161/230-kV electrical substation (onsite)
- A 1.5-mile long 161/230-kV overhead transmission line
- A 1.5-mile long overhead line to provide auxiliary power to the Project area
- An access road from SR 95 to the solar field
- Water wells and a water supply pipeline (onsite)

The construction of the Project would begin once all applicable approvals and permits have been obtained. QSE anticipates Project construction, from site preparation and grading to commercial operation, would take approximately 30 months.

ES-1.1 Applicant's Objective

Both population growth and legislative policy, at the State and National levels, have increased the demand for development of additional renewable energy resources. Over the past 20 years, the southwestern United States experienced tremendous growth. Between 2000 and 2005, Arizona’s population increased by 16 percent (U.S. Census Bureau 2005). This growth rate is second only to Nevada, which showed a 21 percent increase over that same time period. As the demand for power continues to grow in these states and fossil-fuel plants reach the end of their useful lives, there will be a need to provide on-peak and renewable power to the electrical grid.

The increasing demand for renewable electrical power in the southwestern United States is also being driven by regulatory policy. In Arizona, the market for renewable energy is framed by the Renewable Energy Standard, adopted by the Arizona Corporation Commission in 2006. The Renewable Energy Standard requires regulated utilities to generate at least 15 percent of their energy from renewable resources by 2025 (DOE 2010).

Other states in the Southwest have implemented similar requirements for renewable energy. California’s Renewable Portfolio Standard requires utilities to serve 20 percent of their demand with renewable energy by 2010, with the additional requirement of reaching 33 percent renewable energy by 2020. Nevada has a Renewable Portfolio Standard of 25 percent by 2025, with additional stipulations on the renewable technology used: A minimum of 6 percent of the power must be provided by solar resources (DOE 2010).

In consideration of these mandates, the Applicant is proposing to develop a project that would respond to a need for increased renewable energy resources throughout Arizona and the Southwest, due to population growth and renewable energy requirements established by State (e.g., portfolio standards) and Federal (e.g., Energy Policy Act) policy. In addition, the Project would contribute much needed on-peak power to the electrical grid that serves the western United States, as demand for power continues to grow in these states.

ES-2 PURPOSE AND NEED FOR ACTION

ES-2.1 Western Area Power Administration Purpose and Need

QSE proposes to interconnect its Project with Western’s Bouse-Kofa 161-kV transmission line. Western’s purpose and need is to approve or deny the interconnection request in accordance with its Open Access Transmission Service Tariff and the Federal Power Act, as amended.

ES-2.2 Bureau of Land Management Purpose and Need

The BLM’s purpose and need for this action is to respond to QSE’s application under Title V of the Federal Land Policy and Management Act of 1976, as amended (FLPMA) (43 United States Code [USC] § 1761), for a ROW grant to construct, operate, maintain, and decommission a solar thermal generation power plant and ancillary facilities in compliance with FLPMA, BLM ROW regulations, and other applicable Federal and State laws. As part of this EIS, the BLM is also considering a concurrent amendment to the YFO RMP to change the VRM class designation of 6,800 acres of BLM managed land from Class III to Class IV. The area within the YFO subject to the plan amendment is shown on Figure 1-2 (see Chapter 1). Thus the BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to QSE for the Project. If the BLM decides to approve the issuance of a ROW grant for the Project or Alternative 1, the YFO RMP amendment would also be required.

ES-3 APPLICANT'S PROPOSED PROJECT AND ALTERNATIVES

ES-3.1 No Action Alternative

NEPA regulations require that EIS alternative analyses "include the alternative of no action" (40 CFR §1502.14[d]). The No Action Alternative must be included in the analysis so that the EIS clearly evaluates the consequences between the alternative methods of developing the Project and the option of no development. In other words, the No Action Alternative provides a useful baseline for comparison of the environmental effects of the other alternatives. For this analysis, the No Action Alternative assumes that no actions associated with the Project would occur: The BLM would not issue a ROW grant or amend the YFO RMP, and Western would deny the interconnection request.

ES-3.2 Applicant's Proposed Project – Dry-Cooled

The Applicant's Proposed Project includes the construction and operation of a 100-MW dry-cooled CSP facility, which uses heliostats/reflecting mirrors to redirect sunlight onto a receiver erected in the center of the solar field (the solar collecting tower). The electric output of the plant would be provided entirely by solar energy. No electricity would be generated by the use of fossil fuel. Major Project components are listed in Section ES-1.

Water needs for a dry-cooled CSP facility are estimated at 200 acre-feet per year and include three primary uses:

- Steam cycle makeup water – estimated at 100 acre-feet per year
- Mirror wash water – estimated at 70 acre-feet per year
- Other uses including a wet-surface air cooler for auxiliary equipment, service water, quench water – estimated at up to 30 acre-feet per year

Dry cooling does not eliminate water consumption but significantly reduces it. The dry-cooled system receives exhaust steam from the steam turbine, where the steam is piped through a transfer duct to a finned-tube air-cooled condenser. The air-cooled condenser blows ambient air across a heat transfer surface area, which cools and condenses the exhaust steam. While dry-cooling technology is more expensive to build and operate compared with wet-cooling, its ability to significantly reduce water consumption in the locally arid environment makes it the Applicant's preferred cooling technology for the Project.

Three 4-acre evaporation ponds would be necessary to facilitate disposal of the plant's industrial wastewater. Industrial wastewater is generated from the water treatment operation (from the reverse osmosis system pre-treatment of groundwater) and the steam cycle blowdown.

All plant facilities would be designed, constructed, and operated in accordance with applicable laws, ordinances, regulations, and standards. All generating facilities would be located within the facility fence line.

ES-3.3 Alternative 1 – Hybrid-Cooled

Alternative 1 – Hybrid-Cooled would incorporate similar construction, operational, decommissioning, and reclamation components as the Applicant's Proposed Project, but would use an alternative cooling technology. A hybrid cooling system typically includes two cooling towers, one dry-cooling tower, more commonly referred to as an air-cooled condenser (ACC) and one (small) conventional wet-cooling tower designed to operate in parallel as one system.

Hybrid systems use less water than a wet-cooled system, but more than a dry-cooled one. Turbine efficiency would be between that of a wet-cooled and a dry-cooled system. Operational water requirements for Alternative 1 would be up to 600 acre-feet per year and would require an approximately 18-acre evaporation pond surface area for processing wastewater disposal. Water use would depend largely on site conditions, water quality, and the efficiency of the air-cooled condenser and the cooling tower.

ES-3.4 Agency-Preferred Alternative for the Applicant's Proposed Project

The Agency-Preferred Alternative is the alternative that the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. Western and the BLM do not have an Agency-Preferred Alternative at this time.

ES-4 OTHER PROJECT ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Several Project alternatives were considered during the EIS process but eliminated from detailed analysis. The specific alternatives that were eliminated from detailed analysis are discussed in Section 2.3, along with the rationale for their elimination. They include 1) a solar facility with reduced power output and/or Project configuration, 2) alternative sites, and 3) use of an alternative power generating technology.

ES-5 BLM'S PROPOSED PLAN AMENDMENT

In connection with the Applicant's Proposed Project, the BLM is also considering a concurrent amendment to the YFO RMP. The proposed RMP amendment and alternatives are summarized below and discussed in more detail in Appendix A. It should be noted at the outset that there is not a separate analysis of the impacts associated with the proposed plan amendment because the direct, indirect and cumulative effects of the proposed RMP amendment and alternatives identified below are the same as those for the Applicant's Proposed Project, which are already explained in the relevant sections of Chapter 3 and 4 of the EIS, because: 1) the proposed plan amendment only changes the VRM designation for the Project area, and 2) the change in VRM designation simply allows the Project to be built so impacts associated with the proposed amendment are really the impacts of the Project itself, which are presented in Chapters 3 and 4 of this EIS.

ES-5.1 RMP Alternative 1: Proposed Plan Amendment and Project Approval

BLM's RMP Alternative 1 consists of changing lands that are currently managed as VRM Class III to VRM Class IV, approximately 2 miles north of Plomosa Back Country Byway, to the east of SR 95 in proximity to the proposed Project site. Approximately 6,800 acres of VRM Class III would be designated as VRM Class IV as a result of this change, leaving 505,600 acres of VRM Class III designated land within the entire YFO. This alternative changes the minimum number of acres necessary to address the instance of non-conformance created by the Applicant's Proposed Project with the YFO RMP VRM Objectives. Figure A-1 in Appendix A depicts the geographical extent of RMP Alternative 1. The details of RMP Alternative 1 are presented in Appendix A.

ES-5.2 RMP Alternative 2: Plan Amendment with No Project Approval

Under RMP Alternative 2 (Plan Amendment with No Project Approval), no impacts associated with the Applicant's Proposed Project would occur, but the Project area would be available, as a result of the plan amendment, for the development of a project similar to the QSEP in the future. If another solar energy development project like the QSEP were developed, similar impacts to visual resources as those described in Section 4.16 for the proposed Project could occur. However, no such future solar project (or other project that would require a VRM Class IV designation) is reasonably foreseeable at this time.

ES-5.3 RMP Alternative 3: No Action Alternative

The No Action Alternative for the proposed plan amendment is the same as the no action alternative described in Section ES-3.1 above.

ES-5.4 Other Plan Amendment Alternatives Considered but Eliminated from Further Analysis

A range of alternatives to the BLM proposed plan amendment were also analyzed, taking into consideration the Project description provided by QSE and the issues and concerns derived from comments received during the plan amendment scoping period. Plan amendment alternatives that failed to meet the BLM's purpose and need were dismissed from further analysis. A detailed description of plan amendment alternatives considered but eliminated from further analysis can be found in Appendix A.

ES-5.5 Agency-Preferred Plan Amendment Alternative

As mentioned above, the BLM has two decisions to make in this process with respect to the Applicant's Proposed Project: 1) whether or not to approve a ROW grant for the proposed generating facility for the Project and under what conditions, and 2) whether or not to approve a plan amendment. BLM does not have an agency preferred alternative for the proposed Project ROW grant at this time. Of the RMP Amendment Alternatives identified above, the BLM's Agency-Preferred Plan Amendment Alternative is to change the designation of approximately 6,800 acres of VRM Class III to VRM Class IV, as described under RMP Alternative 1 and RMP Alternative 2. This Preferred Plan Amendment Alternative would support all of the generation facility alternatives analyzed, including the Applicant's Proposed Project (dry-cooled), Alternative 1 (hybrid-cooled), and the No Action Alternative. The BLM's Preferred Plan Amendment Alternative does not dictate the selection of either generating facility alternative, nor does it preclude selection of the No Action Alternative.

ES-6 PUBLIC PARTICIPATION AND AGENCY CONSULTATION

ES-6.1 Public Participation

Public scoping is an integral part of the National Environmental Policy Act of 1969 (NEPA) planning process. It provides "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action" (40 Code of Federal Regulations [CFR] 1501.7). Initiation of the EIS process and the public scoping meetings for the proposed Project were announced through the Federal Register Notice of Intent, published January 14, 2010, which marked the beginning of the 30-day public scoping period for the Project EIS ending on February 13, 2010.

During the EIS public scoping period, Western held three scoping meetings to identify issues and concerns regarding the Applicant's Proposed Project. The scoping meetings, held in Yuma, Quartzsite, and Parker, provided an opportunity for the public to learn about the Applicant's Proposed Project and to provide comments. A total of 42 people attended the three meetings.

Since the initial Notice of Intent did not include the potential YFO plan amendment, the BLM issued a separate Notice of Intent to amend the YFO RMP on March 30, 2011. Scoping meetings to present information about the proposed RMP amendment were held in Yuma and Quartzsite during the 30-day scoping period. A total of 75 people attended the two scoping meetings.

ES-6.2 Consultation with Agencies and Indian Tribes

Federal and State agencies were contacted individually to gather input for the EIS. Other resource management agencies at the Federal and State levels were consulted to identify common concerns related to the Applicant's Proposed Project or alternatives. Cooperating agencies on this EIS include the BLM, USACE, USAG–YPG, AZGFD, and ADEQ. Consultations with Federal, State, and local resource management and regulatory agencies are ongoing.

Western invited Indian tribes to consult on the Project on a government-to-government basis at the earliest stages of Project planning by letter on September 14, 2009, and has followed up with additional correspondence and consultation meetings since then. To date, 15 tribes (listed below) have been contacted and invited to consult on the Applicant's Proposed Project. Between September 2009 and November 2010, 11 tribes (noted with an asterisk below) participated in one or more of the six coordination meetings with Western and the BLM. Consultation with interested tribal governments is ongoing.

- Ak-Chin Indian Community *
- Chemehuevi Indian Tribe *
- Cocopah Indian Tribe *
- Colorado River Indian Tribes *
- Fort Mojave Indian Tribe *
- Fort Yuma-Quechan Tribe *
- Gila River Indian Community *
- Hopi Tribe
- Hualapai Tribe *
- Pueblo of Zuni
- Salt River Pima-Maricopa Indian Community *
- Tohono O'odham Nation *
- Twenty-Nine Palms Band of Mission Indians
- Yavapai-Apache Nation
- Yavapai-Prescott Indian Tribe *

ES-7 SUMMARY OF IMPACTS

Table ES-1-1 provides a summary of the potential impacts anticipated on each resource. The table provides potential impacts for the Applicant's Proposed Project (dry-cooled alternative), Alternative 1 (hybrid-cooled alternative), and the No Action alternative.

Table ES-1-1 Summary of Impacts by Resources for the Quartzsite Solar Energy Project Dry-Cooled Alterative, Hybrid-Cooled Alternative, and No Action Alternative

Applicant's Proposed Project – Dry-Cooled Alternative	Hybrid-Cooled Alternative	No Action Alternative
Land Use – Section 3.2 and 4.2		
The Applicant's Proposed Project would remove 1,675 acres of land from other land uses. The Applicant's Proposed Project would result in an approximate 2.6% reduction in available rangeland within the Weisser Ephemeral Allotment, and an approximate 0.04% reduction in available rangeland within the YFO (approximate reduction from 428,300 to 426,625 acres). Given the small size of the Project footprint relative to the Weisser Ephemeral Allotment only minimal impacts are expected.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Special Management Areas – Sections 3.3 and 4.3		
Views of the Applicant's Proposed Project would degrade the desired, primitive experience that visitors seek when visiting the Wilderness Areas, Wilderness Study Areas, Back Country Byway, and Scenic Byway in the vicinity of the Project area. All Wilderness Areas are at least 10 miles away and are described in Section 3.3. No direct impacts to Special Management Areas are expected.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Recreation – Sections 3.4 and 4.4		
The Applicant's Proposed Project would not directly impact any areas with high recreational resource values, elevated public concern, or significant amounts of recreational activity. The Applicant's Proposed Project would not prevent access to existing designated recreation areas or sites. Indirect effects include increased visitation to the general area, due to the unique nature of the Project.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.

Table ES-1-1 Summary of Impacts by Resources for the Quartzsite Solar Energy Project Dry-Cooled Alterative, Hybrid-Cooled Alternative, and No Action Alternative

Applicant's Proposed Project – Dry-Cooled Alternative	Hybrid-Cooled Alternative	No Action Alternative
Transportation and Traffic – Sections 3.5 and 4.5		
Implementation of the Applicant's Proposed Project would result in short-term and long-term increases in traffic volume that could not be eliminated completely through mitigation. Short-term increases would be large and would affect the level of service of roads in the vicinity, particularly during peak traffic times and especially within the Town of Quartzsite. As these impacts are temporary (only during the construction period), efforts to alleviate the impacts are not warranted. Long-term (during the operation of the facility) increases would be very small and would likely not affect the level of service at any intersection in the area.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Air Quality and Climate – Sections 3.6 and 4.6		
The annual emissions are below both Prevention of Significant Deterioration and Title V major source thresholds, as established by the U.S. Environmental Protection Agency (EPA).	Slightly higher emissions due to cooling tower emissions; however, they are still well below both Prevention of Significant Deterioration and Title V major source thresholds, as established by the EPA.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Geological Resources – Sections 3.7 and 4.7		
Unique geological resources would not be impacted by the proposed Project because there are no known unique geological resources associated with the Project area. Impacts from geological hazards are low to non-existent. Given the absence of currently active mining within the Project area, the potential impact to mineral resources is low.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.

Table ES-1-1 Summary of Impacts by Resources for the Quartzsite Solar Energy Project Dry-Cooled Alterative, Hybrid-Cooled Alternative, and No Action Alternative

Applicant's Proposed Project – Dry-Cooled Alternative	Hybrid-Cooled Alternative	No Action Alternative
Soil Resources – Sections 3.8 and 4.8		
The removal of vegetation and soil crusts would expose soil and increase the potential for wind- and water-driven erosion. The only soil map unit within the Project area, the Superstition-Rositas series, exhibits a moderate to high susceptibility to water and wind erosion. The soil surface is expected to stabilize following the construction period.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Paleontological Resources – Sections 3.9 and 4.9		
The Project area contains low potential for paleontological resources. As such, the Applicant's Proposed Project is anticipated to have a low impact on paleontological resources within the Project area.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Vegetation and Special Status Species – Sections 3.10 and 4.10		
Vegetation would be completely removed only in areas requiring excavation for roads, heliostat assembly, buildings, and drainage ditches (totaling approximately 115 acres). Elsewhere, vegetation root systems would remain intact to the extent possible, following clipping to ground level and/or vehicular crushing during construction. Best Management Practices (BMP) would be followed to minimize potential spread of invasive plant species. Scaly sandplant is the only special status plant species with potential to occur within the Project area. No occurrences of this species are known from the Project area; therefore, it is anticipated that there would be little to no impact to this species.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.

Table ES-1-1 Summary of Impacts by Resources for the Quartzsite Solar Energy Project Dry-Cooled Alterative, Hybrid-Cooled Alternative, and No Action Alternative

Applicant's Proposed Project – Dry-Cooled Alternative	Hybrid-Cooled Alternative	No Action Alternative
Wildlife and Special Status Species – Sections 3.11 and 4.11		
Construction and operation of the Project would result in the loss of up to 1,675 acres of wildlife habitat. Mortality of animals due to construction activities or to loss of cover, nesting, and forage resources is possible. Approximately 51.5 acres of moderately suitable habitat for the Mojave fringe-toed lizard (including 11.5 acres of sand dunes) would be lost due to the Project. Sand dunes within the Project area would be lost due to grading and other related construction activities. The Mojave fringe-toed lizard is a special status wildlife species that is dependent upon such habitat.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Water Resources – Sections 3.12 and 4.12		
It is estimated that a total of 1,000 acre-feet of water would be needed during the first year of construction, while the major earthwork is ongoing. Approximately 150 acre-feet of water would be needed per year of construction after the initial earth moving operations are complete (estimated to last 2 years). Operational water requirements for a dry-cooled plant would be approximately 200 acre-feet per year and would require up to three 4-acre evaporation ponds for processing wastewater disposal. Drawdown impacts from groundwater pumping to nearby wells are considered negligible, would not result in local wells becoming unstable or significantly diminishing in capacity, and would not cause significant increases in well electrical usage or maintenance requirements.	Water use during construction would be similar to the Applicant's Proposed Project. Operational water requirements for a hybrid-cooled plant would be between 500 and 700 acre-feet per year and would require an approximately 18-acre evaporation pond surface area for processing wastewater disposal. Drawdown impacts would be the same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.

Table ES-1-1 Summary of Impacts by Resources for the Quartzsite Solar Energy Project Dry-Cooled Alterative, Hybrid-Cooled Alternative, and No Action Alternative

Applicant's Proposed Project – Dry-Cooled Alternative	Hybrid-Cooled Alternative	No Action Alternative
Cultural Resources – Sections 3.13 and 4.13		
There are four cultural properties within the area of potential effect (APE) of the Applicant's Proposed Project. Two sites are not eligible for inclusion in the National Register of Historic Places (NRHP). The portion of one site within the Project area does not contribute to that site's eligibility for inclusion in the NRHP, so the Applicant's Proposed Project would result in no effects to historic properties for these properties. A fourth cultural property is an archaeological site within the APE of the Applicant's Proposed Project that was recommended during recordation as being eligible for inclusion in the NRHP. As a result, the Applicant's Proposed Project would have an effect that would be mitigated through avoidance and construction monitoring.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Social and Economic Conditions – Sections 3.14 and 4.14		
The construction and operation of the Project would provide skilled and unskilled jobs for residents in the area and across the State of Arizona. Construction is expected to provide an average of 280 full-time jobs over a 30-month span. Operation is expected to employ approximately 47 full-time workers. The local community would experience positive effects to business revenues, as well as indirect job creation. Construction and operation is expected to create up to 560 and 141 additional jobs through the construction and operation phases, respectively. The region would experience temporary and permanent population growth of approximately 840 and 521 individuals during the construction and operation phases, respectively. An increase in the year-round temporary population may result in year-round operation of RV, trailer parks, and campgrounds that were previously seasonal. The four school districts within vicinity of the Project may experience growth.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.

Table ES-1-1 Summary of Impacts by Resources for the Quartzsite Solar Energy Project Dry-Cooled Alterative, Hybrid-Cooled Alternative, and No Action Alternative

Applicant's Proposed Project – Dry-Cooled Alternative	Hybrid-Cooled Alternative	No Action Alternative
Environmental Justice – Sections 3.15 and 4.15		
No impacts are anticipated.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Visual Resources – Sections 3.16 and 4.16		
The Applicant's Proposed Project would introduce a new visual element to the existing landscape. Impacts to scenery would range from low to moderate for high sensitivity viewers (e.g., tribal, residential, recreation). Impacts to scenery would range from low (viewers in the background distance zone) to high (viewers in the foreground distance zone) for moderately sensitive viewers (e.g., dispersed recreation, travel routes, community facilities). The Applicant's Proposed Project does not comply with BLM VRM Class III objectives ('partially retain character of landscape' – BLM Visual Resource Management Manual 8400). The YFO RMP would be amended to change the management objective of 6,800 acres around the Project area from VRM Class III to VRM Class IV.	A hybrid-cooled facility would be similar to the dry-cooled plant, except the tower would be larger in size and would appear larger at the base of the tower, increasing visual impacts for foreground viewers. In addition, due to the use of larger amounts of water, there would be an increased potential for visible vapor plume from the power block. Impacts to scenery would range from low (viewers in the background distance zone) to high (viewers in the foreground distance zone) for moderately sensitive viewers (e.g., dispersed recreation, travel routes, community facilities). Construction and operation of a hybrid-cooled plant would not comply with BLM VRM Class III objectives ('partially retain character of landscape' – BLM Visual Resource Management Manual 8400). Therefore, the YFO RMP would need to be amended to change the management objective of the area from VRM Class III to VRM Class IV.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.

Table ES-1-1 Summary of Impacts by Resources for the Quartzsite Solar Energy Project Dry-Cooled Alterative, Hybrid-Cooled Alternative, and No Action Alternative

Applicant's Proposed Project – Dry-Cooled Alternative	Hybrid-Cooled Alternative	No Action Alternative
Noise – Sections 3.17 and 4.18		
There would be short-term increases in noise during the 30-month construction period; however, the increase in ambient noise would not significantly affect any sensitive receptors as no residences, schools, or hospitals are located near the Project area. Noise during construction would typically occur between 5 a.m. and 7 p.m. Monday – Saturday.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Public Health and Safety – Sections 3.18 and 4.18		
Impacts to public health and safety would be minimal during construction and operation of the Project. Best management practices, including a project-specific health and safety program, would be implemented to reduce impacts to public and worker health and safety. A Health and Safety Plan would be included in the Final Plan of Development.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.
Hazardous Materials – Sections 3.19 and 4.19		
The Project would introduce the potential for hazardous material releases during construction and operations; however, Project-specific BMPs would be implemented to reduce the potential for hazardous releases and spills. A Hazardous Materials Plan would be included in the Final Plan of Development.	Same as Applicant's Proposed Project.	Impacts would be consistent with those currently found in the Project area. No plan amendments required for the 2010 YFO RMP.

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CHAPTER 1 – INTRODUCTION, PURPOSE, AND NEED

1.1 INTRODUCTION

Quartzsite Solar Energy, LLC (QSE or Applicant) has applied to Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), to interconnect the Quartzsite Solar Energy Project (Project or Applicant's Proposed Project), a proposed concentrating solar power (CSP) plant, to Western's transmission system at the Bouse-Kofa 161-kilovolt (kV) transmission line. The Project area is located approximately 10 miles north of Quartzsite, Arizona, on the east side of Arizona State Route (SR) 95 in La Paz County, Arizona.

In addition, QSE has applied to the Bureau of Land Management (BLM) Yuma Field Office (YFO) for a right-of-way (ROW) (BLM Serial Number AZA-34666) on Federal land to construct and operate the Project and ancillary linear facilities. The ROW application was submitted for 26,273 acres; however, the footprint of the Project would occupy approximately 1,675 acres of that total application area. Following the necessary environmental impact analyses and the completion of more detailed engineering, the ROW application would be amended to reflect actual acreage needed for Project construction and operations.

As explained in Section 4.16.3.2, the Project, as proposed, is not in conformance with the YFO Resource Management Plan (RMP), Visual Resource Management (VRM) Class III objective (see Section 1.5.3.2). Therefore, in connection with QSE's ROW request for the Project, the BLM is also considering a concurrent RMP amendment that would address the identified non-conformance if approved, and would allow the BLM to grant the ROW necessary to construct and operate the Project, as proposed.

The decision by Western to approve or deny the interconnection request and the decision by the BLM to approve or deny the ROW request and amend the YFO RMP are considered major Federal actions. As major Federal actions, these decisions require preparation of an environmental impact statement (EIS) to identify and mitigate the effects of the Project on the environment. This Draft EIS and Proposed YFO RMP Amendment has been prepared under the direction of Western as the lead Federal agency, with the BLM YFO, as cooperating agency, to comply with the following:

- National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321 et seq.)
- Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500 to 1508)
- DOE NEPA implementing procedures (10 CFR Part 1021)
- Department of the Interior (DOI) NEPA implementing procedures (43 CFR Part 46)
- Federal Land Policy Management Act of 1976, as amended (FLPMA) (43 USC §§ 1701-1787)
- BLM's Solar Energy Development Policy (Instruction Memorandum [IM] 2007-097) (BLM 2007a)
- Section 211 of the Energy Policy Act (EPAct) of 2005 (119 Stat. 594, 660)
- BLM's Solar Energy Development Policy (IM 2011-003)
- YFO RMP (BLM 2010a)

- Executive Order (EO) 13212 (Actions to Expedite Energy-Related Projects)
- Other associated regulations and guidance

Other cooperating agencies reviewing this Draft EIS and Proposed YFO RMP Amendment include the U.S. Army Corps of Engineers (USACE), U.S. Army–Yuma Proving Ground (USAG–YPG), Arizona Game and Fish Department (AZGFD), and Arizona Department of Environmental Quality (ADEQ). Their roles and responsibilities as a cooperating agency are described in Section 1.8.1. As appropriate, these agencies may consider the analysis contained in this Draft EIS when issuing other permits and approvals required by QSE. Potential permits and approvals that may be required from these agencies are described in Table 1-2.

1.2 PROJECT OVERVIEW

QSE, an affiliate of SolarReserve, LLC, is proposing to construct, own, and operate the Project. The Project would be capable of producing approximately 450 gigawatt-hours of renewable energy annually, with a nominal net generating capacity of 100 megawatts (MW). QSE's proprietary concentrating solar thermal technology uses a field of heliostats (elevated mirrors guided by a tracking system) to focus sunlight onto a receiver erected in the center of the solar field (the central receiver). Each heliostat tracks the sun throughout the day and reflects the solar energy to the central receiver. The Project features thermal energy storage that allows solar energy to be captured throughout the day and retained in a liquid salt heat transfer fluid (HTF). When electricity is generated, the hot liquid salt is used to generate electricity in a conventional steam turbine cycle that would utilize an air-cooled condenser to minimize water consumption.

Major Project components include:

- 653-foot-tall central receiver and solar collecting tower (includes a 15-foot-tall maintenance crane on top of the tower)
- Up to 17,500 heliostats (mirrors)
- A conventional steam turbine generator
- Insulated storage tanks for hot and cold liquid (molten) salt
- Ancillary tanks (service/fire water, demineralized water, etc.)
- Evaporation ponds (size would vary dependent upon the cooling mechanism selected)
- Temporary construction laydown area
- Ancillary buildings (e.g., maintenance, administration, warehouse)
- Water treatment building
- Operations and control building
- Switchyard (at the interconnection point with Western's transmission line)
- Transformers and 161/230-kV electrical substation (onsite)
- A 1.5-mile-long 161/230-kV overhead transmission line
- A 1.5-mile long overhead line to provide auxiliary power to the Project area
- An access road (approximately 0.5 mile) from SR 95 to the solar field
- Water wells and a water supply pipeline (onsite)

The construction of the Project would begin once all applicable approvals and permits have been obtained. QSE anticipates Project construction, from site preparation and grading to commercial operation, would take approximately 30 months.

1.2.1 Applicant's Objective

Both population growth and legislative policy, at the State and National levels, have increased the demand for development of additional renewable energy resources. Over the past 20 years, the southwestern United States has experienced tremendous growth. According to the U.S. Census Bureau, Arizona's population has increased by 16 percent between 2000 and 2005. This growth rate is second only to Nevada, which showed a 21 percent increase over that same time period. As the demand for power continues to grow in these states and fossil-fuel plants reach the end of their useful lives, there will be a need to provide on-peak and renewable power to the electrical grid.

The increasing demand for renewable electrical power in the southwestern United States is also being driven by regulatory policy. In Arizona, the market for renewable energy is framed by the Renewable Energy Standard adopted by the Arizona Corporation Commission in 2006. The Renewable Energy Standard requires regulated utilities to generate at least 15 percent of their energy from renewable resources by 2025 (DOE 2010).

Other states in the Southwest have implemented similar requirements for renewable energy. California's Renewable Portfolio Standard requires utilities to serve 20 percent of their demand with renewable energy by 2010, with the additional requirement of reaching 33 percent renewable energy by 2020. Nevada has a Renewable Portfolio Standard of 25 percent by 2025, with additional stipulations on the renewable technology used: A minimum of 6 percent of the power must be provided by solar resources (DOE 2010).

In consideration of these mandates, the Applicant is proposing to develop a project that would respond to a need for increased renewable energy resources throughout Arizona and the Southwest, due to population growth and renewable energy requirements established by State (e.g., portfolio standards) and Federal (e.g., EPAct) policy. In addition, the Project would contribute much needed on-peak power to the electrical grid that serves the western United States, as demand for power continues to grow in these states.

QSE's specific intentions are as follows:

- Deliver approximately 450,000 megawatt hours (MWh) of cost-effective, clean renewable energy annually to the electricity grid
- Interconnect directly to the existing electrical transmission system
- Develop a solar energy project utilizing the Applicant's proprietary CSP tower technology, with thermal storage that provides a stable source of renewable energy to the grid
- Develop a renewable energy project that can reliably produce electricity during peak demand periods; in the Southwest, peak demand often occurs between 4:00 and 7:00 p.m. (Figure 1-1), which may be after the sun has set and solar projects without storage can no longer generate electricity

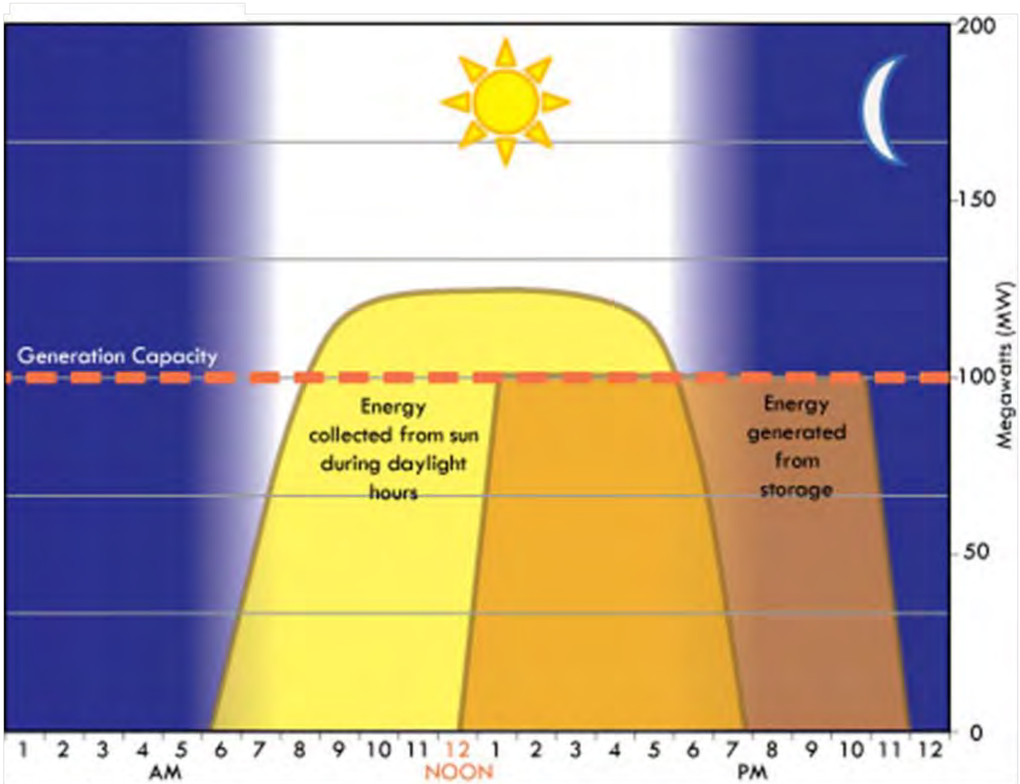


Figure 1-1 Peak Load Profile Diagram

1.3 PROJECT LOCATION

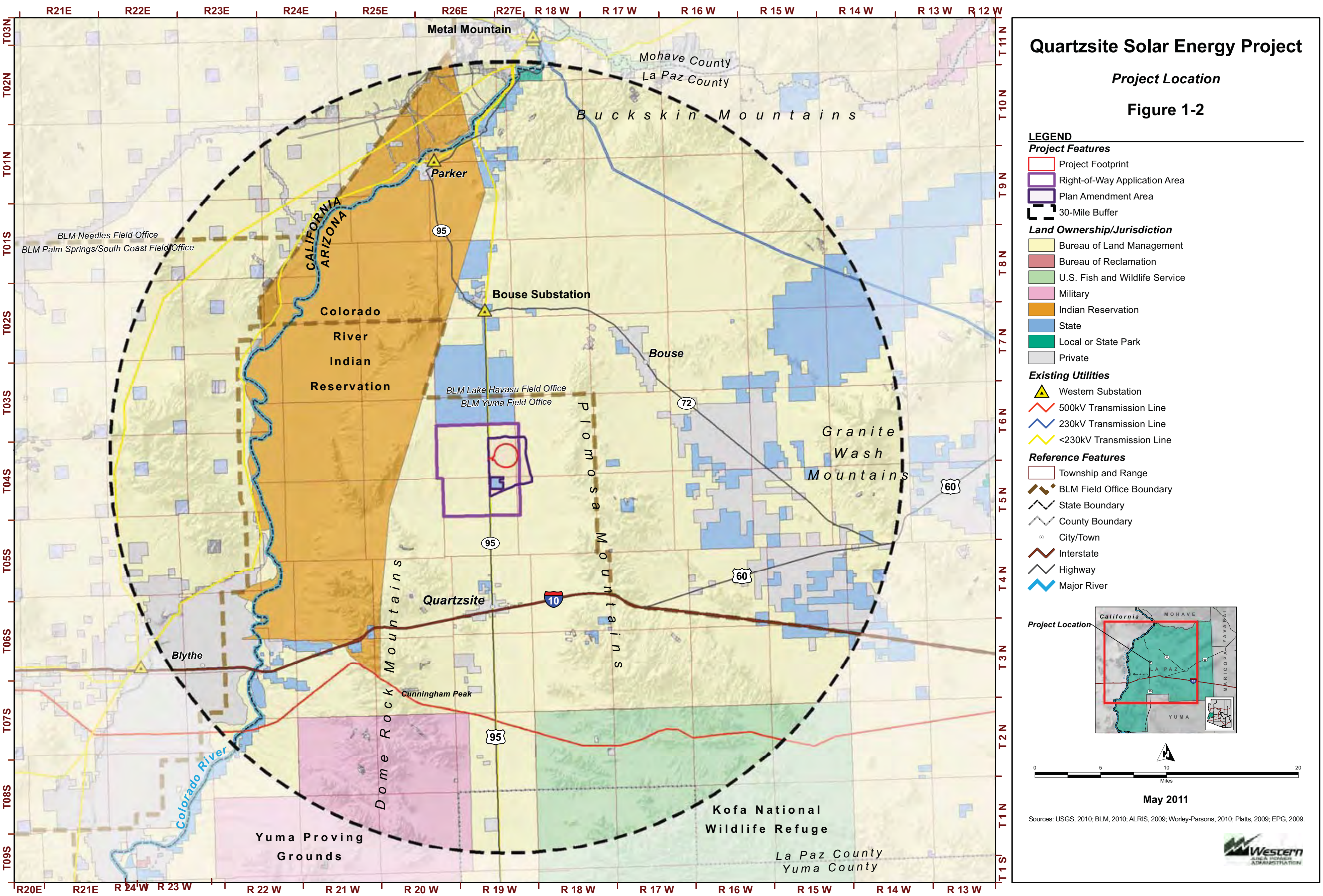
The Project would be located east of SR 95, approximately 10 miles north of Quartzsite, Arizona, in La Paz County. The Project footprint would occupy approximately 1,675 acres and would be located entirely on BLM-administered land (Figure 1-2).

1.4 PURPOSE AND NEED

1.4.1 Western's Purpose and Need

QSE proposes to interconnect its Project with Western's existing Bouse-Kofa 161-kV transmission line. Western's purpose and need is to approve or deny the interconnection request, in accordance with its Open Access Transmission Tariff (OATT) and the Federal Power Act, as amended.

Under the OATT, Western offers capacity on its transmission system to deliver electricity when capacity is available. The OATT contains terms for processing requests for the interconnection of generation facilities to Western's transmission system, and substantially conforms to Federal Energy Regulatory Commission (FERC) final orders that provide for non-discriminatory transmission system access.


Quartzsite Solar Energy Project
Project Location
Figure 1-2
LEGEND
Project Features
Project Footprint
Right-of-Way Application Area
Plan Amendment Area
30-Mile Buffer
Land Ownership/Jurisdiction
Bureau of Land Management
Bureau of Reclamation
U.S. Fish and Wildlife Service
Military
Indian Reservation
State
Local or State Park
Private
Existing Utilities
Western Substation
500kV Transmission Line
230kV Transmission Line
<230kV Transmission Line
Reference Features
Township and Range
BLM Field Office Boundary
State Boundary
County Boundary
City/Town
Interstate
Highway
Major River
Project Location
California
MOHAVE
LA PAZ
YUMA
MARICOPA
YAVAPAI
0 5 10 20
Miles
May 2011
Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.
Western Area Power Administration
Metal Mountain
Mohave County
La Paz County
Buckskin Mountains
Parker
CALIFORNIA
ARIZONA
BLM Needles Field Office
BLM Palm Springs/South Coast Field Office
Bouse Substation
Colorado River Indian Reservation
Bouse
BLM Lake Havasu Field Office
BLM Yuma Field Office
Plomosa Mountains
Granite Wash Mountains
Quartzsite
Dome Rock Mountains
Blythe
Cunningham Peak
Colorado River
Yuma Proving Grounds
Kofa National Wildlife Refuge
La Paz County
Yuma County
95
72
60
10
R21E R22E R23E R24E R25E R26E R27E R 18 W R 17 W R 16 W R 15 W R 14 W R 13 W R 12 W
R20E R21E R 24 W R 23 W R 22 W R 21 W R 20 W R 19 W R 18 W R 17 W R 16 W R 15 W R 14 W R 13 W
T03N T02N T01N T01S T02S T03S T04S T05S T06S T07S T08S T09S
T 11 N T 10 N T 9 N T 8 N T 7 N T 6 N T 5 N T 4 N T 3 N T 2 N T 1 N T 1 S

Western originally filed its OATT with the FERC on December 31, 1997, pursuant to FERC Order Nos. 888 and 889. Responding to FERC Order No. 2003, Western submitted revisions regarding certain OATT terms and included Large Generator Interconnection Procedures and a Large Generator Interconnection Agreement in January 2005. In response to FERC Order No. 2006, Western submitted additional term revisions and incorporated Small Generator Interconnection Procedures and a Small Generator Interconnection Agreement in March 2007. In September 2009, Western submitted yet another set of revisions to address FERC Order No. 890 requirements, along with revisions to existing terms.

In reviewing interconnection requests, Western must ensure that existing reliability and service is not degraded. Western's Large Generator Interconnection Procedures provides for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the Project and address whether the upgrades/additions are within the Project scope.

Western must consider interconnection requests to its transmission system in accordance with its OATT and the Federal Power Act. Western satisfies Federal Power Act requirements to provide transmission service on a non-discriminatory basis through compliance with its OATT. Under the Federal Power Act, the FERC has the authority to order Western to allow an interconnection and to require Western to provide transmission service at rates Western itself charges, and under terms and conditions comparable to those that Western provides. However, Western has discretion whether to allow the interconnection based on its NEPA review.

1.4.2 BLM's Purpose and Need

In accordance with FLPMA (Section 103(c)), public lands are to be managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501(a)(4)). Taking into account the BLM's multiple use mandate, the BLM's purpose and need for this action is to respond to QSE's application under Title V of FLPMA (43 USC § 1761) for a ROW grant to construct, operate, maintain, and decommission a solar thermal generation power plant and ancillary facilities in compliance with FLPMA, BLM ROW regulations, and other applicable Federal and State laws and policies. The BLM is responding to the following statutes, directives, and policies in considering the Project:

- Under Title V of FLPMA (43 USC §§ 1761–1771), the BLM is authorized to grant rights-of-way for "systems for generation, transmission, and distribution of electric energy" and/or "other necessary...systems or facilities which are in the public interest," such as systems needed to meet the interest of Arizona utilities in obtaining dispatchable renewable electricity required to meet demand during peak load hours, Arizona's Renewable Energy Standards and OATT rules, and other renewable energy mandates that call on the state's electric utilities to produce at least 15 percent of their electricity from renewable sources by 2025.

- Section 211 of the EPAct of 2005, which established a goal for the DOI to achieve up to 10,000 MW of non-hydropower renewable energy projects on public land, where appropriate, by 2015.

- The Project would support the President's New Energy for America Plan, which sets a target of ensuring that 10 percent of the United States' electricity is generated from renewable sources by 2012, rising to 25 percent by 2025.

- IM 2011-003, dated October 7, 2010, Solar Energy Development Policy establishes BLM policy to ensure the timely and efficient processing of energy rights-of-way for solar projects on public land.

- Secretarial Order 3283, Enhancing Renewable Energy Development on the Public Lands, signed January 16, 2009, facilitates the DOI's efforts to achieve the goals established in Section 211 of the EPAct of 2005.

- Secretarial Order 3285A1, Renewable Energy Development by the DOI, signed February 22, 2010, establishes the development of environmentally responsible renewable energy as a priority for the DOI-established Departmental Task Force on Energy and Climate Change.

The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to QSE for the Project. Modifications may include modifying the proposed use or location of the proposed facilities (43 CFR 2805.10(a)(1)). The BLM's action also will include consideration of a concurrent amendment of the YFO RMP to change the VRM Class designation for certain lands from VRM Class III to VRM Class IV as described in Appendix A of this EIS. As noted in Section 1.1, the Project as proposed is not in conformance with existing VRM objectives for the Project area. Therefore, if the BLM decides to approve the issuance of the ROW grant, the YFO RMP amendment would also be required.

1.5 NEPA AND PLAN AMENDMENT PROCESSES

The NEPA process consists of an evaluation of the environmental effects of a Federal project or action undertaking. Under NEPA, Federal agencies must consider the environmental effects of their actions. NEPA directs Federal agencies to "utilize a systematic, interdisciplinary approach...in planning and decision-making, which may have an impact on man's environment, to ensure that environmental amenities and values...be given appropriate consideration in decision-making along with economic and technical considerations," and to "study, develop, and describe appropriate alternatives to recommended courses of action." This mandate applies to all "major Federal actions" (Title 43, Part 1500 CFR).

The preparation of an EIS follows a highly formalized process, consisting of eight major steps. The steps listed below also include the BLM's plan amendment process.

1. Issue the Notice of Intent to prepare an EIS and plan amendment;
2. Conduct public and agency scoping;
3. Prepare the interdisciplinary analysis of the issues and alternatives;

4. Issue the Notice of Availability for Draft EIS and Proposed YFO RMP Amendment;
5. Conduct the public review and 90-day comment period;
6. Issue the Notice of Availability for Final EIS and Proposed YFO RMP Amendment;
7. A 30-day comment period on the DEIS and a 30-day protest period and 60-day Governor's consistency review of the proposed plan amendment;
8. Issue the Record of Decisions (ROD) for the interconnect request, the ROW grant, and the plan amendment.

1.5.1 The Environmental Impact Statement Decision Framework

This EIS provides a site-specific analysis of impacts that would be expected to result from implementing the Project or alternatives to the Project, detailed in Chapter 2. The EIS assists Western and the BLM in project planning, ensures compliance with NEPA and associated regulations, and serves as a decision-making tool. Based on the analyses in this EIS, and if approved, Western would issue a ROD for the interconnection request and the BLM would issue a ROD for the ROW application and would amend the YFO RMP.

1.5.2 BLM Plan Amendment Process

Section 202 of FLPMA states: "The Secretary shall, with public involvement…develop, maintain, and when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands" (43 USC 1712). The regulations for making and modifying land use plans and planning decisions are found in 43 CFR 1600. The proposed plan amendment shall follow the regulations as set forth in 43 CFR 1610, Resource Management Planning.

The BLM uses a multi-step process when developing an RMP or RMP amendment. Some of the steps may occur concurrently. Some situations may require the BLM to supplement previous work as additional information becomes available. These steps have been fully integrated with the NEPA process and CEQ guidelines, and are briefly summarized below. Appendix A contains more details about the proposed plan amendment related to the Project:

Step 1 – Identification of Issues: Issue a Notice of Intent in the *Federal Register* to begin the scoping process to identify issues and develop planning criteria and to begin public participation. This sets the tone and scope for the entire planning process and is done with full public participation.

Step 2 – Develop Planning Criteria: Establish constraints and guides, and determine what will, or will not, be done or considered during the planning process.

Step 3 – Inventory Data and Information Collection: As necessary, based on specific circumstance, the BLM may collect an inventory of data and information relevant to the proposed plan amendment.

Step 4 – Analyze the Management Situation: Gather information on the current management situation. Describe pertinent physical and biological characteristics and evaluate the capability and condition of the resources.

Step 5 – Formulate Alternatives: Alternative formulation is the step where the success of the planning effort hinges on clearly identified reasonable alternatives.

Step 6 – Estimate Impacts of Alternatives: Estimate the impact or effects of each alternative on the environment and management situation. As explained above and in Appendix A, the impact of the proposed RMP amendment and its alternatives are the same as for the Applicant's Proposed Project, and therefore those impacts are not repeated in Appendix A, but rather are reflected in the existing discussion of the Project impacts as presented in Chapters 3 and 4 of this EIS.

Step 7 – Select the Preferred Alternative: Select the Preferred Alternative, which in the judgment of BLM management, best resolves the planning issues and promotes balanced multiple use objectives. Issue a Notice of Availability of the Draft EIS and Proposed YFO RMP Amendment for the 90-day public review (see schedule in Section 1.5).

Step 8 – Select the RMP Amendment: After reviewing and analyzing the public comments, opinions, suggestions, and recommendations prepare a Final EIS and Proposed YFO RMP Amendment. Issue a Notice of Availability of the Final EIS and Proposed YFO RMP that announces the 30-day protest period on the plan amendment and concurrent 60-day Governor's consistency review. After the conclusion of those periods and the resolution of any protests received, issue a Notice of Availability for the ROD/Approved RMP Amendment. For purposes of the Project, the BLM decision on the ROW grant request and plan amendment will be presented in the same ROD.

1.5.3 Decisions to be Made

1.5.3.1 Western Area Power Administration

QSE has submitted an application to Western to interconnect a proposed 100-MW solar energy generation site with Western's existing Bouse-Kofa 161-kV transmission line. Western is addressing the QSE application under its Large Generator Interconnection Procedures included with its OATT. Based on the analyses in this EIS, Western will approve or deny the interconnection request and issue a ROD.

1.5.3.2 Bureau of Land Management

Per a Memorandum of Understanding between the BLM and Western, the BLM intends to use this EIS as a basis for future actions and authorizations of interest in public land related to the Project. The BLM is considering two decisions related to the Applicant's Proposed Project.

First, the BLM will use the analyses contained within this EIS to make a decision whether to grant a 30-year ROW to allow for the construction, operation, and maintenance of the Project and any associated transmission interconnect lines and other facilities on Federal land. If the decision is made to grant the ROW, the BLM will also make the decision on which alternative to select and the terms and conditions that would be included in the ROW grant. This decision will be outlined in a ROD, based on the analyses in this EIS. If the ROD were to grant the ROW, the ROW grant would only be issued upon completion and approval of the Plan of Development.

The Plan of Development would also be made a part of the ROW grant. The ROW grant would be authorized or denied by the BLM (Arizona) Authorizing Officer, and the BLM decision would only apply to public land.

Second, in order for the BLM to issue a ROW, the Applicant's Proposed Project must be in conformance with the YFO RMP (2010). A visual contrast rating analysis determined a strong contrast to the landscape, due to the height of the solar receiver tower (653 feet), the receiver's glow during daylight hours, and proximity to SR 95 (see Section 4.16.3.2; and Appendix A). As such, the Project would not be in conformance with the YFO RMP VRM Class III management objectives. The objective of VRM Class III designation is to partially retain the existing character of the landscape; level of change to the characteristic landscape should be moderate. Therefore, consideration of the ROW request for the Applicant's Proposed Project requires the BLM to also consider a concurrent RMP amendment that would change the VRM designations of certain lands in the Project area from VRM Class III to VRM Class IV.[1] The BLM's plan amendment decision will be outlined in a ROD concurrently with its decision regarding the Project's ROW grant, based on the analyses in this EIS. As explained in Appendix A, one of the plan amendment alternatives being considered by the BLM is a change in the VRM classification without granting the ROW request.

1.6 RELATIONSHIP TO POLICIES, PLANS, AND PROGRAMS

This Draft EIS and Proposed YFO RMP Amendment was prepared in compliance with CEQ regulations for implementing NEPA (40 CFR §§ 1500-1508; 43 CFR Part 46); DOE NEPA implementing procedures; the BLM NEPA Handbook H-1790-1; FLPMA Sections 201, 202, and 206 (43 USC §§ 1711, 1712, 1716; see also 43 CFR § 1600 et seq.); and the BLM Land Use Planning Handbook H-1601-1. The BLM also has IM 2004-105, 149, 231; 2005-105; and 2011-059, 060, and 061, which set NEPA compliance policy for the BLM.

Table 1-1 is a representative list of Federal and State laws, statutes, regulations, and EOs that may apply to the siting, construction, and operation of the Project. If the Project were to be approved, QSE and its contractors would comply with requirements set forth in these directives, as applicable.

Table 1-1 Federal and State Laws, Regulations, and Executive Orders that may apply to the Applicant's Proposed Project and Alternatives
Federal Statutes
American Indian Religious Freedom Act of 1978 (Public Law [PL] 95-341; 42 USC 1996)
Archaeological and Historic Data Preservation Act of 1974 (PL 86-253, as amended by PL 93291; 16 USC 469)

[1] While objectives for VRM Class III areas do not preclude siting wind or solar facilities in these areas, the proposed Project tower would create a strong contrast to the landscape, and therefore changing the area to a VRM Class IV management area would allow a greater degree of contrast in the landscape setting in this area.

Table 1-1 Federal and State Laws, Regulations, and Executive Orders that may apply to the Applicant's Proposed Project and Alternatives
Archaeological Resources Protection Act of 1979 (PL 96-95; 16 USC 470aa-mm)
Bald and Golden Eagle Protection Act of 1940 (BGEPA) (16 USC 668-668d, 54 Stat. 250), as amended (PL 95-616 [92 Stat. 3114] November 8, 1978)
Clean Air Act of 1990 (as amended by PL 92-574; 42 USC 4901)
Clean Water Act (CWA) (33 USC 1251-1387)
Department of Transportation Act of 1966, (PL 89-670; 49 USC Section 303)
Endangered Species Act of 1973 (ESA) (PL 85-624; 16 USC 1531-1544)
EPAct of 2005 (PL 109-58)
Farmland Protection Policy Act (PL 97-98 and 7 CFR Part 658)
FLPMA of 1976, Section 201(a) (PL 94-579; 43 USC 1701 et seq.)
Federal Water Pollution Control Act of 1972, Section 404 (PL 92-500; 33 USC 1344, as amended)
Historic Sites Act of 1935 (PL 292-74; 16 USC 461-467)
Land and Water Conservation Fund Act of 1965 (PL 88-578)
Migratory Bird Treaty Act of 1918 (MBTA) (16 USC 703-712, as amended)
NEPA of 1969 (PL 91-190; 42 USC 4321; 43 CFR Part 46)
National Historic Preservation Act of 1966 (NHPA), Section 106, (PL 89-665; 16 USC 407(f)
Native American Graves Protection and Repatriation Act of 1990 (PL 101-601)
Paleontological Resources Preservation Act of 2009 (PL 111-11; 16 USC 470aaa)
Executive Orders
EO 11296 Flood Hazard Evaluation Guidelines
EO 11514 Protection and Enhancement of Environmental Quality
EO 11593 Protection and Enhancement of the Cultural Environment
EO 11988 Floodplain Management (43 CFR 6030)
EO 11990 Protection of Wetlands
EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
EO 13007 Indian Sacred Sites
EO 13175 Consultation with Indian Tribal Governments
EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds

Table 1-1 Federal and State Laws, Regulations, and Executive Orders that may apply to the Applicant's Proposed Project and Alternatives
EO 13212 Actions to Expedite Energy-Related Projects
EO 13287 Preserve America
EO 123772 Intergovernmental Review of Federal Programs
Federal Regulations
40 CFR Parts 1500-1508 CEQ Implementation of the NEPA
33 CFR 320-331 and 40 CFR Part 230, Section 404 of the CWA and its Implementing Regulations
36 CFR Part 800, as amended, Protection of Historic Properties
7 CFR Part 658, as amended, Prime and Unique Farmlands
43 CFR Part 2800, as amended, Right-of-way Principles and Procedures
State Laws and Statutes
Arizona Revised Statute (ARS) § 3-901 – 3-916 Arizona Native Plant Law
ARS § 41-861 through 865 State Historic Preservation Act
ARS § 49-426; Arizona Administrative Code (AAC) 2, Article 3 Air Quality Regulations

1.7 PERMITS REQUIRED OR POTENTIALLY REQUIRED

To implement any of the action alternatives analyzed in this EIS, the Applicant must acquire applicable Federal, State, and county permits and other approvals, as necessary. Applicable or potentially applicable approvals (permits, licenses, compliance, or reviews) are listed in Table 1-2.

Table 1-2 Authorizations, Permits, Reviews, and Approvals

Action Requiring Permit, Approval, or Review	Permit, Approval, or Review	Approving Agency	Statutory Reference
Federal			
NEPA Compliance to Process Interconnection Request	EIS and ROD	Western	NEPA, 40 CFR 1500 et seq.
NEPA Compliance to Process Right-of-Way Application	EIS and ROD	BLM	NEPA, 40 CFR 1500 et seq.
YFO RMP Amendment	EIS and ROD	BLM	43 USC 1712; 43 CFR 1610

Table 1-2 Authorizations, Permits, Reviews, and Approvals			
Action Requiring Permit, Approval, or Review	**Permit, Approval, or Review**	**Approving Agency**	**Statutory Reference**
Temporary Land Use Permit; Form 2920	Temporary Use Permit (pre-operational activities on BLM land)	BLM	43 USC 1201; 43 CFR Part 2920
Rights-of-Way over Land under Federal Management; Form SF-299	Right-of-Way Grant	BLM	FLPMA (PL 94-579) USC. 1761-1771 and 43 CFR 2800
NHPA Compliance to Process Right-of-Way Application	Section 106 Compliance or Consultation	Western/Arizona State Historic Preservation Office (SHPO)	NHPA, 36 CFR part 800; 16 USC 47
Compliance with the ESA	Analysis to determine if the Applicant's Proposed Project would violate the ESA	Western/BLM/U.S. Fish and Wildlife Service (USFWS)	ESA Section 7 Consultation, 50 CFR Part 17, 16 USC 1536
Discharge of dredged/fill material into waters of the U.S.	Jurisdictional Delineation Report Concurrence, Nationwide or Individual Permit	USACE	Section 404 of the CWA, 33 USC 1344
Project Component Height Relative to Air Traffic; Form 7460-1	No Hazard Declaration required if any structure is more than 200 feet	Federal Aviation Administration (FAA)	49 USC 1501, 14 CFR Part 77
U.S. Environmental Protection Agency (EPA) ID Number	Compliance with Federal hazardous waste management requirements	EPA	40 CFR Part 124, 260, and 270
Oil Pollution Prevention – Spill Prevention, Control, and Countermeasure (SPCC) Plan	If total aboveground storage capacity of oil is greater than 1,320 gallons, then an SPCC Plan is required.	EPA – Office of Emergency Services	40 CFR Part 112, and Section 311(j) of the CWA
Review of Project for its potential impact on military overflights and operations	U.S. Department of Defense (DOD) R 2508 Complex Sustainability Office	DOD	DOD
State of Arizona			
Drilling of new water supply well that would produce groundwater at a rate greater than 35 gallons per minute (gpm)	Notice of Intent to drill nonexempt well	Arizona Department of Water Resources (ADWR)	ARS 45-599
Discharge into waters of the State	Water Quality Certification – CWA Section 401	ADEQ	18 AAC 11, Article 1

Table 1-2 Authorizations, Permits, Reviews, and Approvals			
Action Requiring Permit, Approval, or Review	**Permit, Approval, or Review**	**Approving Agency**	**Statutory Reference**
Discharge any pollutants into waters of the U.S.; requires Stormwater Pollution Prevention Plan (SWPPP), Best Management Practices (BMP), and a Notice of Intent (construction)	Arizona Pollution Discharge Elimination System (AZPDES) General Permit for Stormwater Discharges from Construction Activities – CWA Section 402	ADEQ	18 AAC 9, Article 9
Discharge of groundwater. Notice of Intent to discharge before groundwater produced during drilling or well development can be discharged offsite	AZPDES De Minimis General Permit for Offsite Discharge of Water	ADEQ	49 ARS 2 Article 3.1; 18 AAC 9, Article 9
Construction required for evaporation ponds and the land treatment unit for soils impacted by the HTF	Individual Aquifer Protection Permit	ADEQ	ARS § 49-241 through 252
Travel on state routes by large trucks carrying heavy equipment	Oversize/Overweight Load Permit	Arizona Department of Transportation (ADOT)	ADOT rules and regulations
Construction within ADOT ROW	Encroachment Permit	ADOT	ADOT rules and regulations
La Paz County			
Grading of the Project area	Grading Permit	La Paz County Department of Community Development	County Regulation
Encroachment onto public roadway	Encroachment Permit	La Paz County Department of Community Development	County Regulation
Construction. Building Permit (for structures)	Building Permit	La Paz County Department of Community Development	County Regulation

1.8 CONSULTATION WITH AGENCIES AND INDIAN TRIBES

Per a Memorandum of Understanding between Western and the BLM, Western was designated to serve as the lead agency for compliance with NEPA and Section 106 of the NHPA. In this role, Western assumed the lead responsibility for carrying out compliance and consultation requirements with cooperating agencies, the Arizona SHPO, and Indian tribes. The BLM has participated in most of the consultation meetings; reviewed reports, consultation materials, and related documentation prepared by Western; and coordinated with Western throughout the NEPA and Section 106 processes to ensure those efforts were consistent with the requirements of the BLM, especially as related to the plan amendment process.

Chapter 5, Consultation and Coordination, contains an in-depth discussion of the consultation process undertaken by Western for this project.

1.9 PUBLIC SCOPING

Public scoping is an integral part of the NEPA planning process. It provides "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action" (40 CFR 1501.7). Public and agency input is solicited in order to identify the range, or scope, of issues to be addressed during the environmental analysis and in the EIS. Initiation of the EIS process and the public scoping meetings for the Project were announced through the Federal Register, BLM press releases, paid advertisements in the media, and postings on Western and the BLM's Project websites. These activities are described below.

1.9.1 Federal Register Notice of Intent

The public was notified of the Project and upcoming EIS scoping meetings through the Notice of Intent published in the Federal Register on January 14, 2010 (75 FR 2133-2134). The notice announced the intent to prepare an EIS and provided the specific dates, locations, and times of the public scoping meetings. In addition, the notice provided information such as a description of facilities and Project location, information on how to submit comments and why they are important, and contact information for Western, DOE, and the BLM. The comment period for EIS scoping closed on April 29, 2010.

On March 30, 2011, the BLM issued a separate Notice of Intent to amend the YFO RMP (76 FR 17668-17669). The comment period for the BLM's notice closed on April 29, 2011.

1.9.2 Newsletters and Posters

On January 12, 2010, a newsletter announcing the dates and location of the EIS scoping meetings was distributed to approximately 130 agencies, elected officials, potentially interested Native American tribes, and special interest groups. In addition to meeting information, the newsletter provided a general description of the Project and instructions on how to submit scoping comments for consideration in the EIS. These scoping meetings were also announced in a poster distributed by mail to libraries, community/senior centers, and other town or public facilities in Quartzsite and Parker, Arizona. The poster was intended to increase public awareness of the scoping meetings, particularly in Quartzsite where the population is largely seasonal and may not have been effectively notified through direct mail or newspaper coverage.

In April 2011, postcard mailers were sent to more than 1,700 residents and businesses, informing them of scoping meetings for the proposed YFO land use plan amendment. Individuals in La Paz County and others who had previously expressed an interest in projects within the Yuma District also received these cards.

1.9.3 Media Contacts

During the EIS scoping period (January 14 – February 16, 2010), information was provided to the media to provide broad public notice of the Project and upcoming scoping meetings. Display advertisements providing the Project location, meeting information, and Project website for the EIS scoping meetings were published in the *Yuma Daily Sun* (January 11, 2010), *Parker Pioneer* (January 13, 2010), and *Palo Verde Valley Times*/*Quartzsite Times* (January 13, 2010) approximately 2 weeks prior to the scoping meetings. A BLM press release announcing the scoping meetings for the EIS was distributed on January 21, 2010, to local newspapers and radio stations, in addition to county officials and other Federal agency representatives.

During the RMP amendment scoping period (March 30 – April 29, 2011), the BLM issued a press release announcing the dates and locations of the RMP amendment scoping meetings. The BLM media release was distributed on April 1, 2011, to local newspapers and radio stations.

1.9.4 Public Scoping Meetings

During the EIS scoping period, Western held three public scoping meetings to identify issues and concerns regarding the Applicant's Proposed Project. These scoping meetings provided an opportunity for the public to learn about the Applicant's Proposed Project and to provide comments. Meeting locations, dates, times, and number of attendees is provided in Table 1-3.

Table 1-3 Public Scoping Meetings – January 2010

Location	Date	Time	Attendance*
BLM YFO, Yuma, Arizona	January 26, 2010	6:00 – 8:00 p.m.	8
Blue Water Casino, Parker, Arizona	January 27, 2010	6:00 – 8:00 p.m.	4
Quartzsite Town Hall, Quartzsite, Arizona	January 28, 2010	6:00 – 8:00 p.m.	30
Total			**42**

*These counts reflect only those attendees who elected to sign in at the door.

During the RMP amendment scoping period, the BLM held two public scoping meetings to identify issues and concerns regarding the proposed land use plan amendment. Meeting locations, dates, times, and number of meeting attendees is provided in Table 1-4.

Table 1-4 Public Scoping Meetings – April 2011			
Location	**Date**	**Time**	**Attendance***
BLM YFO, Yuma, Arizona	April 18, 2011	6:00 – 8:00 p.m.	21
Quartzsite Town Hall, Quartzsite, Arizona	April 19, 2011	6:00 – 8:00 p.m.	54
Total			**75**
*These counts reflect only those attendees who elected to sign in at the door.			

1.10 ISSUES ADDRESSED IN THE EIS

NEPA requires Federal agencies to focus their analysis and documentation on the significant issues related to a proposed project. These issues were used as the basis for developing and comparing the proposed Project and alternatives. During the EIS scoping period, a total of 21 comments were received. Within the 21 comment submissions, 239 issues were identified and categorized into the 14 main issue categories, as shown in Table 1-5.

Table 1-5 Summary of Issues Identified through the EIS Scoping Period

Main Issue	Total Issues Identified in Comment Submissions
Biological Resources	59
Water Resources	38
Project Alternatives	30
Project Description	19
Air Quality	14
Cultural Resources	14
Cumulative Impacts	13
Hazardous Materials and Safety	13
Land Use, Recreation, and Transportation	8
Project Need	8
Visual Resources	8
NEPA Process	7
Geology and Minerals	4
Socioeconomics	4
Total Issues Identified in Comments	**239**

During the RMP amendment scoping period, a total of 37 comments were received. Within the 37 comment submissions, 65 individual comments were identified. Twenty-four of the 37 comments received either expressed support or disapproval of the Applicant's Proposed Project. The remaining comments either requested information about the Applicant's Proposed Project or listed concerns about the Project's impact on various resources (e.g., biological resources, cultural resources, transportation, recreation, or visual impacts). A summary of issues identified during the RMP scoping period is shown in Table 1-6.

Table 1-6 Summary of Issues Identified through the RMP Amendment Scoping Period

Main Issue	Total Issues Identified in Comment Submissions
Other	23
Project Alternatives	12
Visual Resources	6
Project Description	5
Recreation	4
Socioeconomic Resources	4
Cultural Resources	3
Project Need	2
Biological Resources	2
Land Use	2
NEPA Process	1
Health and Safety	1
Transportation	1
Water Resources	1
Total Issues Identified in Comments	**67**

Table 1-7 lists the key issues and/or questions that were raised by agencies or the public during the two scoping periods and indicates the sections where the issues are addressed in the EIS.

Table 1-7 Summary of Issues Identified during Scoping Periods

Issue or Question	Response or Section(s) of the EIS Where Issue is Addressed
Project Description	
The EIS should discuss site security, fencing, the type and height of fencing, etc.	Section 2.4.2.4
The EIS should discuss how many homes could be powered by the Project.	According to QSE, they estimate that up to 50,000 homes could be powered by the Project.
The EIS should discuss the Project footprint, and if it would occupy the entire 1,675 acres or only a portion of it.	Sections 1.2 and 2.4
The EIS should discuss site access for construction and operation and how many new access roads would be required.	Section 2.4.2.3
The EIS should discuss how the (wet and dry) cooling system works, and water usage requirements.	Section 2.4
The EIS should discuss how much wind the solar collecting tower can withstand.	According to QSE, the solar collecting tower would be designed to withstand the International Building Code required design wind speed for the Project area, which is a basic wind speed of 90 miles per hour (International Code Council 2009).
The EIS should discuss if this technology has been tested at this scale or only on smaller facilities.	To date, this technology has only been used on smaller scale facilities (Solar One, later renamed Solar Two). SolarReserve has received all permits and approvals to begin construction of a similar 110-MW solar facility near Tonopah, Nevada. Construction of the Crescent Dunes Solar Project is expected to begin mid- to late summer 2011.
Project Purpose and Need	
The EIS should discuss how the Project would assist the state in meeting its renewable energy portfolio standards and goals.	Section 1.4
The EIS should discuss what energy market this Project would serve and who would purchase the power.	As of October 2011, a power purchase agreement has not been established.
Project Alternatives	
The EIS should clearly discuss the reasons for elimination of alternatives not evaluated in detail.	Section 2.3
The EIS should consider alternative sites on public land with fewer resource conflicts, prior disturbance, private land, etc.	Section 2.3.2
The EIS should explain why the proposed site was selected.	Section 2.2.1
The EIS should consider a distributed generation alternative.	Section 2.3.3
The EIS should include evaluation of a less water-intensive technology or dry-cooling system.	Section 2.4. The Applicant's Proposed Project is a dry-cooled system.

Table 1-7 Summary of Issues Identified during Scoping Periods

Issue or Question	Response or Section(s) of the EIS Where Issue is Addressed
The EIS should discuss alternatives and should consider alternative capacities or a smaller Project.	Section 2.6
Air Quality	
The EIS should consider the Project's effects on climate change.	Sections 3.6 and 4.6.3.2
The EIS should discuss the impacts to air quality resulting from construction of the Project, including fugitive dust and emissions.	Sections 3.6 and 4.6.3.2
Biological Resources	
The EIS should discuss how impacts to plant and wildlife species would be mitigated.	Sections 2.7.3, 2.7.4, 4.10.3.4, 4.11.3.4
The EIS should discuss how access roads affect wildlife and vegetation, how those impacts would be mitigated, and how roads no longer used after construction would be restored to natural conditions.	Sections 2.7.3, 2.7.4, 4.10.3.4, 4.11.3.4, and 4.11.5
The EIS should discuss how construction and maintenance of the Project, particularly the transmission line, could result in increased potential for invasive weeds (non-native or noxious species).	Sections 2.7.3, 4.10.3.2, 3.10.4.1, and 4.10.5
The EIS should discuss how invasive weed species would be monitored and controlled (e.g., chemical and manual weed control) on the transmission line and onsite.	Sections 2.7.3, 4.10.3.4, and 4.10.5
The EIS should discuss collisions, burns, and the reflection effect on wildlife, including birds, bats, and game animals (e.g., desert bighorn sheep).	Section 4.11.3
The EIS should discuss what would be done to prevent birds from perching on the solar collecting tower.	Section 4.11.3
The EIS should discuss transmission line effect on raptors, and degradation and fragmentation of habitat and interference with wildlife corridors.	Section 4.11.3
The EIS should discuss evaporation and stormwater pond effects to wildlife and mitigation measures.	Sections 4.11.3 and 4.11.3.4
The EIS should discuss the Project's effect on habitat (including wash habitat), and what measures would be taken to reduce habitat loss and fragmentation.	Section 4.11.3, and 4.12.3
The EIS should identify the potential presence of special status species and potential impacts.	Sections 3.10.5, 3.11.4, 4.10.3, and 4.11.3
The EIS should discuss impacts to desert tortoise, and mitigation employed to reduce impacts to this species during construction and operation.	Section 3.11.4.5

Table 1-7 Summary of Issues Identified during Scoping Periods	
Issue or Question	**Response or Section(s) of the EIS Where Issue is Addressed**
Cultural Resources	
The EIS should discuss cultural and paleontological resource impacts near the Colorado River, where there are large-scale geoglyphs.	Section 4.9
The EIS should discuss construction and operation of Project facilities, including the transmission line and effects to prehistoric and historic archaeological sites and traditional cultural properties.	Section 4.13
The EIS should discuss Western's coordination with Native American tribes; the results of the government-to-government consultation should be discussed.	Sections 1.5 and 5.1.3
Cumulative Impacts	
The EIS should discuss growth inducing effects, resulting in the proposal of additional energy projects and other types of development.	Section 4.1.3
The EIS should consider the cumulative impacts of many large-scale solar projects proposed on public land.	Section 4.1.3
The EIS should consider the cumulative impacts on groundwater from proposed solar facilities and other projects.	Section 4.12.6
The EIS should discuss cumulative impacts associated with the transmission needs of other foreseeable projects.	Section 4.1.3
The EIS should discuss irreversible impacts; although the anticipated Project lifespan is 20-30 years, the character of the land would be permanently changed.	Each resource section in Chapter 4 includes a description of irreversible impacts.
Geology, Minerals, and Soils	
The EIS should discuss how soil erosion from construction could affect water quality and habitat; erosion should be mitigated.	Section 2.7.2
The EIS should discuss any mining claims in the Project area.	Section 3.7.6
Hazardous Materials and Safety	
The EIS should discuss what hazardous materials would be used during construction and operation and any fire hazards associated with the oil or other materials used and stored onsite.	Sections 2.7.5, 3.19, and 4.19
The EIS should discuss weed control measures to reduce fire hazard onsite and along the transmission line.	Sections 2.7.3 and 4.18.3.2
The EIS should discuss whether local services have access to the site to respond to emergencies.	Section 4.14.3.2
The EIS should discuss the Project's effect on air traffic safety.	Sections 2.4.2.2 and 4.18.3.2

Issue or Question	Response or Section(s) of the EIS Where Issue is Addressed
The EIS should discuss reflection from the solar collecting tower and safety issues for travelers along SR 95.	Sections 4.16.3.2 and 4.18.3.2
Land Use, Recreation, and Transportation	
The EIS should discuss how construction traffic would affect local traffic and SR 95.	Section 4.5
The EIS should discuss if/how the transmission line would result in new access to public land or increased off-highway vehicle (OHV) use.	Sections 4.4.3.2 and 4.5.3.2
The EIS should discuss if the Project is consistent with the objectives of the Dunes Wildlife Habitat Management Area (WHA).	Sections 3.11.5 and 4.11.3.2
The EIS should discuss how the Project would affect recreation in the area, including riding, hunting, hiking, etc.	Section 4.4
Socioeconomics	
The EIS should discuss employment needed during construction and during operation.	Section 4.14.3.2
The EIS should discuss if job training would be offered in the local area.	Section 4.14.7
The EIS should discuss effects on minority or low-income populations.	Section 4.15
Visual Resources	
The EIS should discuss power plant and transmission line visual impacts on the viewshed and adjacent public and private land.	Section 4.16.3.2
The EIS should discuss the reflection from the solar collecting tower for travelers on SR 95 and to nearby viewers in Quartzsite and camping areas.	Section 4.16.3.2
Water Resources	
The EIS should discuss construction of the Project and associated facilities (e.g., access roads, transmission lines), and effects to washes and waters of the U.S. and drainage patterns.	Sections 2.5.4, 2.5.5, and 4.12.3.2
The EIS should discuss if the Project would result in discharges that could affect surface or groundwater quality; and how overflow and seepage from onsite storage facilities can be prevented.	Section 2.7
The EIS should discuss groundwater use and availability, annual recharge rates, existing water rights, alternate water sources, and effects to other water users and natural resources in the area.	Section 4.12

1.11 ORGANIZATION OF THE EIS

This EIS follows the CEQ recommended organization per 40 CFR 1502.10-1502.18. Table 1-8 describes the organization of the Draft EIS and Proposed YFO RMP Amendment.

Table 1-8 Organization of the Draft EIS and Proposed YFO RMP Amendment

Chapter 1 – Introduction, Purpose and Need	This chapter provides a description of the purpose of, and need for, the Applicant's Proposed Project; the role of Western, the BLM, and cooperating agencies in the EIS process; and the required regulatory actions for the Project. Chapter 1 also includes a summary of the scoping process and issues identified.
Chapter 2 – Description of the Applicant's Proposed Project and Alternatives	This chapter describes the Applicant's Proposed Project and alternatives analyzed in the EIS, including the No Action Alternative. Alternatives that were considered but eliminated from further analysis are described, with a discussion of why they were not considered further.
Chapter 3 – Affected Environment	This chapter describes the existing environment that could be affected if Western granted the interconnection request and the BLM issued the ROW grant and amended the YFO RMP. The existing environment includes the social and natural environment.
Chapter 4 – Environmental Consequences	This chapter describes possible environmental consequences of the Applicant's Proposed Project and alternatives analyzed in the EIS. Direct, indirect, and cumulative impacts of the Applicant's Proposed Project and alternatives are assessed and described in order to allow for comparative impact evaluation. Impacts are compared to the social and natural environment that would be expected to exist if no action were taken (No Action Alternative).
Chapter 5 – Public Involvement, Consultation, and Coordination	This chapter describes public participation undertaken to date, and additional opportunities that would occur throughout the EIS process. It also lists agencies and organizations that will receive copies of the EIS for review, as well as the preparers of the document.
Chapter 6 – References	This chapter includes a list of references used in the preparation of the EIS.
Chapter 7 – Glossary	This chapter includes a glossary of technical terms used in the EIS.
Chapter 8 – Index	Index listing of keywords used in the EIS.
Appendix A	Explanation of the proposed plan amendment to the YFO RMP.
Appendix B	Western's Construction Standards (Standard 13)
Appendix C	U.S. Fish and Wildlife letter responding to Western's Request for a List of Threatened and Endangered Species for the Quartzsite Solar Energy Project
Appendix D	Air Quality Emissions Analysis
Appendix E	Mojave Fringe-toed Lizard Study Proposal
Appendix F	Key Observation Point Worksheets
Appendix G	Visual Simulations

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CHAPTER 2 – ALTERNATIVES AND PROPOSED FEDERAL ACTIONS

2.1 INTRODUCTION

This chapter describes the Applicant's Proposed Project, proposed Federal actions, and the Applicant's site selection and screening methods. These methods were used to determine which alternatives would be carried forward for analysis.

This Draft EIS considers three Project alternatives: the No Action Alternative; the Applicant's Proposed Project (a dry-cooled alternative); and Alternative 1 – a hybrid (wet- and dry-cooled) alternative. Alternative 1, the hybrid option, would generally incorporate the same construction, operational, decommissioning, and reclamation components as the Applicant's Proposed Project, but would use an alternative cooling technology. To avoid redundancy, this section will present a single Project description that identifies the elements common to all action alternatives, and then separately identify the elements unique to Alternative 1.

If Western chooses to allow interconnection of QSE's proposed solar facility, under either the dry- or hybrid cooled alternative, Western would construct and operate a new 161/230-kV switchyard to interconnect the solar facility to Western's existing Bouse-Kofa 161-kV transmission line. Western would need to upgrade its communication system to provide dual and redundant communications to deliver signals to operate the switchyard equipment from control centers and other remote locations and to report metering. Western's proposed switchyard and telecommunication options are described in Section 2.2.4.

2.1.1 Federal Agency Proposed Action

Western's proposed action is to approve QSE's request to interconnect to Western's Bouse-Kofa 161-kV transmission line. Should Western grant QSE's interconnection request, Western would select a telecommunications alternative: fiber-optic or microwave. These alternatives are described in Section 2.2.4.

The BLM's proposed action as it relates to the Applicant's Proposed Project is to decide whether or not to amend the YFO RMP and to approve, approve with modifications, or deny issuance of the ROW grant for the Project. In order to approve either the Applicant's Proposed Project or Alternative 1, the BLM has to decide concurrently to approve the proposed YFO RMP amendment. The proposed RMP amendment is presented in Appendix A to this EIS.

The decisions of both Western and the BLM will be documented in separate RODs and published in the *Federal Register*.

2.1.2 Regulatory Framework for Alternatives

Federal agencies are required by NEPA to evaluate not only the Applicant's Proposed Project, but reasonable alternatives such as the No Action Alternative (40 CFR §1502.14). Section 1502.14(a) requires Federal agencies to explore a reasonable range of alternatives, "and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." The CEQ Guidance concerning NEPA regulations adds that reasonable alternatives include those that are "practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant" (CEQ 1981).

When granting a ROW, FLPMA Title V, Section 505, requires the BLM to include in the ROW terms and conditions that minimize environmental impacts. Specifically, such terms shall "minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment…require compliance with applicable air and water quality standards established by or pursuant to applicable Federal or State law; and…require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation and maintenance of" the ROW. Consideration of such terms and conditions will be part of the alternatives analyzed in this EIS.

2.2 ALTERNATIVES DEVELOPMENT AND SCREENING

Based on public comments received during scoping, interdisciplinary interaction among resource professionals, and collaboration with interested agencies, a range of potential alternatives to be considered in the EIS was identified and evaluated by Western and the BLM. A screening process was used to identify which alternatives would or would not be carried forward for analysis in this EIS. The process included:

- Develop an understanding of the Project; identify the basic objective of the Project; and describe its beneficial and adverse impacts.
- Explore and evaluate all reasonable alternatives that meet QSE's objectives and Western and the BLM's purpose and need and are feasible from a technical and economic perspective.
- Of those reasonable alternatives, identify those that would avoid or minimize adverse impacts or enhance the quality of the human environment.
- Evaluate the impacts of not amending the YFO RMP and not constructing the Project (No Action Alternative).

2.2.1 Consideration of Alternative Sites

CSP tower technology has specific siting requirements. As part of its siting process, QSE used a refined set of criteria to screen, identify, and prioritize potential land sites for eventual solar development. Criteria include the physical characteristics of the site, environmental considerations, proximity to transmission, and other siting factors that impact project costs and economics. Each of these criteria was applied during the screening phase of the Project, which led to the selection of the current site.

These criteria included:

- **Solar Resources –** The site needs to be located where high solar direct normal insolation, or exposure to the sun's rays is available to maximize the plant's output and allow efficient utilization of the land area affected by Project development. For a project to be economically viable, only the highest of solar insolation levels are desirable.

- **Size and Shape –** The site must be large enough (minimum area of four contiguous square miles [a 2- by 2-mile square]), allowing for uninterrupted placement of the solar collection field (i.e., heliostat mirrors) to support an efficient and cost-effective layout of the Project facilities.

- **Slope –** The site should be relatively flat, with a slope of 3 percent or less, to minimize the need for extensive grading and a large volume of cut and fill.

- **Environmental Consideration –** It is preferable to select sites that avoid or minimize impacts to known cultural resources, threatened and endangered species, and other sensitive resources.

- **Transmission Infrastructure –** To minimize cost and potential environmental impacts, the site should be located where interconnection to an existing high-voltage transmission system is possible without the construction of lengthy generation tie-lines. In addition, the site should be in reasonable proximity to suitable transportation infrastructure to allow easier access during both construction and operation without creating the need for additional road construction.

- **Water Resources –** Since the CSP technology requires water for cooling, the site should be located where surface and/or groundwater is available.

- **Site Control –** The land must be available for sale or lease/ROW at a reasonable cost and be free of conflicting surface and subsurface encumbrances. In addition, the site must be located in an area that does not interfere with civilian or military flight paths and airport operations.

QSE initially identified the region in the vicinity of Quartzsite, Arizona, with high potential for a CSP project due to high direct normal insolation, large contiguous tracts of land with relatively flat topography, and potential access to high-capacity transmission lines. QSE next conducted field reconnaissance to look at large blocks of land on both the east and west sides of SR 95 near Quartzsite. These field surveys included evaluation of topography, drainage, and biological diversity, which served to characterize biological sensitivity in the area. A records search of the archaeological files was also completed to assess cultural resource sensitivity of the area. Following these evaluations, QSE identified two potentially available sites:

- A parcel approximately 13 miles north of Quartzsite on State Trust Land administered by the Arizona State Land Department ("State Land Site")

- The ROW application area, located approximately 10 miles north of the Town of Quartzsite ("Project area") on BLM-administered land

Initial screening of the State Land Site and the BLM ROW application area indicated that both sites offered high direct normal insolation, favorable topography, and existing transportation access. In addition, water supplies in the area are not restricted or in an Active Management Area for water resources. Both sites also have good access to transmission infrastructure via Western's existing 161-kV Bouse-Kofa transmission line, thereby reducing the potential for environmental impacts that would be associated with the construction of a new, lengthy transmission line to interconnect the Project with the electrical grid.

State Trust Land – The State Land Site included an area of approximately 2,240 acres. It was one of the areas QSE initially identified as an alternative site in the preliminary screening stage as having good topography, reduced vegetation (when compared to surrounding areas), and minimum stormwater drainage features. To further characterize the site, additional environmental studies were conducted on the State Land Site. The purpose of these studies and additional field surveys was to characterize dune areas, determine the presence of sensitive species, and draw a correlation between significant dunes and preferred Mojave fringe-toed lizard habitat. These biological and geomorphological surveys concluded that more than 90 percent of the State Land Site consisted of loose, sandy habitat suitable for occupancy by the Mojave fringe-toed lizard (EPG 2009). The survey also cited the increased numbers of Mojave fringe-toed lizard on the State land site due to the prevalence of dune habitat there, which is the lizard's preferred habitat type. Therefore, QSE eliminated this site from further consideration in order to avoid impacts to Mojave fringe-toed lizard habitat.

Right-of-Way Application Area – QSE's ROW application area includes approximately 26,000 acres, encompassing locations on both the west and east sides of SR 95. It is typical for project developers to apply for large land areas, allowing for site control, while additional due diligence studies are performed to determine and finalize the best location for facility development. Following the initial due diligence review, QSE refined the analysis area within the ROW application area based on topography, drainage, biological diversity, and the cultural resources records review.

Alternative Sites West of SR 95 – During preliminary screening and analysis, QSE determined that all sites west of SR 95 demonstrated:

- Less favorable topography and a greater environmental impact from grading and land disturbance; QSE's technology requires contiguous flat land of typically no greater than 3 percent grade in order to minimize land disturbance and associated engineering costs.

- Additional potential eolian dune-type habitat area associated with the rolling topography; based on QSE's efforts to avoid or minimize siting the facility within dune habitat and the associated potential impacts to Mojave Fringe-toed lizard habitat.

- Numerous active mining claims west of SR 95 as shown on Figure 3-6; these claims create the potential for surface access conflicts.

- A greater distance from the existing north-south BLM utility corridor and Western's161-kV transmission line. Given the need to interconnect with the Western transmission line in the existing utility corridor east of SR 95, sites west of SR 95 would create higher generator costs, higher land costs, higher potential land impacts, and potential for difficulty in crossing SR 95 (a major north-south highway).

- No significant improvement in potential visual impact as compared with sites east of SR 95. Based on the evaluation of the entire ROW application area, and given the height of the tower, siting the Project on the west side of SR 95 would not materially improve visual impacts of the Project.

- A higher likelihood of impacts to military operations due to the existence of additional slow speed and visual flight routes identified by the DOD Preliminary Screening Tool. Given the potential incompatibility with commercial and military airspace, QSE evaluated the site and determined the east side of SR 95 provided less physical interference than the west side.

The sites west of SR 95 were therefore abandoned from further consideration for these reasons.

Alternative Sites East of SR 95 – QSE considered two alternative sites on the east side of SR 95 – a "northern site" (which was selected as the Project site), and a "southern site". The southern site is located south of a private parcel of land located within the 26,000-acre ROW application area (see Figure 1-1). When comparing these two sites, the topography of the southern site was not as favorable as the Project site. As previously indicated, QSE's technology requires contiguous flat land of typically no greater than 3 percent grade in order to minimize land disturbance and associated engineering costs. The southern site topography is inconsistent with this criterion, and therefore, it was removed from further consideration.

Project Area – The Project area was ultimately selected by QSE based on the results of biological and geomorphological surveys performed on both the northern location within the ROW application area as well as the State Land Site. The geomorphological survey provided an indication of the extent of the sand dunes that serve as the basis for Mojave fringe-toed lizard habitat. The findings of the geomorphological survey were combined with the biological survey, which included an assessment of both plants and animals. The only sensitive species identified by field surveys was the Mojave fringe-toed lizard, an AZGFD species of concern (EPG 2009). Within the Project area, the Mojave fringe-toed lizard was observed only on sand ridges. Sand ridges are found in less than 5 percent of the Project area. Thus, the northern site in the BLM application area was selected as the Project area because there were fewer and smaller sand ridges and fewer identified Mojave fringe-toed lizard, minimizing potential impacts to the Mojave fringe-toed lizard.

Within the Project area, facility locations were further refined by shifting the heliostat field slightly to the north and east to avoid both a BLM-designated utility corridor adjacent to SR 95 and sand dunes located in the southeastern corner of the Project area, where the biological survey indicated the presence of Mojave fringe-toed lizard.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Several alternatives were considered during the EIS process but eliminated from detailed analysis. The specific alternatives that were eliminated from detailed analysis are discussed below, along with the rationale for their elimination. In addition to the alternatives for the Applicant's Proposed Project, the BLM also developed alternatives to the plan amendment that is being considered concurrently with the Project. Those RMP amendment alternatives, including those plan amendment alternatives eliminated from further analysis are described in Appendix A of this EIS.

2.3.1 Reduced MW and/or Footprint Configuration of the Applicant's Proposed Project

Unlike other solar generation technologies such as solar trough or solar photovoltaic, SolarReserve's "power tower" solar thermal technology does not vary in physical size as a function of power output. All solar thermal projects being developed by SolarReserve require a similar number of heliostat mirrors as well as tower and receiver dimensions. The most significant plant variances between projects include generator size, thermal storage capacity, and cooling technology. All of these variances occur within the power block and do not affect total land impact. Stated differently, a smaller output power plant will not be physically smaller than a larger output power plant.

The concentrating solar power system components for the Project, including total heliostat surface area, receiver size and thermal rating, and tower height have been designed and engineered to provide optimum yield and therefore the lowest levelized cost of energy. This optimized solar collection and molten salt system configuration is backed with guarantees and warranties from the manufacturer. These guarantees and warranties require that the technology be deployed per manufacturer's specifications. As a result, the technology proposed for the QSE project will vary only slightly in land impact and annual megawatt-hour energy delivery from project to project, but can vary in megawatt output capacity depending on available transmission capacity and cost for interconnection upgrades. Other differences from project to project will be in cooling technology and thermal energy storage capability to match MW output capacity, and both changes would occur within the power block and would not affect the physical size of any individual project.

SolarReserve submitted an Interconnection Request with Western for project interconnection to the Bouse-Kofa 161-kV line and subsequently held a scoping meeting with Western in accordance with the LGIP. The LGIP provides a standardized methodology allowing SolarReserve to proceed through a series of engineering studies conducted by Western to assess the electrical impact of the Project to Western's grid, and thus the cost to the Proponent to upgrade the network in order to accommodate the expected electrical impacts. The study methodology considers the type of power generation technology being used and its specific generation characteristics. For this Project, Western is considering interconnecting a 100-MW

CSP solar facility to their Bouse-Kofa 161-kV line. This process provides an additional constraint on the size, in MW, of the proposed Project.

2.3.2 Other Alternative Sites

Brownfield Sites – During the public scoping period, several commenters requested the Applicant consider development of the Project on a Brownfield site. Brownfield sites have been previously used as a commercial or industrial site and are available for re-use. The land may be contaminated by low concentrations of hazardous waste or pollution, and has the potential to be reused once it is cleaned up. Redevelopment of such a facility may be complicated by real or perceived environmental contamination and often needs to be restored before use, which can increase the costs for a developer.

A search of the ADEQ website did not identify any Brownfield sites in the vicinity of the Project (ADEQ 2010a). Additionally, no Brownfield sites or sites of marginal quality were identified within the BLM's YFO district (BLM 2010a). Therefore, alternative sites that would utilize Brownfield sites or previously disturbed lands of marginal quality have been eliminated from further consideration.

Private Lands – Comments were received suggesting the use of private property instead of using BLM-administered land. Private property in the Project area and in the vicinity of the Bouse-Kofa transmission line is limited, and none of the properties would meet the size (acreage) requirement of the Project. Most of the private property in the Project area is within the town limits of Quartzsite.

In addition, alternative sites on private land would not meet the purpose and need for the BLM to process the ROW application for the Project and to increase renewable energy resources on public land by 2015, as directed in the EPAct. Therefore, alternative sites on private land have been eliminated from further consideration.

BLM Disposal Land – The BLM YFO RMP has designated approximately 11,900 acres of public land within the planning area as being available for withdrawal, disposal by sale, or exchange. The Yuma RMP states that all public land would be retained in Federal ownership, unless determined that disposal of a particular parcel(s) would serve the public interest (BLM 2010a).

There are approximately 6,000 acres of disposal land in and around the Town of Quartzsite. These disposal lands basically surround Quartzsite on the east, north, and west sides. The Town of Quartzsite has already included these disposal lands within their Town Limits, with the area designated as Rural Residential. BLM disposal land does not meet QSE's requirement of a 2- by 2-mile area or their desire to locate a project on State/Federal land away from population centers. None of the other disposal lands within the BLM YFO were of sufficient size to meet QSE's minimum acreage requirements. Therefore, alternative sites utilizing BLM disposal land have been eliminated from further consideration.

BLM Visual Resource Management Class IV Land – The Project, as proposed, is located in a VRM Class III management area. A comment suggested locating the Project within BLM VRM

Class IV land. The current RMP for the YFO identifies that of 1,318,000 acres managed by the YFO for one of the four VRM classes, there are only 19,200 acres of VRM Class IV available in the BLM Yuma District (BLM 2010a). The majority of Class IV land is identified south of Quartzsite and Interstate 10 (I-10), along US 95, in an area of intensive camping and recreational use along with several designated long-term visitor use areas. Other large VRM Class IV lands are located on the north and east sides of the Town of Quartzsite, Arizona. Construction and operation of the Applicant's Proposed Project on VRM Class IV lands in these areas would result in greater visual and noise impacts to recreation users in the intensive camping and recreation use areas, and to residents in the Town of Quartzsite.

The BLM is considering an amendment to the YFO RMP to change the management objective of areas along the northern extent of the YFO planning area from VRM Class III to VRM Class IV.

2.3.3 Alternative Power Generating Technologies

During the scoping period, several commenters requested QSE consider other power generating technologies such as distributed generation and solar photovoltaic (PV) generation or increased energy efficiency. The following section describes other power generating technologies considered by QSE. It is important to note that Western has no authority/jurisdiction over the type of generation technology that an applicant chooses to interconnect to a Western facility. As described in section 2.1.1, Western's proposed action is to either grant or deny QSE's request to interconnect to Western's Bouse-Kofa 161-kV transmission line. Similarly, such alternative technologies do not respond to BLM's proposed action to consider an application for the authorized use of public lands for a specific renewable energy technology, like the one submitted by QSE for the Project.

2.3.3.1 Wet-Cooling Alternative

QSE's original Plan of Development identified a wet-cooled solar thermal power plant as the preferred alternative. However, following extensive due diligence that took into account unique environmental and ecological considerations—including water conservation—and State and Federal government renewable energy initiatives and policies, it was determined that a dry-cooling solar thermal power plant would be the best technology option for the Project area.

While wet-cooling is typically the lowest cost system and provides the highest steam turbine efficiency, the evaporative cooling process results in higher water use than other cooling methods. Operational water requirements under the wet-cooled alternative would be approximately 1,200 to 1,500 acre-feet of water per year. Therefore, the wet-cooled option has been eliminated from further consideration.

2.3.3.2 Photovoltaic Power Generation (Utility Scale)

Photovoltaic technologies use special semiconductor devices (frequently called cells) to directly convert solar energy (sunlight) into electrical energy. PV cells are currently made of semiconductor materials such as silicon, which is the most commonly used material. When light strikes the solar cell, a certain portion of it is absorbed within the cell material. The energy of the absorbed light (photons) is transferred to the semiconductor. This energy releases electrons, allowing them to flow freely. This flow of electrons creates an electrical current.

While SolarReserve (QSE's parent company) develops up to 20-MW projects using PV technology in other locations with smaller acreage and lower distribution-level voltages, the characteristics of the Project area make it ideally suited for meeting QSE's objective (i.e., to develop a solar energy project using the Applicant's proprietary CSP thermal storage technology that would allow the flexible and non-intermittent production of renewable power during peak and/or off-peak demand periods). PV cannot provide energy storage for reliable dispatchable generation. At the Project area, the availability of a large parcel of land, its proximity to Western's Bouse-Kofa 161-kV transmission line, and the availability of significant electrical capacity on that line, make the site a more natural fit for the deployment of QSE's larger CSP technology.

2.3.3.3 **Residential (Rooftop) Photovoltaic Energy Production, Distributed Generation, and Energy Conservation**

Several comments received during the scoping process suggested consideration of other power generating technologies, such as distributed generation, rooftop PV power generation, or increased energy efficiency, as opposed to, or in addition to, the development of centralized, utility-scale solar energy facilities. Distributed generation refers to the installation of small-scale solar energy facilities at individual locations at or near the point of consumption (e.g., use of solar PV panels on a business or home to generate electricity for on-site consumption). Distributed generation systems typically generate less than 10,000 kW. Other terms for distributed generation include on-site generation, dispersed generation, distributed energy, and others. QSE did not consider these alternatives as viable, as they do not manufacture, install, or operate such distributed generation systems.

Also, neither Western nor the BLM have decision-making authority regarding the use and implementation of distributed generation, rooftop PV, and energy conservation in private homes or commercial buildings. Residential rooftop or distributed energy production are at the discretion of the private homeowner/business owner and other entities (e.g., local, county, and state governments).

Additionally, the applicable Federal orders and mandates providing the drivers for specific actions being evaluated in EIS compel the BLM to evaluate utility-scale solar energy development on public lands. As discussed in Section 1.4.2, the Energy Policy Act of 2005 (PL 109-58) requires the Secretary of the Interior to seek to approve non-hydropower renewable energy projects on public lands with a generation capacity of at least 10,000 MW of electricity by 2015; this level of renewable energy generation cannot be achieved through distributed generation systems. In addition, Order 3285A1 issued by the Secretary of the Interior requires the BLM and other Interior agencies to undertake multiple actions to facilitate large-scale solar energy production (Secretary of the Interior 2010). Accordingly, the BLM's purpose and need for agency action in this EIS is focused on the siting and management of utility-scale solar energy development on public lands and, therefore, alternatives incorporating distributed generation with utility-scale generation or looking exclusively at distributed generation, do not respond to either Western's or the BLM's purpose and need for agency action in this EIS.

2.4 PROPOSED PROJECT AND ALTERNATIVES

Based on project scoping meetings and discussions with resource professionals and Project staff at Western, BLM and QSE, three alternatives were chosen to be evaluated in detail in the EIS. These include: (1) No Action Alternative; (2) Applicant's Proposed Project – a dry-cooled option; and (3) Alternative 1 – a hybrid (wet- and dry-cooled) option. Comparative information about these two alternatives is provided in Table 2-1.

Table 2-1 Facility Features of Each Action Alternative

Feature/Facility	Applicant's Proposed Project (Dry-Cooled Option)	Alternative 1 Hybrid Wet- and Dry-Cooled Option
Technology Type	Dry-cooled CSP plant	CSP plant with an air-cooled condenser (dry-cooled) augmented with an evaporative cooling tower (wet-cooled).
Nominal Capacity	100 MW nominal; daily operating hours would vary by season and solar potential. Plant is estimated to have a capacity factor of approximately 50 percent, generating an estimated 450,000 MWh per year.	Similar to the dry-cooled option with additional operating hours and MWh production, due to increased efficiency (approximately 5 percent overall increased efficiency).
Project Disturbance (a) Size of area subject to permanent disturbance (b) Size of area subject to temporary disturbance	(a) Up to 1,675 acres (b) Up to 70 acres	(a) Up to 1,685 acres to accommodate larger evaporation ponds. (b-d) Same as the dry-cooled option.
(c) Size of offsite construction parking area (d) Size of offsite construction office, laydown, and heliostat assembly area	(c) Up to 10 acres (d) Up to 35 acres	
Solar Array	The array would consist of a circular field encompassing an area with a radius of 4,650 feet (approximately 1,550 acres), where as many as 17,500 heliostats (or mirrors) would be located.	Same as the dry-cooled option.

Table 2-1 Facility Features of Each Action Alternative

Feature/Facility	Applicant's Proposed Project (Dry-Cooled Option)	Alternative 1 Hybrid Wet- and Dry-Cooled Option
Power Block	The power block, in a circular area with a radius of approximately 400 feet would house the solar collecting tower, storage tanks, steam turbine, air-cooled condenser, transformers, heat exchangers, power block buildings, and other ancillary equipment.	Same as the dry-cooled option, except the air-cooled condenser would be approximately one-quarter the size, and an evaporative cooling tower (approximately 45 feet wide and 135 feet long) would be added. The total duty on the cooling system would be split between the two coolers, with an increase in water consumption for the addition of the evaporative cooling tower from 200 acre-feet per year to 600 acre-feet per year. Same 400-foot radius utilized as under the Applicant's Proposed Project.
Solar Collecting Tower	Base diameter approximately 115 feet; maximum tower height – overall 653 feet (538-foot concrete tower, 100-foot solar receiver, 15-foot crane)	Same as the dry-cooled option.
Reverse Osmosis (RO) Treatment System and Evaporation Ponds	RO facility to be located within the power block. Up to three 4-acre evaporation ponds would be required. Ponds to be located at the southwestern end of the solar field.	Same as the dry-cooled option, but larger evaporation ponds required (up to three 6-acre evaporation ponds)
Molten Salt Storage	Up to 70 million pounds or approximately 4.4 million gallons of molten salt (sodium nitrate-potassium nitrate mixture) at 550 degrees Fahrenheit (°F). Two 40-foot-tall hot and cold storage tanks made from high nickel alloy stainless steel for compatibility with liquefied salt. Hot tank with approximately 170 feet inside diameter; cold tank with approximately 160 feet inside diameter. Insulation is approximately 2 feet thick.	Same as the dry-cooled option.
Access Road	A new paved, two-lane access road would extend approximately 2,800 feet east from SR 95 to the western edge of the facility.	Same as the dry-cooled option.

Table 2-1 Facility Features of Each Action Alternative		
Feature/Facility	**Applicant's Proposed Project (Dry-Cooled Option)**	**Alternative 1 Hybrid Wet- and Dry-Cooled Option**
Transmission Line	A new 230-kV design generation tie-line would interconnect to Western's existing 161-kV transmission line located on the east side of SR 95. Line may be up to 1.5 miles in length. Estimated pole height is 85 feet, and no taller than 115 feet. Poles would be steel monopoles. An additional 69-kV line to provide backup power to the facility would run parallel to the generation tie-line and would connect to the existing 69-kV Arizona Public Service transmission line. Future engineering would determine if the backup line would run on the same poles as the generation tie-line or if additional poles would be required.	Same as the dry-cooled option.
Electrical Switchyard (to be constructed and owned by Western)	A new switchyard would be constructed to 230-kV standards west of the solar facility adjacent to the existing transmission line, and operated at 16- kV. Preliminary dimensions – 300 feet by 400 feet.	Same as the dry-cooled option.
Water Service	Up to three onsite wells would be used to provide Project water. During construction up to 1,000 acre-feet[1] per year would be needed requiring a pumping rate of 1,293 gpm. During operations, up to 200 acre-feet per year would be required, with a pumping rate of 254 gpm. Water would be split between the wells.	Same as the dry-cooled option, except the operational water use would be up to 600 acre-feet per year requiring a pumping rate of 761 gpm.
[1] *An acre-foot equals 325,000 gallons, which is the amount of water it would take to flood an acre to a depth of one foot. Average household water use annually is 127,400 gallons (American Water Works Association 2011).*		

2.4.1 No Action Alternative

NEPA regulations require that EIS alternative analyses "include the alternative of no action" (40 CFR §1502.14[d]). The No Action Alternative is included in the analysis so that the EIS clearly evaluates the effects of not amending the YFO and not developing the Project. In other words, the No Action Alternative provides a baseline for comparison of the environmental effects of the other alternatives. For this analysis, the No Action Alternative includes the following:

- Western would deny the interconnection request and would not build, own, and operate a new electrical switchyard and would not upgrade their telecommunication system to support the proposed Project.

- The BLM would deny the ROW application and not amend the YFO RMP. Existing management of the area would continue in accordance with the BLM's YFO RMP.
- QSE's Project would not be built, and any environmental and socioeconomic impacts associated with construction and operation would not occur.

2.4.2 Applicant's Proposed Project – Dry-cooled

The Project uses CSP technology, which uses heliostats/reflecting mirrors to redirect sunlight onto a receiver erected in the center of the solar field (the solar collecting tower). An HTF is heated as it passes through the receiver, and then circulated through a series of heat exchangers to generate high-pressure, superheated steam. The steam is then used to power a conventional Rankine cycle steam turbine/generator, which produces electricity. The exhaust steam from the turbine is condensed and returned via feedwater pumps to the heat exchangers, where the high-pressure, superheated steam is generated again. Figure 2-1 presents a conceptual diagram of the process.

Both the central receiver and type of HTF used in the cycle distinguish QSE's technology from other CSP technologies. The HTF consists of a mixture of 60 percent sodium nitrate and 40 percent potassium nitrate salts, with a melting temperature of approximately 460°F. Approximately 35,000 tons is melted to a liquid form (approximately 4.5 million gallons) and circulated through the tubes in the central receiver, collecting the energy gathered from the sun. The heated salt is then routed to an insulated storage tank (hot thermal storage tank), where the energy can be stored for extended periods of time with minimal energy loss. No addition of salt is expected for the system over its operating lifetime.

To generate electricity, the hot salt is routed to the steam generation system (or heat exchanger) and used to produce steam at high temperature. After exiting the steam generator, the salt is sent to a "cold" salt thermal storage tank, and the cycle is repeated.

The thermal storage capability allows the excess heat to be stored until needed for power generation, effectively decoupling energy collection from the energy production process. Thermal storage also can extend the generating period of a power plant to provide a steam heating source after the sun sets, allowing the facility to more closely satisfy the demand for electricity, which typically peaks in the late afternoon and evening hours.

2.4.2.1 **Generating Facility Components**

The general layout for the proposed solar plant and ancillary facilities is shown on Figure 2-2 and includes the following components:

- Solar collecting tower
- The heliostat (mirror) array – a circular field with a radius of approximately 4,650 feet where the heliostats are located

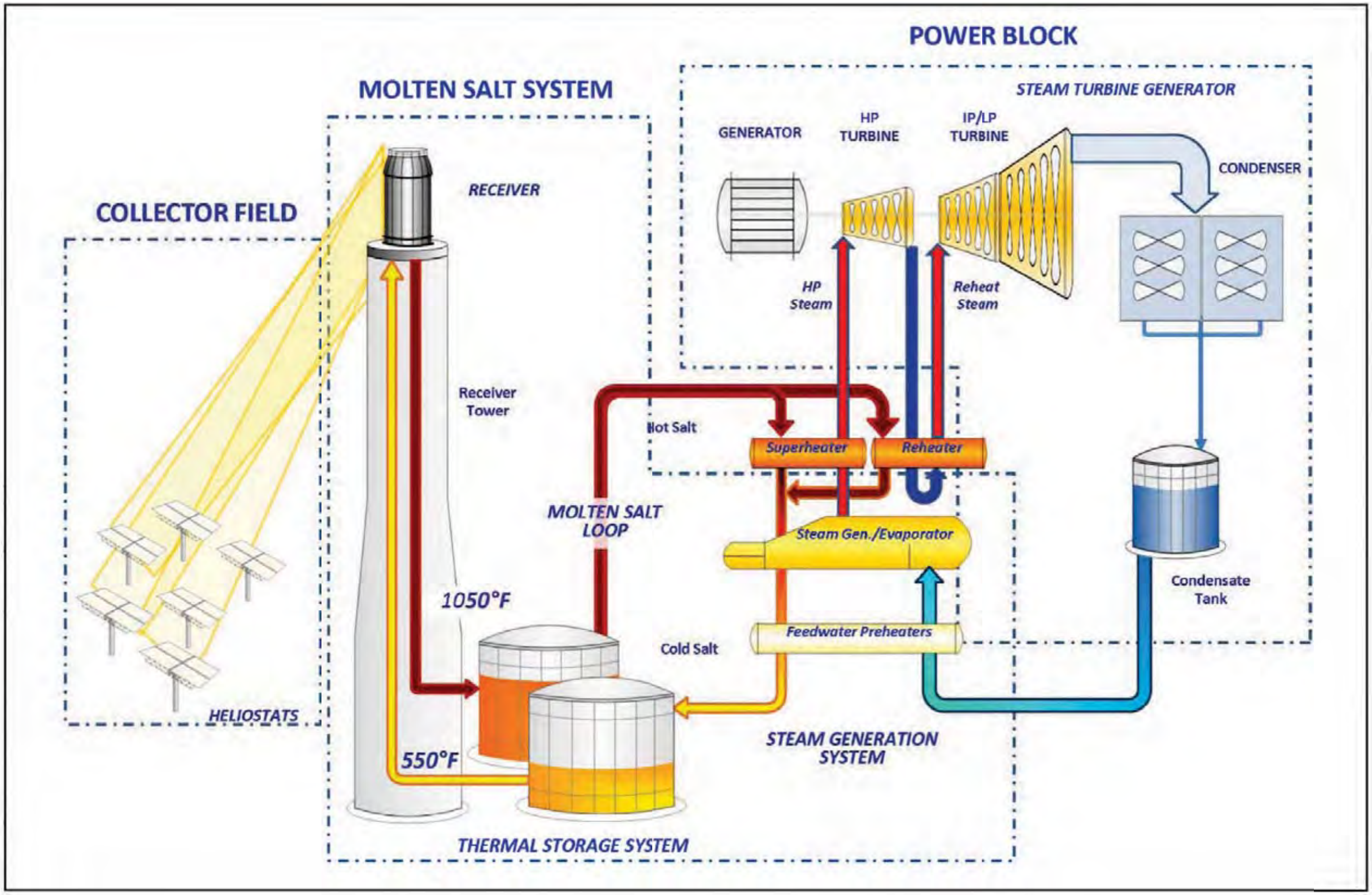
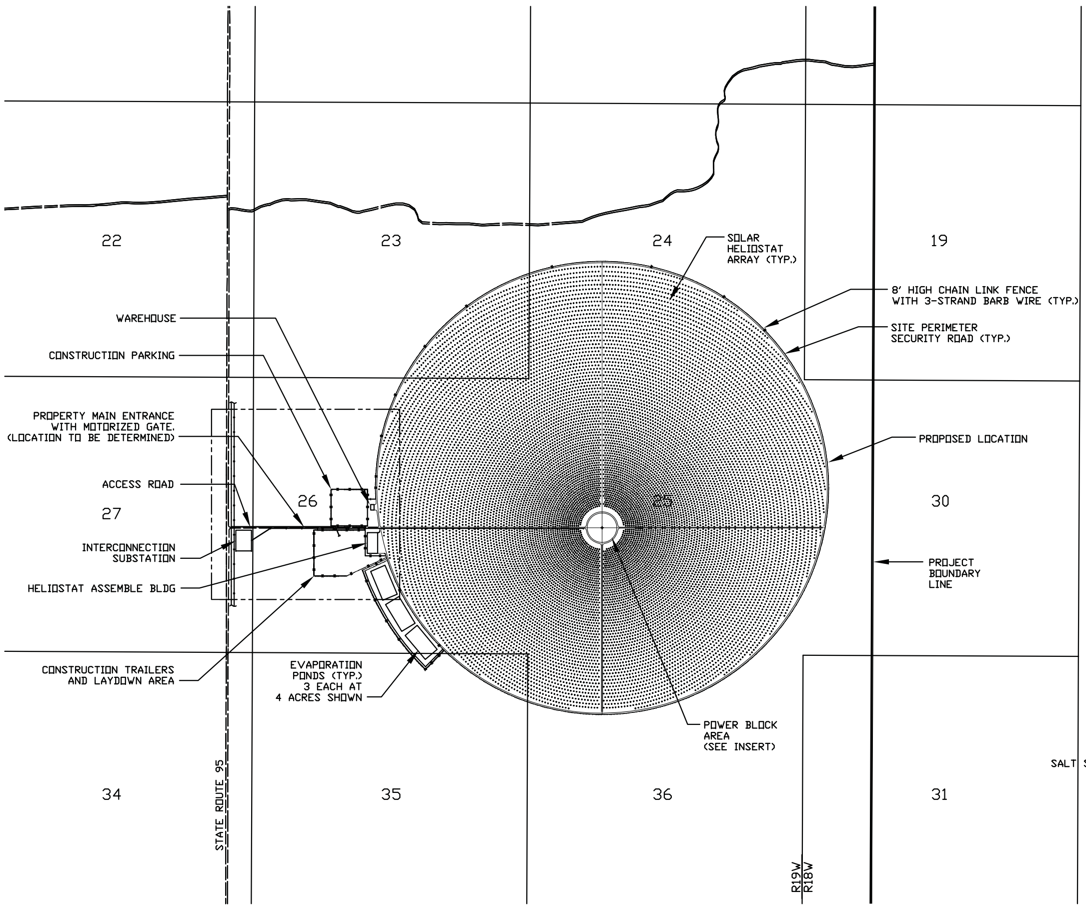


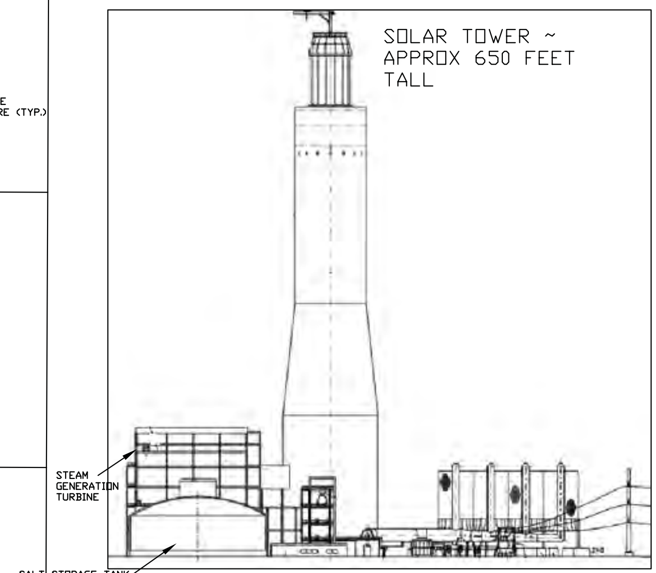
Figure 2-1 Conceptual Process Diagram
Quartzsite Solar Energy Project

Source: Solar Reserve

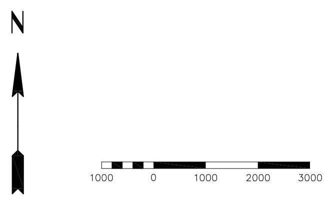


NOTES:

1. THE FINAL LOCATION OF THE SOLAR FIELD WILL BE WITHIN THE PROJECT BOUNDARY, LOCATED GENERALLY AS SHOWN, AND ADJUSTED IN LOCATION TO MINIMIZE DISTURBANCE OF SENSATIVE RESOURCES.
2. TOTAL APPROXIMATE AREA WITHIN THE PERIMETER FENCE IS 1,620 ACRES.
3. THE FINAL SIZE OF THE EVAPORATION PONDS IS TO BE DETERMINED. SHOWN AS THREE PONDS AT 4 ACRES EACH FOR DEMONSTRATION ONLY (TYPICAL SIZE).



POWER BLOCK ELEVATION



QUARTZSITE SOLAR ENERGY LLC
QUARTZSITE SOLAR ENERGY PROJECT

WorleyParsons
resources & energy

General Solar Power Plant Arrangement	11/2010	Figure 2-2

- The power block – a circle with a radius of approximately 400 feet that houses the solar collecting tower, steam turbine generator, steam heat rejection and condensing equipment, transformers, steam generating system, heat exchangers, thermal storage system, buildings, and other ancillary equipment
- Electrical, lighting, and communication systems
- Western's transmission system, switchyard, and interconnections
- Access road
- Administration and maintenance buildings, which would be located along the outside perimeter of the solar array
- Water supply, storage, and treatment system

A brief summary of the various components and aspects of the Project is provided in the following sections.

Solar Collecting Tower

The solar collecting tower would be a 538-foot concrete structure that supports a 100-foot cylindrical receiver mounted on the top of the tower. The receiver would be composed of tube panels through which the liquid salt (also referred to as HTF) flows. Therefore, the top of the receiver would be at a height of 638 feet. A maintenance crane also would be mounted on top of the receiver, which would be 15-feet tall, for an overall height of 653 feet.

Heliostat (Mirror) Array

The solar collecting tower/central receiver system generates electric power from sunlight by focusing concentrated solar radiation on a tower-mounted receiver. The system would use thousands of sun-tracking mirrors called heliostats, which would be arranged concentrically around the solar collecting tower and reflect the incident sunlight onto the receiver.

Up to 17,500 heliostats arranged in concentric circles around the solar collecting tower would occupy approximately 1,550 acres. Each heliostat would be configured with a mirror array hung in a landscape orientation.

Each mirror array would be 24-feet high by 28-feet wide, providing a reflective surface of 672 square feet per heliostat. Each heliostat has a 12-foot high post or pier-type pedestal mounted on a foundation to support and anchor the unit. The overall height of the heliostats would be approximately 26 feet when they are facing near vertically, with approximately 2 feet of ground clearance. The heliostat power and control cables would be direct-bury cables (or similar) in the field, up to each individual heliostat unit. Depictions of the heliostats are shown on Figure 2-3.

The arrangement of the heliostats within the field would be optimized to maximize the amount of solar energy that could be collected by the field, and would be arranged to avoid interference among heliostats as they track the sun during the day. The heliostats would be arranged asymmetrically in arcs around the solar receiver.

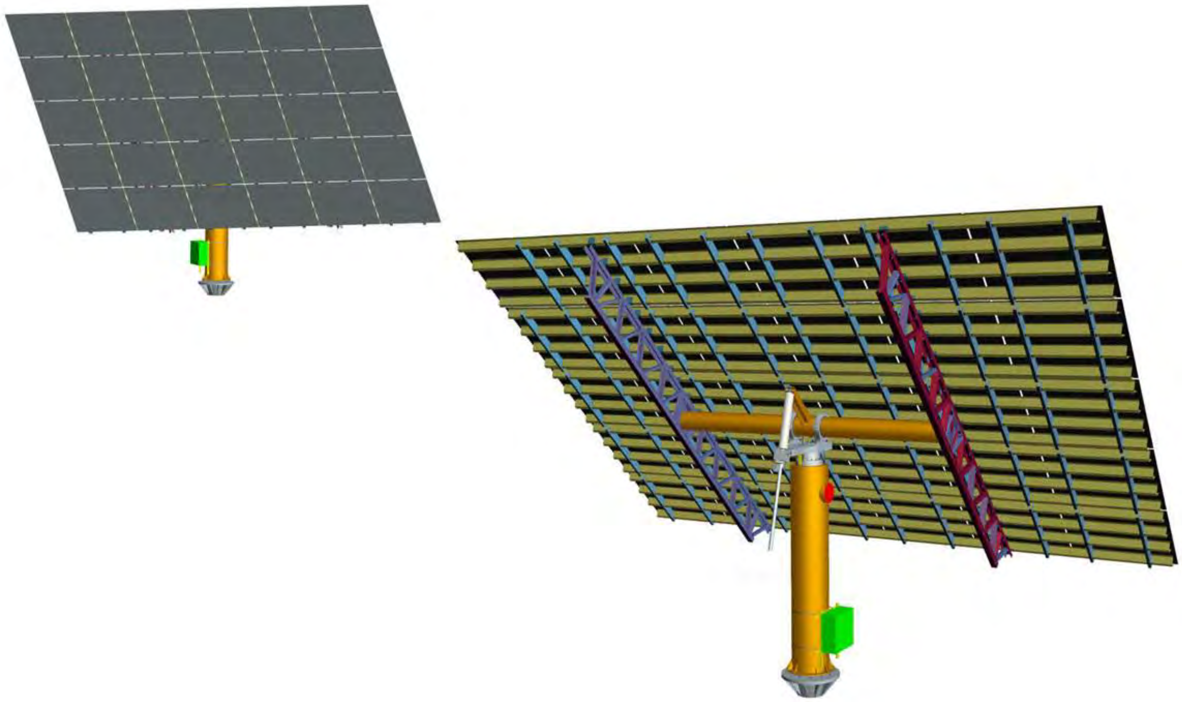


Figure 2-3 Heliostat

Power Block

The power block would include, in part, a steam turbine generator, multiple feedwater heaters, steam superheaters and reheaters, lubricating oil system, hydraulic control system, valving, piping, and feedwater pumps. Steam would be generated at a temperature up to 1,050°F and a pressure of approximately 1,685 absolute pounds per square inch before entering the high-pressure section of the turbine. Steam exiting the high-pressure section of the turbine (referred to as "HP Turbine" on Figure 2-1) would be reheated to increase its temperature before entering the immediate-/low-pressure section of the turbine (referred to as "IP/LP Turbine" on Figure 2-1). Exhaust steam from the turbine would be directed to the cooling system.

The turbine would drive a generator, which would deliver electrical power via a main generator step-up transformer from the onsite substation to the utility grid. Extraction steam from the steam turbine would be used to preheat the feedwater and for de-aerating the feedwater.

This high-efficiency turbine would be designed for reliable operation under conditions of daily start-up and shutdown over the life of the plant. The solar field would be started each morning after sunrise and insolation (heat) build-up, although the power generation equipment may be started at anytime in the morning based on the demand for electricity. The solar field would be shut down in the evening as the sun sets, although the integral thermal energy storage system would allow the steam turbine to continue operating.

The primary components of the power block are depicted on Figure 2-4 and are described below.

Steam Generator

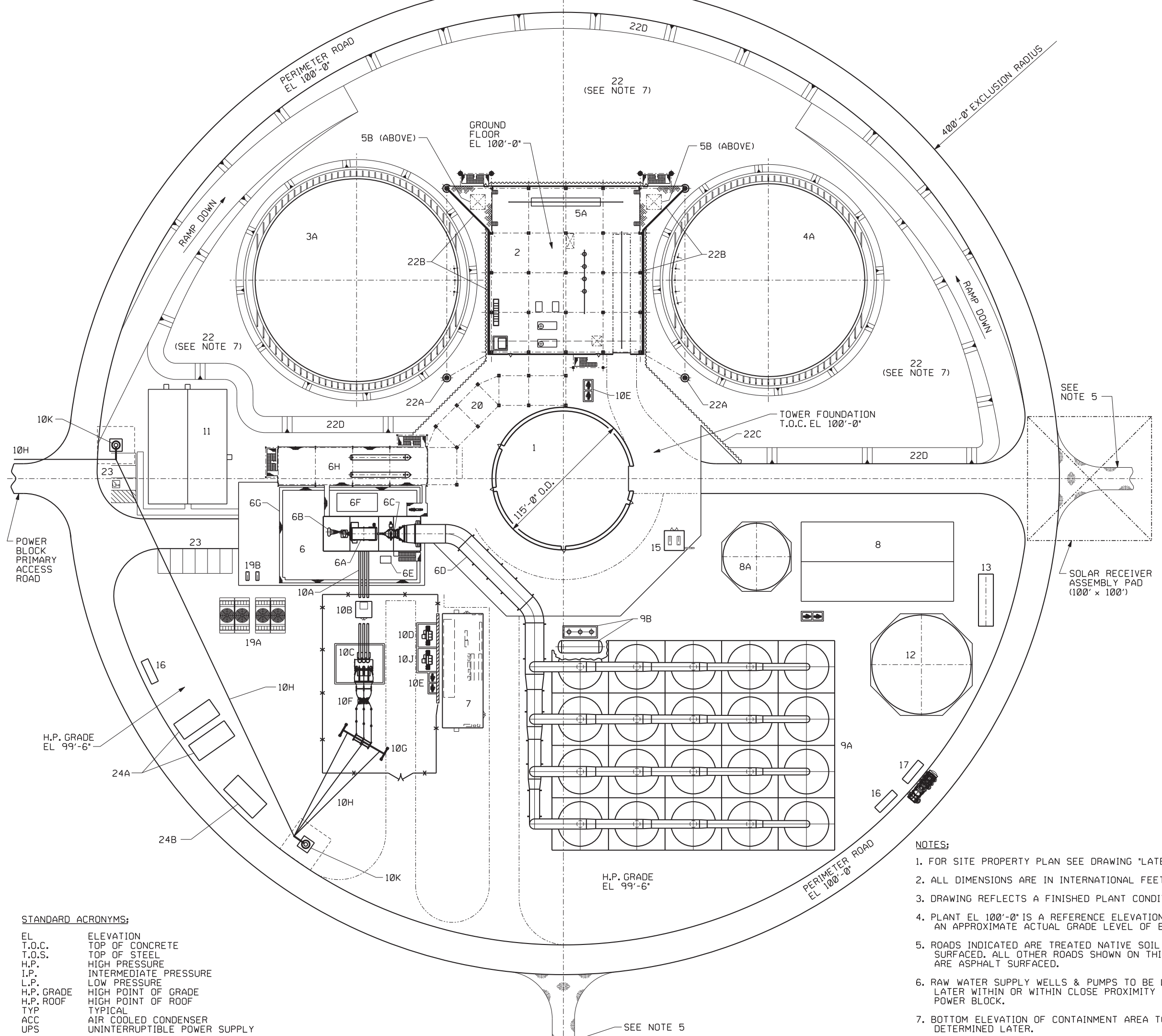
The steam generator is the core of the steam-supply system for the power block. The steam generator system includes a preheater, evaporator, superheater, reheater, and steam drum. High pressure feedwater enters the steam generator from the feedwater heaters and preheater and leaves as saturated steam that subsequently flows to the superheaters. The major components of the steam generator system are described below.

- **Preheater –** The preheater would have a shell and tube design. High-pressure feedwater would enter the preheater from the low-pressure and high-pressure feedwater heaters and would leave as high-temperature feedwater.
- **Evaporator –** The evaporator would receive heated, high-pressure feedwater from the preheater and would evaporate the water into saturated steam. The evaporator would have a shell and tube design.
- **Superheaters/Reheaters –** The saturated steam would flow to shell and tube superheaters to reach the desired steam-turbine temperature- and pressure-operating conditions. The reheaters would receive "cold" outlet steam from the high-pressure turbine stage and reheat the steam before being reintroduced into the intermediate-pressure stage of the turbine.
- **Steam Turbine –** Once the pressurized steam has reached the optimum temperature in the superheaters, it would flow to the steam turbine, which would extract thermal energy from the steam.
- **Feedwater Heaters –** The feedwater would be heated to the required conditions using conventional turbine extraction steam in low- and high-pressure feedwater heaters.
- **Deaerator –** A direct-contact steam deaerator would be included to eliminate dissolved oxygen in the condensate and feedwater.

Cooling System

Under the Applicant's Proposed Project, a dry-cooling system would be employed at the site. The cooling system consists of an air-cooled condenser, condensate tank, and condensate pumps. The dry-cooled system receives exhaust steam from the steam turbine, where it is piped through a transfer duct to a finned-tube air-cooled condenser. The air-cooled condenser blows ambient air across a heat transfer surface area, which cools and condenses steam.

The finned tubes are usually arranged in the form of an A-frame or "delta" structure over forced draft fans to reduce land area requirements. The condensed steam is gathered in a condensate tank and provided to the feedwater circuit by condensate pumps. A typical air-cooled condenser can condense steam within 30° to 50°F of the ambient dry-bulb temperature.



LEGEND

1 SOLAR RECEIVER TOWER

2 STEAM GENERATION BUILDING

3 HOT SALT STORAGE TANK AREA
3A HOT SALT STORAGE TANK

4 COLD SALT STORAGE TANK AREA
4A COLD SALT STORAGE TANK

5 PUMP SUPPORT & MAINTENANCE AREA
5A PUMP MAINTENANCE AREA
5B PUMP REMOVAL HATCH

6 STEAM TURBINE/GENERATOR AREA
6A GENERATOR
6B H.P. TURBINE
6C I.P./L.P. TURBINE
6D TURBINE EXHAUST DUCT
6E HYDRAULIC OIL UNIT
6F LUBE OIL UNIT
6G FLOOR TRENCH
6H HEATER BAY
6J BOILER FEEDWATER PUMPS (NOT SHOWN)
6K DEAERATOR (NOT SHOWN)

7 ELECTRICAL BUILDING/PDC

8 WATER TREATMENT AREA/BUILDING
8A DEMINERALIZED WATER TANK
8B DEMINERALIZED WATER PUMPS (NOT SHOWN)
8C SERVICE WAER PUMPS (NOT SHOWN)

9 AIR COOLED CONDENSER AREA
9A AIR COOLED CONDENSER
9B CONDENSATE DRAIN TANK & PUMPS (UNDER ACC)

10 ELECTRICAL TRANSMISSION AREA
10A SEGREGATED PHASE BUS DUCT
10B GENERATOR CIRCUIT BREAKER SWITCHGEAR
10C GENERATOR STEP-UP TRANSFORMER
10D UNIT AUXILIARY TRANSFORMER
10E STATION SERVICE TRANSFORMER
10F STEP-UP CIRCUIT BREAKER
10G TRANSMISSION TOWER
10H OVERHEAD POWER LINES
10J BACKFEED UTILITY TRANSFORMER
10K TUBULAR STEEL POLE

11 CONTROL & OPERATIONS BUILDING

12 SERVICE/FIRE WATER STORAGE TANK

13 FIRE WATER PUMP HOUSE

14 NOT USED

15 FIRE WATER BOOSTER PUMPS

16 ABOVE GROUND DIESEL FUEL STORAGE TANK

17 HELIOSTAT WASH TRUCK FILL AREA

18 OIL/WATER SEPARATOR - LATER

19 AUXILIARY COOLING SYSTEM
19A WET SURFACE AIR COOLER (WSAC)
19B CLOSED COOLING WATER PUMPS

20 HIGH ENERGY PIPE BRIDGE

21 NOT USED

22 MOLTEN SALT CONTAINMENT AREA
22A CAISSON FOUNDATION
22B DIVERSION WALL
22C RETAINING WALL
22D 2:1 SLOPED SOIL

23 DESIGNATED PARKING AREA

24 HELIOSTAT UPS AREA
24A EMERGENCY GENERATOR
24B HELIOSTAT DISTRIBUTION SWITCHGEAR

25 RAW WATER SUPPLY WELLS & PUMPS (SEE NOTE 6)

REFERENCES:
1. LATER

Figure 2-4
Power Block Plan

NOTES:
1. FOR SITE PROPERTY PLAN SEE DRAWING "LATER".
2. ALL DIMENSIONS ARE IN INTERNATIONAL FEET.
3. DRAWING REFLECTS A FINISHED PLANT CONDITION.
4. PLANT EL 100'-0" IS A REFERENCE ELEVATION EQUAL TO AN APPROXIMATE ACTUAL GRADE LEVEL OF EL "LATER".
5. ROADS INDICATED ARE TREATED NATIVE SOIL OR GRAVEL SURFACED. ALL OTHER ROADS SHOWN ON THIS PLAN ARE ASPHALT SURFACED.
6. RAW WATER SUPPLY WELLS & PUMPS TO BE LOCATED LATER WITHIN OR WITHIN CLOSE PROXIMITY TO THE POWER BLOCK.
7. BOTTOM ELEVATION OF CONTAINMENT AREA TO BE DETERMINED LATER.

STANDARD ACRONYMS:

EL	ELEVATION
T.O.C.	TOP OF CONCRETE
T.O.S.	TOP OF STEEL
H.P.	HIGH PRESSURE
I.P.	INTERMEDIATE PRESSURE
L.P.	LOW PRESSURE
H.P. GRADE	HIGH POINT OF GRADE
H.P. ROOF	HIGH POINT OF ROOF
TYP	TYPICAL
ACC	AIR COOLED CONDENSER
UPS	UNINTERRUPTIBLE POWER SUPPLY

40 0 40 80 120

REV	DATE	DESCRIPTION
B	04/05/11	ISSUED FOR REVIEW AND COMMENT
A		IN PROGRESS

PRELIMINARY STATUS — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.

APPROVED STATUS — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.

ORIGINATING PERSONNEL / PROFESSIONAL ENGINEER'S SEAL

DRAWN BY: A. PRATT
CHECKED BY:
LEAD DESIGNER:
ENGINEER/TECH SPECIALIST:
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

Zero Harm — Leadership, No Incidents, Safe Behavior

WorleyParsons
resources & energy

SolarReserve

CLIENT/PROJECT TITLE
QUARTZSITE SOLAR ENERGY PROJECT
QUARTZSITE SOLAR ENERGY, LLC

GENERAL ARRANGEMENT
SOLAR POWER PLANT
POWER BLOCK PLAN

SCALE: 1" = 40'-0"
DRAWING SIZE: ARCH D (36" x 24")
WORLEYPARSONS DWG. NO.: SRQZ-1-SK-111-002-002
REV: B

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Thermal Storage System

The thermal storage system contains two storage tanks—one “cold” tank storing liquid salt at approximately 550°F and one “hot” tank storing liquid salt at approximately 1,050°F. As the sun rises, cold liquid salt (or HTF) would be pumped from the cold liquid salt tank through the tubes on the receiver. After absorbing energy from the concentrated sunlight, the temperature of the HTF would be increased to the design outlet temperature of 1,050°F. Part of the heated HTF is then pumped to a hot liquid salt tank for storage and the other part to a steam generating system that produces superheated steam for use in the conventional Rankine cycle turbine/generator system. After exiting the steam generator, the HTF would be returned to the cold tank, where it is stored and eventually reheated in the receiver. The cold salt storage tank would be approximately 42 feet tall at the perimeter (including insulation), 63.5 feet tall at the center, 159 feet in diameter, and have a capacity of approximately 5.6 million gallons. The hot salt storage tank would be approximately 42 feet tall at the perimeter (including insulation), 64.5 feet tall at the center, 167 feet in diameter, and have a capacity of approximately 6.3 million gallons.

The HTF consists of a mixture of sodium nitrate and potassium nitrate designed to remain liquid or molten over a wide temperature range. The HTF mixture has a melting point of 460°F and must be preheated and maintained above this minimum temperature in order to be pumped through the system. This arrangement allows for excess heat to be stored for power generation outside of the direct solar-heating period of the day. The system also includes piping, valves, pumps, expansion tanks, and heaters.

2.4.2.2 Onsite Major Electrical Systems and Equipment, Lighting, and Communication Systems

Electrical – Electrical power from the proposed solar energy facility would enter the electrical transmission grid via an interconnection with Western’s existing power transmission system. During operation, a small amount of electric power would be used to power station auxiliary loads such as pumps and fans, control systems, and general facility loads including lighting, heating and air conditioning, heliostat movement, and other uses. The electrical system for Project facilities, buildings, and communication systems would be installed onsite, inside conduit in underground trenches or overhead in cable tray as per applicable code requirements. Some of the electric power would be used for heat tracing that would provide energy to maintain the salt in fluid state during protracted maintenance outages. Additionally, QSE proposes to obtain backup power from an existing 69-kV overhead transmission line that parallels SR 95. The 69-kV transmission line is owned and operated by Arizona Public Service.

Lighting – The Project’s lighting system would provide operation and maintenance personnel with light for both normal and emergency conditions. Project lighting would be designed to minimize light pollution through the use of sensor-operated lights and directional lighting in cases where this would not compromise safety or security.

Aviation lighting would be installed on the solar collecting tower according to the recommendations of U.S. Department of Transportation FAA’s Advisory Circular, AC 70/7460-1K, Obstruction Marking and Lighting. Lighting would not be provided for the solar field; however, for the remainder of the facility aside from the tower, lighting would be expected to be provided in the following areas:

- Building interior equipment, office, control, maintenance, and warehouse
- Solar collecting tower
- Building exterior entrances
- Outdoor equipment within the power block and tank area
- Power transformers
- Power block roadway and parking areas
- Entrance gate
- Water treatment area

Onsite Communications – The major communication system onsite would include hardware and software, field instrumentation, meteorological stations, and communications devices designed for site monitoring and control of the solar power plant. All data collected from the field would be transmitted to an onsite control room via a fiber or copper communications infrastructure. The network of cables for the communications system would be buried in the same trenches or run in overhead cable tray as the electrical system cables, maintaining appropriate levels of separation according to code requirements.

2.4.2.3 **Access Roads**

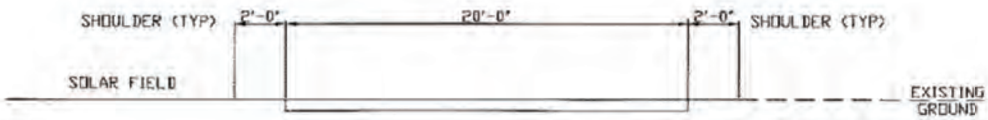
A paved access road would be constructed from SR 95 to the Project area, a distance of approximately 0.5 mile. Other paved and unpaved roads would be developed within the Project area to provide access to the power block and other ancillary facilities. Deceleration and/or acceleration lanes would be constructed, as required, to meet the ADOT and La Paz County requirements where the Project access road would connect to SR 95. The Project access road would be a two-lane road, constructed for two directions of travel, with a minimum width of 24 feet and 2-foot-wide shoulders on each side of the road. Additionally, paved roads meeting this same general description may be constructed from the power block to the east and south edges of the solar field. Alternate surfacing for these road segments would be rock. A perimeter road would be constructed around the perimeter of the solar field and would be surfaced with rock. Permanent access roads as discussed above are anticipated to occupy 2.3 acres. A typical section of this road is shown on Figure 2-5.

2.4.2.4 **Buildings, Enclosures, and Fencing**

The following buildings and enclosures are planned as part of the Project, and their locations are described below:

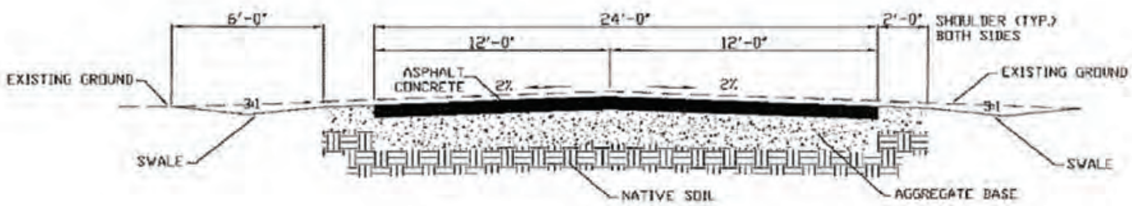
- **Steam Generator Building** (0.7 acre). This structure would be located between the HTF storage tanks within the power block. The building would provide structural support and protection for the equipment associated with the heat exchange process.

- **Steam Turbine Area/Enclosure** (not considered a building). This structure would support the Steam Turbine Generator and associated equipment, and would be located within the power block. The Steam Turbine Generator may be enclosed in a building for protection, or it may be located outdoors.



1 PERIMETER ROAD- AGGREGATE SURFACE DETAIL

NOT TO SCALE



2 ACCESS ROAD SECTION (TYP.)

NOT TO SCALE

DRAWN BY: C. MAHER

Figure 2-5 Road Sections

Quartzsite Solar Energy Project

Source: Solar Reserve

- **Electrical Building** (0.05 acre). This structure would be located within the power block area and would house the switchgear, motor control centers, battery power supply, and other primary plant electrical components.

- **Administration/Maintenance Building** (0.23 acre). This building would serve as the center for support staff for the Project during operations. This facility may be located outside the heliostat field, near the access road, or within the power block area.

- **Heliostat Assembly Building** (1.8 acres). This building would be used as a protected environment for the assembly/construction of heliostats during construction of the plant. It may be converted to other uses upon completion of Project construction, or may be removed entirely, following completion of the heliostat assembly.

- **Permanent Warehouse** (0.14 acre). This building would provide permanent warehouse space for the facility and would be located near main access road to facilitate delivery of equipment without transiting the heliostat field.

- **Control Room Building** (0.14 acre). This building would be located within the power block and would provide the control room functions for the Project.

- **Building Sanitation Facilities**. The administrative/maintenance building and the control building may each be served by a permanent septic system (tank and leach field).

- **Water Treatment Building** (0.28 acre). The building would house the water treatment facilities.

Site Security and Fencing – Chain link security fencing would be installed around the Project area perimeter, substation, ponds, and other areas requiring controlled access prior to beginning construction. The Project area perimeter fence would be 8 feet high and have an overall height of no more than 10 feet from the bottom of the chain link to the top barbed wire, or per requirements mandated by the North American Electric Reliability Corporation and the U.S. Department of Homeland Security for facilities of this type. The fence may have a top rail, bottom tension wire, and three strands of barbed wire mounted on 45 degree extension arms. Posts would be set in concrete, based on Federal security assessments (to be completed prior to start of construction).

Controlled access gates would be located at the entrances to the facility. Project area gates would be swing or rolling type access gates. Access through the main gate would require an electronic swipe card (or other acceptable means), preventing unaccompanied visitors from accessing the facility. All visitors would be logged in and out of the facility during normal business hours. Visitors and non-employees would be allowed entry only with approval from a staff member at the facility. Visitors would be issued passes to be worn during their visit and returned at the main office when leaving.

Personnel would staff the facility 24 hours per day/7 days per week. Even when the solar power plant is not operating, personnel would be present, as necessary, for maintenance; to prepare the plant for startup, and/or for Project area security. It is anticipated that 30 to 35 personnel would be present onsite during normal working hours and three to five personnel during any other shift (i.e., overnight or weekends).

2.4.2.5 **Water Supply, Storage, and Treatment Systems**

Water Requirements during Construction – During construction of the Project, there would be a need for water for soil moisture conditioning, dust control, and other construction activities. The construction water source likely would come from onsite water wells, or if not available during construction, would be sourced from an offsite location.

Based on the expected soil conditions (existing moisture content and the optimal moisture of the soil necessary to achieve proper compaction), it is estimated that a total of approximately 1,000 acre-feet of water would be needed the first year of construction, while the major earthwork is ongoing. Approximately 150 acre-feet of water would be needed per year of construction, after the initial earthmoving operations are complete, for ongoing dust control and moisture conditioning of soils for ongoing backfilling operations.

Water Requirements during Operations – Water needs during plant operation, estimated at 200 acre-feet per year, include three primary uses:

- Steam cycle makeup water – estimated at 100 acre-feet per year
- Mirror wash water – estimated at 70 acre-feet per year
- Other uses including a wet-surface air cooler for auxiliary equipment, service water, and quench water, estimated at up to 30 acre-feet per year

Although the steam cycle is a “closed system,” operational steam blowdown requires the addition of makeup water throughout the operating time frame. Additionally, the heliostat mirrors’ reflectivity would decrease in efficiency as the mirrors collect dust and other particles. Thus, water would also be required to support a mirror wash program to be implemented that would clean the mirrors on a continual basis. This program may run up to 7 days/nights per week.

Operational water would be obtained from onsite wells; an offsite pipeline would not be required. The location, number, depth, and design of any new groundwater wells that would be used to supply the Project would be determined based on a groundwater investigation; however, up to three wells would be required for redundancy.

Water Storage – The onsite water storage system would include one demineralized water storage tank to store demineralized water for use as mirror wash water and for steam cycle makeup. One fire water/service water tank also would be constructed onsite to store water for fire protection, service water needs, and raw water storage prior to treatment.

Water Treatment System – Raw water would be treated through an onsite RO water treatment facility and converted to demineralized water for use in the steam cycle and for mirror washing. The need for additional pre-treatment such as water softening or ion exchange, if any, would be determined based on analytical data obtained during the groundwater investigation.

Evaporation Ponds – Two types of wastewater would be generated from the Project: industrial and domestic. In the industrial process, wastewater is generated from the water treatment operation (from the RO system pre-treatment of groundwater) and the steam cycle blowdown. A dry-cooled Project would require three 4-acre, double-lined evaporation ponds to manage the industrial wastewaters generated by the power block. Each brine pond would have an average design depth of at least 6 feet to allow for 1 foot of sludge buildup, 3 feet of operational depth, and 2 feet of freeboard. The ponds would be constructed and lined as follows:

- a base layer consisting of either a geo-synthetic clay liner or 2 feet of onsite material with a hydraulic conductivity of less than 1 x 10.6 centimeters/second
- a secondary high density polyethylene liner (minimum of 40 mils)
- a leak detection and removal system comprising a geonet and collection sump
- a primary 60-mil high density polyethylene liner at the surface of the ponds

The wastewater to be discharged into the evaporation ponds is anticipated to be nonhazardous; however, it would contain pollutants that could exceed water quality objectives or affect the beneficial uses of groundwater, if released. Therefore, the wastewater would be classified as a "designated waste" and would be regulated by ADEQ.

Wastewater from industrial processes would be piped to the evaporation ponds for disposal. Three ponds were selected for reliability. The plant would operate using all three ponds; however, the ponds would be designed and sized so that one pond can be taken out of service for up to one year for maintenance/service. If a pond requires maintenance or solids removal, the plant still could operate with the other two ponds for up to one year. Solids removed from the evaporation ponds would be disposed of at a permitted hazardous waste landfill.

To limit the amount of wastewater discharged to the ponds, waste streams from within the plant, such as steam cycle blowdown, can be used as makeup water for the heat exchanger, to cool auxiliary plant loads called a wet surface air cooler. The wet surface air cooler evaporates water to remove heat from the internal plant cooling system used for small cycle heat loads, such as the main electrical generator's cooling system. By evaporating various plant waste water streams, the amount of water discharged to the ponds is reduced, allowing the majority of the water to evaporate quickly in the ponds, and preventing an excess of standing water that would attract wildlife and waterfowl in this arid environment. Also, by discharging the remaining wastewater to multiple ponds simultaneously, the water would also evaporate quickly during most days of the year, helping to preclude an excess of standing water in the ponds.

In the domestic process, all wastewater generated from toilets, showers, kitchens, and sinks would be directed into an onsite sanitary septic system and onsite leach field.

2.4.2.6 **Emergency Diesel Generator**

The primary function of the emergency generators would be to provide relatively instantaneous backup power needed to redirect the heliostat field flux off the solar receiver during loss of liquid salt flow emergencies. The emergency generators are approximately 4,000 brake-horsepower each and would be test-run at least monthly to meet supplier guarantee, the National Fire Protection Association (NFPA), and insurance carrier requirements on maintenance and testing.

2.4.2.7 **Fire Protection**

A Construction Fire Protection and Prevention Plan would be developed and followed throughout all phases of construction. The permanent facility fire protection system would be put into use during construction as soon as is practicable. Prior to the availability of this system, fire extinguishers and other portable fire-fighting equipment would be available onsite. Locations of portable firefighting equipment may include portable office spaces, welding areas, flammable chemical areas, and vehicles and other mobile equipment. All equipment would be NFPA and Occupational Safety and Health Administration (OSHA) compliant.

The facilities operating fire protection water system would be supplied from a dedicated portion of the service/fire water storage tank located on the plant site. One electric and one diesel-fueled backup firewater pump would deliver water to the fire protection water-piping network. A smaller electric motor-driven jockey pump would maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, the motor-operated fire pump starts automatically. If there is a loss of power to the motor-driven fire pump, and the system pressure falls to a preset pressure, the diesel fire pump starts automatically.

The fire protection system piping network would be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. The piping network would supply fire hydrants located at intervals throughout the power plant site, at the Steam Turbine Generator lube oil equipment, and at other equipment as required. Sprinkler systems would also be installed in the administration control warehouse, maintenance buildings, and fire pump enclosure as required by the NFPA and local fire protection codes. Handheld fire extinguishers of the appropriate size and rating (NFPA 10) would be located throughout the facility.

2.4.3 Action Alternative 1 – Hybrid Cooling

Alternative 1, the hybrid wet- and dry-cooled option, would incorporate similar construction, operation, decommissioning, and reclamation components as the Applicant’s Proposed Project, but would use an alternative cooling technology. To avoid redundancy, the description of the construction, operation, decommissioning, and reclamation aspects of the hybrid alternative is described under the Applicant’s Proposed Project. Key differences between the two options are described in Table 2-1.

A hybrid cooling system typically includes two cooling towers (one dry-cooled and one wet-cooled) and an air-cooled condenser designed to operate in parallel as one system. The cooling towers would only operate at peak temperature conditions to provide for the most economic operation of the plant. Equipment sizes vary, depending on specific conditions for a given site; but typically, each unit (the air-cooled condenser and cooling towers) would be designed to provide less than 100 percent of the cooling demand. However, together these units provide 100 percent of plant cooling requirements at full load and at the design temperature.

Hybrid systems would operate between a wet-cooled and a dry-cooled system in all aspects. Hybrid systems use less water than a wet-cooled system, but more than an air-cooled one. Turbine efficiency would be between that of a wet-cooled and a dry-cooled system. The cost of a hybrid system is typically higher than that of either an air-cooled or a wet-cooled system, because it requires capital investment for both technologies.

Operational water requirements for Alternative 1 would be up to 600 acre-feet per year and would require up to 18 acres of evaporation pond surface area to process wastewater disposal. Water use would depend largely on site conditions, water quality, and the efficiency of the air-cooled condenser and the cooling tower.

2.4.4 Western's Switchyard and Telecommunication System

The Project would interconnect to Western's transmission system through Western's existing Bouse-Kofa 161-kV transmission line, located to the east of and parallel to SR 95. The interconnection would require an onsite substation (owned and operated by QSE), located within the power block area, to transform the voltage of the power generated by the solar facility, making it compatible for transmission on the proposed 1.5-mile 161/230-kV transmission line to the interconnection point. The interconnection point would be at a new switchyard, which would be owned and operated by Western, where power would be interconnected to the existing system. The 1.5-mile long, 161/230-kV transmission line would be designed as a single-circuit overhead line on monopole or lattice structures; the structures would be 85 to 115 feet tall, with spans of up to 500 feet between structures. The final locations of transmission line tower structures would depend on the type of structure selected, the type of terrain encountered, and geotechnical conditions.

Independent of this Project, Western has a long-term plan to rebuild the existing 161-kV lines at 230 kV to provide for a more standard and reliable infrastructure. Western's existing Bouse-Kofa 161-kV transmission line is anticipated to be rebuilt as a part of this long-term plan. All facilities that are added to existing systems in this area, such as the proposed transmission line for the Project, are required to be built to 230-kV standards in anticipation of the future transmission line conversion to 230 kV. Therefore, the transmission lines would be constructed to 230-kV standards. If in the future, Western's 161-kV system is modified to operate at 230 kV, it is anticipated that QSE's onsite substation would be modified to step-up the voltage to 230 kV. This Draft EIS and Proposed YFO RMP Amendment is not intended to analyze a future upgrade of the Bouse-Kofa 161-kV transmission line by Western.

At this time, all the transmission system studies associated with the proposed interconnection have not been completed. Details, requirements, and environmental impacts for other system improvements are unknown at this time, as they would be dictated by the ongoing transmission system studies. These studies may identify additional system upgrades needed to accommodate the proposed interconnection; upgrades also may be required to some of Western's existing substations. If improvements are identified after the EIS is completed, additional NEPA analysis for these necessary improvements to the electrical system would be completed.

2.4.4.1 **Western's Switchyard**

Western's switchyard would occupy approximately 4.6 acres of BLM-administered land adjacent to the Bouse-Kofa 161-kV transmission line. The final switchyard location would be based on a number of different factors that include proximity to the transmission line, drainage, security, and access. The switchyard must be located as close to the existing transmission line as possible to allow for entry and exit of the existing conductor into the switchyard. The most direct route for the 161-kV (high voltage) conductor into the switchyard is preferred to minimize realignment of the existing line. Once the switchyard is complete, the existing conductors would be cut and rerouted into the new switchyard for service.

Locating the facility next to a paved road improves access for personnel, equipment, and machinery for required maintenance and replacement of critical equipment as needed (Figure 2-6). An 8-foot block wall or chain link fence topped with razor wire (or similar) would provide security for the switchyard. Adequate space would be provided inside the fence to maneuver construction and maintenance vehicles.

2.4.4.2 **Western's Communication Facilities**

The Project would require improvements to Western's communication system to provide redundant communication paths. Redundant paths are required to provide reliability within the electrical transmission system. Two different types of communication (microwave and fiber) are preferred for redundancy. From Western's interconnection switchyard east of SR 95, telecommunications would be established by: (1) installing a new fiber optic line on Western's existing Bouse-Kofa 161-kV transmission line from the switchyard to the Bouse Substation, a distance of approximately 12 miles; or (2) microwave (radio-frequency) transmission from (a) a new microwave dish mounted within the new Western switchyard to Metal Mountain, or (b) a new microwave dish mounted within the Project solar field to Metal Mountain, or (c) a new microwave dish mounted within the Project solar field to the Bouse Substation. The location of the Bouse Substation and the communication sites at Metal Mountain and Cunningham Peak are shown on Figure 2-6.

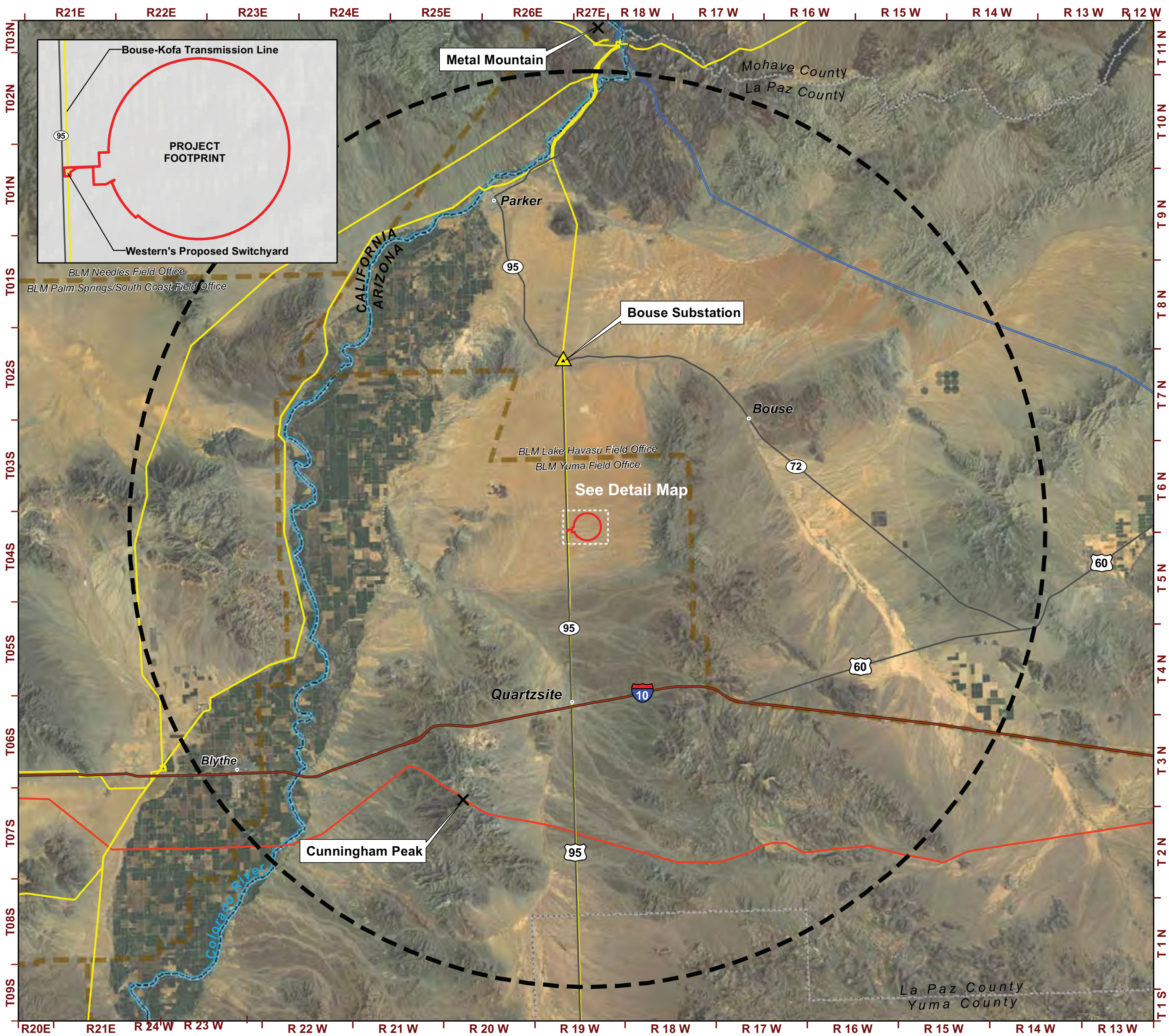
<u>Fiber Optic Line Option</u>

- ***Fiber from the new Western Switchyard to the existing Bouse Substation***. Under this option, a new fiber optic line would be installed on Western's existing 161-kV transmission line for approximately 12 miles to the north into the Bouse Substation (Figure 2-6). From Bouse, the signal would be on an existing microwave path to Cunningham Peak. Construction equipment used to replace one of two existing overhead groundwires would include a manlift truck (multi-axle, rough terrain vehicle with an articulating-boom and man-bucket), a truck-mounted tensioner, and a reel truck and trailer. Approximately 96 structures exist on the 12-mile transmission line section. Vehicles would use the existing maintenance road for all access along the transmission line.

Quartzsite Solar Energy Project

Telecommunication Options

Figure 2-6



LEGEND

Project Features

- Project Footprint
- 30-Mile Buffer

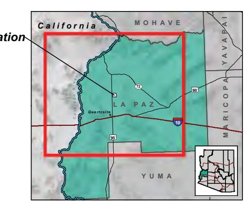
Existing Utilities

- 500kV Transmission Line
- 230kV Transmission Line
- <230kV Transmission Line

Reference Features

- BLM Field Office Boundary
- State Boundary
- County Boundary
- City/Town
- Interstate
- Highway
- Major River

Project Location



0 5 10 20
Miles

May 2011

Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Geocommunicator, 2010; Platts, 2009; EPG, 2009;

Western Area Power Administration

Microwave Options

- ***Microwave from the new Western Switchyard to Metal Mountain***. Under this option, an 80-foot monopole and microwave dish would be installed within the new Western switchyard. The microwave would have a direct path to the existing Metal Mountain facility located approximately 32 miles north of the Project area. A new microwave dish would be mounted on an existing pole/structure at Metal Mountain using ropes and pulleys. A single pick-up truck would be used to transport the dish to Metal Mountain using existing access roads.

- ***Microwave from the Project Solar Field to Metal Mountain***. Under this option, a new fiber optic line would be installed on the generation tie-line between the solar field and Western's switchyard. The generation tie-line may be up to 1.5 miles long. A microwave dish would be mounted at approximately 40 feet on a Project facility component that would provide a microwave path to Metal Mountain, where a new microwave dish would be installed on an existing pole or structure using ropes and pulleys. A single pick-up truck would be used to transport the dish to Metal Mountain using existing access roads.

- ***Microwave from the Project Solar Field to the existing Bouse Substation***. Under this option, a fiber optic line would be installed on the generation tie-line between the solar field and Western's switchyard. The generation tie-line may be up to 1.5 miles long. A microwave dish would be mounted at approximately 350 feet on the Project's central receiver tower to provide a microwave path to the Bouse Substation. Under this option, a new microwave dish would be installed on an existing structure or new monopole at the Bouse Substation. If the microwave dish is installed on an existing structure, it would be installed using ropes and pulleys and delivered using a single pick-up truck along existing access roads. Should a new monopole need to be erected, an auger drill rig, medium-duty crane, and concrete truck would be used during construction.

At this time, Western has not selected a communication option.

2.5 PROJECT CONSTRUCTION

The construction of the Project would begin once all applicable approvals and permits have been obtained. Project construction, from site preparation and grading to commercial operation, would be expected to take approximately 30 months. Table 2-2 provides a conceptual Project schedule with activities representative of construction of a thermal solar power plant and associated infrastructure, including Western's switchyard and communication facilities.

Typically, construction would be scheduled to occur between 5 a.m. and 7 p.m. on Monday – Saturday (approximately 14 hours per day, 6 days per week). However, construction could occur outside of these hours to make up schedule deficiencies, to work around extreme mid-day heat or other weather events, or to complete critical construction activities such as when pouring concrete. During some construction periods and during the start-up phase of the Project, some activities would continue 24 hours per day/7 days per week. The items of work that may occur 24 hours per day would include, but are not limited to, placing and finishing concrete (because of cooler nighttime temperatures), welding on critical pipe systems (these may be critical path items and need to be expedited), radiographic testing of the welds on certain pipes (completed when staff are vacated from the area), electrical terminations, distributed control system wiring and programming, heliostat assembly (if this seems to be falling behind schedule), and preparation for start-up testing. Because this is a solar plant, testing of the facility requires adequate energy supply (i.e., the sun). Therefore, preparations may take place overnight to ready the facility for start-up tests the following day, when the sun would provide the energy to power the start-up testing.

Table 2-2 Conceptual Project Schedule

Activity	Time Frame
Start construction	Month 1
Begin mobilization	Month 1
Delineate and mark the boundaries of the construction zone	Month 1
Stabilize construction entrance/exit and roadway; install tire wash	Months 2 and 3
Establish parking and staging areas for vehicle and equipment storage and maintenance	Month 2
Establish lay down area(s) for materials storage and staging	Month 3 and 4
Establish concrete washout area	Month 3
Clear and grub, strip topsoil	Months 1 to 4
Install certified weed-free fiber rolls or silt fence at the base of slopes adjacent to delineated sensitive areas, if any	Months 1 and 2
Construct stormwater infiltration/evaporation area	Months 3 to 6
Assemble and erect heliostats	Months 10 to 22
Power block construction	Months 3 to 18
Construction of Western's switchyard	Months 10 to 16
Construction of Western's telecommunications	Month 16
Construct reinforced concrete foundations	Months 3 to 18
Construction administrative/warehouse building	Months 20 to 22
Final stabilization of site	Month 29
Commission and testing	Months 22 to 30

2.5.1 Construction Work Force

Separate construction crews are expected to build the solar generating facility, the generation tie-line, and Western's switchyard and communication facilities. QSE-managed construction crews would be responsible for completing the solar facility and generation tie-line to connect the solar facility to Western's switchyard. Western-managed construction crews would be responsible for the construction of Western's new switchyard and associated elements, as well as the communication facilities.

The construction work force would consist of approximately 400 to 500 personnel at peak for construction, including supervisors and management personnel, with an average of approximately 250 crewmembers onsite at any given time. Project construction would require additional support staff, including construction inspectors, surveyors, Project managers, and environmental inspectors.

2.5.2 Temporary Construction/Laydown Areas

The Project construction contractor would mobilize and develop temporary construction facilities and laydown areas adjacent to the power block and outside the heliostat field (see Section 2.5.9 for details about Western's switchyard). Once a final design has been established, the contractor would prepare site maps showing the construction activities in detail. Temporary construction facilities would include:

- Approximately 19 single-wide full-length trailer offices or equivalent complete with electrical, telephone, and internet service
- Guard shack
- Chemical toilets
- Employee parking area for approximately 500 vehicles
- Approximately 15 tool sheds/containers
- Equipment parking for approximately 20 pieces of construction equipment
- Construction material laydown area
- Solar field equipment laydown area
- Onsite dumpsters for domestic and construction waste
- Portable concrete batch plant (to be located within the temporary laydown area outside the heliostat circle or near the power block)
- Construction access and material/equipment delivery area
- Diesel storage tank (up to 10,000 gallons) with appropriate containment

Construction laydown and storage would occur throughout the permanently disturbed areas. The power block and the heliostat field immediately adjacent to the power block would be used for laydown and storage of the power block components. Equipment would be stored within the power block, and would include cranes, loaders, forklifts, generators, boom trucks, and water trucks. The earthmoving equipment would be stored in a central location each night near the area where the work is being undertaken, or near the western side of the heliostat field, where all the equipment can be most easily fueled. All these locations would be within the perimeter of the permanent Project facilities.

A temporary concrete batch plant consisting of three portable units would be set up near the perimeter of the site to supply the necessary ready-mix concrete for the plant. Concrete requirements include foundations for the solar collecting tower, the storage tanks, several building/structures, and all the heliostats. Concrete would also be required for the tower structure itself. For monolithic concrete mass such as the foundation of the solar collecting tower and the tower structure, continuous supply and pouring of concrete would be necessary. Consequently, it is conservatively assumed that the batching units would be operated up to 24 hours per day/7 days per week during the construction of the tower. The concrete batch units would be individually powered by portable diesel generators. It is anticipated that one or two batching units would be removed from the Project area as soon as the production demand rate subsides.

The heliostat assembly building may be constructed permanently to be used during the life of the Project, or may be a temporary facility removed after construction. Areas along the transmission line corridor and near the substation (less than 5 acres) may be used for storage of power poles during construction. These areas would remain within the area identified for temporary disturbance.

2.5.3 Aggregate Processing Plant

An onsite aggregate processing plant may be deployed relatively early in order to support the Project’s need for aggregates (e.g., road compaction, dust minimization, material for batch plant). Alternatively, aggregates may be procured from a commercial source. Activities at the plant (onsite or offsite) would consist of quarrying, crushing, and screening for aggregates, pea gravel, and coarse rock and sand. Equipment and emission sources associated with the aggregate processing plant would generally consist of:

- A 350-ton per hour primary crusher, a primary screening system, and a baghouse controlling both pieces of equipment
- A 200-ton per hour secondary crusher and a secondary screening system

A tertiary screener would provide additional processing for the primary screened material. Operation of the aggregate plant would occupy approximately 9 months of the 30-month overall schedule. A conservative estimate of maximum hourly throughput may be based on a 3-month time window and on a 10-hour day/5-day per week schedule: 350,000 tons / (10 x 90) = 388 tons/hour (approximately 410 tons per hour [maximum] for permitting purpose).

Should an aggregate processing plant be established on public land under BLM jurisdiction, additional permitting and environmental analysis would be required.

2.5.4 Site Preparation

Site preparation activities would be completed with traditional earthmoving equipment, including but not limited to bulldozers, scrapers, motor graders, excavators, water trucks, water wagons, loaders, and compactors. Only areas of excavation for foundations would require complete removal of all vegetation (Table 2-3).

The root system of existing vegetation would remain intact to the extent possible to limit fugitive dust and soil erosion, and to allow native vegetation to regrow. Impacts to native plants, including salvage, would be consistent with Arizona’s Native Plant Law. Subsequent removal of plant material would be done with heavy equipment and may include the use of a bulldozer equipped with a brush rake.

Table 2-3 Areas of Vegetation Clearance	
Facility	**Acres of Vegetation Clearance**
Power Block	12
Access Road	5
Ponds	20
Laydown Area	20
Construction Parking	10
Drainage Ditch outside Fence	35
Administration Building/Warehouse	3
Heliostat Assembly	5
Switchyard	5
TOTAL	**115**

Waste vegetation would be chipped and incorporated into the topsoil, or chipped and spread on disturbed areas that are not part of the Project. All cut vegetation would be managed onsite to limit waste.

Topsoil would be stockpiled from the Project area for use in revegetation areas. The topsoil excavated would be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. The upper 1 inch of topsoil that contains the seed bank would be scraped and stockpiled for use as the top-dressing for the revegetation area. An additional 6 to 8 inches of soil below the top 1 inch of soil would also be scraped and separately stockpiled for use in revegetation areas. Topsoil would be replaced in its original vertical orientation following ground disturbance, ensuring the integrity of the top 1 inch in particular.

The majority of the efforts to grade the Project area would be completed within the first year of construction activities. Early grading would be completed in the area of the roads and parking areas (to provide access), the laydown area (to provide an early location for storage), and in the power block (to provide an early start to the power block construction activities). Detailed information regarding the location within the solar field of the laydown and parking areas would be developed once the Project engineering is finalized. Completion of the earthwork within the solar field would follow immediately after or during the early grading activities, in order to allow construction of the solar field heliostats.

Minor grading would be ongoing in the form of excavation and backfill for foundations, pipelines, conduits, and other miscellaneous facilities for the duration of construction. Some re-grading for maintenance most likely would be required within the access roads due to soil erosion and regular use.

A temporary fence would be installed around the construction laydown and parking area, with a permanent fence being installed as soon as doing so would not disrupt construction of the Project.

Dust control measures would be implemented throughout the construction phase and during operations. These measures would include, but would not be limited to, frequent application of a BLM-approved dust suppressant, restriction of construction vehicle speed on unpaved roadways (i.e., less than 15 miles per hour [mph]), restriction or cessation of construction activities during high wind events, and covering or otherwise shielding stockpiles of soil or similar construction materials.

2.5.5 Solar Array Assembly and Construction

The heliostats consist of glass mirror modules, structural support components, motor drives, a heliostat controller, and a foundation. There would be a total of approximately 17,500 heliostats. The support structure consists of a steel frame backing to support the mirror modules and a steel tubular post (pedestal) for supporting the heliostat in the ground. The heliostat assemblies would be mounted on steel or concrete foundations. The geotechnical information and the potential pile test program would provide the information necessary to determine the most cost-effective foundation. The most likely foundation would be a reinforced concrete pier foundation that would be cast in a drilled hole. Alternate foundations could be traditional concrete mat foundations, concrete piles, or steel piles. Solar field equipment and material laydown areas would be rotated through the site as construction progresses.

The individual heliostats are located within the solar field in order to maximize the reflected solar energy to the receiver. The precise location of each heliostat and its associated foundation can vary within a few feet of the designated coordinates in order to avoid sensitive areas within the field such as washes, flora, or subsurface irregularities (i.e., geologic anomalies). This is because the control system is able to compensate for the variation in location of each heliostat in the field, providing some (limited) flexibility in the precise location of each unit, so long as the units do not physically interfere with each other’s full range of motion and proper operation.

2.5.6 Power Block Construction

Concrete, mechanical, and electrical work would be performed over a period of months, with the aid of graders, rollers, front loaders, dump trucks, trenching machines, concrete mixer and pump trucks, cranes, and pick-ups. Approximately 90,000 cubic yards of concrete would be used to construct the power block and heliostat fields. Miscellaneous, non-vehicle, motorized equipment would also be used over the length of the job, such as welding machines and compressors.

The first phase of power block construction would consist of foundation work and underground mechanical work. Foundation construction would involve excavation, form, and rebar work preceding a number of concrete pours. The specific equipment in use would be more variable as the individual foundations and components are erected. The solar collecting tower would be constructed of reinforced concrete using a slip-form process. Underground pipe work would require trenching, onsite welding, backfill, and compaction. When the foundations have cured adequately, major equipment and aboveground piping could be installed. During this phase of construction the steam turbine generator, water treatment system, cooling tower and/or air-cooled condenser (depending on the alternative), generator step-up transformer, unit auxiliary transformers, and other ancillary equipment would be set on their corresponding foundations. Major equipment components would then be installed, and pump, turbine, and fan alignments would be performed.

With the equipment set on their foundations, aboveground piping and electrical activities can be completed. Piping and electrical cable would be terminated at equipment interfaces. High-voltage bus duct would be installed between the steam turbine generator and generator step-up transformer. The final construction activities would include site paving, installation of final surfacing of power block areas (such as crushed stone), completion of final landscaping, and any remaining restoration of temporarily disturbed areas. Once systems are installed and complete, commissioning would begin.

2.5.7 HTF Material Process

The HTF material (salt) would be delivered to the Project area at an indoor storage and staging location. The material would be delivered in 1.2-metric ton “super sacks,” some or all of which would be stored onsite until melted for use in the plant process. The remainder of the salt would be delivered to the site and incorporated into the salt melting operation over a period of approximately 10 months at a rate of approximately 150 super sacks per day until the entire quantity has been received. A standard multi-axle highway transport truck can carry approximately 30 super sacks at one time. The salt must be heated until liquefied for use in the system, and would be stored within a secured laydown area within the Project area until it is heated, liquefied, and pumped into the storage tanks.

The HTF system hot and cold storage tanks would first be preheated to help prevent against thermal shock to the tank and foundation. It is expected to take approximately 2 to 3 months to melt and load the complete volume of salt. The salt is not consumed and is expected to remain in an effective and usable form throughout the operating plant life.

2.5.8 Transmission Line

The 1.5-mile long 161/230-kV transmission line between the solar field and Western’s switchyard would be constructed as a single-circuit overhead line, on steel monopoles or lattice structures. Foundation holes for the transmission towers would be excavated, forms constructed, reinforcing bars installed, and concrete poured. The structures would be assembled in sections at a staging area and then transported to each tower location by truck, placed by crane, and bolted to the foundations. The design of the transmission line would be in accordance with industry codes and standards.

Before conductor installation begins, temporary guard structures would be installed at road crossings and other locations where the new conductors may inadvertently come into contact with electric or communications facilities and/or vehicular traffic during installation. These guard structures consist of one or two poles on either side of the feature crossed with a “V”-shaped cargo net tensioned between the guard structures.

The actual conductor-stringing operation begins with the installation of rollers attached to the cross arm of the transmission structure. The rollers allow the individual conductors to be pulled through each structure until the conductor is ready to be pulled up to the final tension position. When the pull and tension equipment is set in place, a sock line (a small cable used to pull in the conductor) would be pulled from tower to tower using ground equipment. After the sock line is installed, the conductor would be attached to the sock line and pulled in, or strung, using the tension-stringing method. This involves pulling the conductor through each tower under a controlled tension to keep the conductor elevated above crossing structures, roads, and other facilities. After the conductor is pulled into place, tension would be adjusted to a pre-calculated level. The conductor is then clamped to the end of each insulator as the rollers are removed. The final step of the conductor installation would be to install vibration dampers and other accessories.

2.5.9 Western's Switchyard

Western's proposed 161/230-kV interconnection switchyard would be constructed on BLM-administered land adjacent to the existing right-of-way of Western's Bouse-Kofa 161-kV transmission line. Primary construction and maintenance access to the switchyard site would be off of SR 95 and the new access road between SR 95 and the solar facility.

The switchyard is expected to be approximately 400-feet wide by 500-feet long (approximately 5 acres). The switchyard would contain power circuit breakers, disconnect switches, steel busses, steel poles, cables, metering equipment communication equipment, DC batteries, and other equipment. The switchyard facilities would be constructed, owned, and operated by Western through a land use agreement with the BLM.

The 161/230-kV switchyard would temporarily require approximately 7 acres during construction. Construction vehicles and equipment that would be needed for the construction of the switchyard include large cranes, heavy backhoes and earthmovers, large forklifts, and various power tools. Construction of the switchyard and interconnection facilities would involve several stages of work including access road construction and/or improvement; grading of the switchyard area; construction of foundations for transformers, steel work, breakers, control houses; and other outdoor equipment.

A temporary staging area would be developed on approximately two acres adjacent to the switchyard site. The staging area would be used for construction safety meetings, to host office trailers, temporary sanitation stations, parking for equipment, vehicle parking for equipment operators and construction workers, and staging for limited project components. The staging area would be prepared by clearing and grading as needed. The area would then be covered with four to six inches of gravel to provide a level ground surface.

To interconnect the new switchyard with the existing Bouse-Kofa 161-kV transmission line, two existing H-frame transmission structures (one north and one south of the new switchyard), would be replaced with two dead-end type structures. These poles would resemble the existing H-frame structure, but would be more robust in construction. The new structures would be located in the existing structure locations and would require an area of 4,000 square feet to install.

Switchyard start-up would follow a detailed plan for testing and energizing the step-up substation, tie-line, and interconnection switchyard in a defined sequence, with lock and tags on breakers to ensure safety and allow for fault detection prior to energizing any component of the system. Switchyard start-up would not require any heavy machinery to complete.

During operation of the new switchyard, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage, and replacement of gas-filled breakers to minimize any releases to the environment. During inspections, equipment would be monitored for detection of leaks and repairs would be made as appropriate. The switchyard would be designed to operate from a remote location, and no permanent employees would be required.

2.5.10 Post-Construction

QSE would restore all temporarily disturbed areas, to the extent practicable, to their preconstruction conditions, as required by Western and the BLM. These include temporary construction areas and access roads as well as offsite underground utility alignments. These areas would be regraded and revegetated to restore them to pre-existing conditions.

Site stabilization could include the use of soil binders, geo-grid, or aggregate surfacing to allow the movement of maintenance vehicles and mirror wash water trucks to travel within the solar array.

2.6 PROJECT OPERATION, MAINTENANCE, AND DECOMMISSIONING

The facility would be operated up to 7 days a week/10 or more hours per day. The facility would be staffed 24 hours per day, and would be operated in the following mode:

- The facility would be operated up to its maximum output as dictated by the available solar insolation and the available thermal storage, for as many hours per year as possible.
- The facility would be placed in standby mode every night when the solar insolation or thermal energy storage level drops to a point that results in the steam turbine generator output to be reduced from its maximum designed capacity.
- A full shutdown would occur if forced by equipment malfunction, transmission line disconnect, or scheduled maintenance.

Long-term operation of the facility would include periodic maintenance and overhaul of all balance-of-plant and solar facility equipment including, but not limited to, the steam turbine generator, pumps, and piping, in accordance with manufacturer-recommended schedules. Routine cleaning of the heliostats with demineralized water would be necessary to maintain the desired mirror reflectivity.

Regular inspections of the substation and electric transmission line would be conducted by certified site personnel as required by Federal, State, and local codes or as needed under emergency conditions. All non-destructive testing and in-process compliance inspections and certifications would be completed in accordance with the applicable Federal, State, and local codes for each given activity. Various inspection processes, including aerial inspection, ground inspection, and climbing, may be conducted. All of the onsite substation structures would be inspected from the ground on an annual basis for corrosion, misalignment, and foundation condition. Frequency of inspection may vary depending on factors such as the age of the system, structure type, and vegetation conditions.

2.6.1 Operations Workforce

Management, engineering, administrative staff, skilled workers, and operators would serve the solar plant. The Project would employ approximately 47 full-time employees during operation. It is planned that plant personnel would be onsite in two 12-hour shifts or three 8-hour shifts, 7 days a week, to ensure that the facility would be staffed at all times. The full-time staff required for operations and maintenance of the facility would be approximately 1 operator for every 12-hour rotating shift, 4 relief operators, 4 maintenance technicians, 4 mirror washers, 1 to 2 process/performance engineers, 1 maintenance manager, and 5 to 7 administrative staff members per day. An additional part-time staff of 5 to 15 subcontractor personnel would be onsite periodically to conduct occasional maintenance of the facility, including cleaning or repairing equipment; system testing; removing, repairing, and/or installing insulation before and after maintenance; scaffold installation and removal; and personnel facility-related activities.

2.6.2 Decommissioning

The lifespan of the Project is expected to be at least 30 years. At the end of the Project's useful lifespan, the facilities would be either repowered or decommissioned. Due to the excellent solar resource at the Project area, repowering is a viable option. This may involve retrofitting existing components with updated, more efficient components; thereby extending the useful lifespan of the Project.

The procedures described for decommissioning are designed to ensure public health and safety, environmental protection, and compliance with applicable regulations. It is assumed that decommissioning would begin 30 to 50 years after the commercial operation date of the solar plant.

The Project goals for site decommissioning are as follows:

- Remove above-ground structures, unless converted to other uses
- Restore the lines and grades in the disturbed area of the Project area to match the natural gradients of the site
- Re-establish native vegetation in the disturbed areas

Although various types of decommissioning and demolition equipment would be utilized to dismantle each type of structure or equipment, dismantling would proceed according to the following general staging process. The first stage consists of the dismantling and demolition of above-ground structures. The second stage consists of concrete removal, as needed, to ensure that no concrete structure remains within 3 feet of final grade (i.e., floor slabs, below-ground walls, and footings), as appropriate. The third stage consists of removal/dismantling of underground utilities within 3 feet of final grade. The fourth stage consists of the excavation and removal of soils and final site contouring to return the originally disturbed area of the Project area to near original conditions while disturbing as little of the other Project area portions, as is practical.

Above-ground demolition entails breakdown and removal of above-ground structures and facilities. Residual materials from these activities would be transported via heavy-haul dump truck to a central recycling/staging area where the debris would be processed for transport to an offsite recycler.

The below-ground facilities to be removed would include concrete slabs and footings that would remain within 3 feet of final grade at the end of the Project. It is anticipated that any and all Project-related piping and utilities—including water lines—below ground electric, control, and communication lines would be completely removed, regardless of the depth below final grade. These materials would be excavated and transported to the recycling area(s) for processing and ultimate recycling. The resulting trenches would be backfilled with suitable material of similar consistency and permeability as the surrounding native materials, and compacted to 85 percent relative compaction.

The need for, depth of, and extent of contaminated soil excavation would be based on observation of conditions and analysis of soil samples after removal of the evaporation pond and hazardous materials storage areas, and upon closure of the recycling center(s) and waste storage areas used during decommissioning. At this time, removal of contaminated soil is assumed not to be needed. If required, removal would be conducted to the extent feasible and as required to meet regulatory cleanup criteria for the protection of groundwater and the environment. If contaminated soil removal would be required, the resulting excavations would be backfilled with native soil of similar permeability and consistency as the surrounding materials, and compacted to 85 percent relative compaction.

Recontouring of the Project area would be conducted using standard grading equipment to return the land to match, within reason, the previously existing surface and surrounding grade and function. Grading activities would be limited to previously disturbed areas that require recontouring. Efforts would be made to disturb as little of the natural drainage and vegetation as possible. Concrete rubble, crushed to approximately 2-inch minus size, would be placed in the lower portions of fills, at depths at least 3 feet below final grade. Fills would be compacted to approximately 85 percent relative compaction by wheel or track rolling to avoid over-compaction of the soils. To the extent feasible, efforts would be made to place a layer of coarser materials at the ground surface to add stability.

After recontouring, the Project area would be revegetated using native plants and seeds, where appropriate.

If approved, the ROW authorization for the proposed Project would include a required Performance and Reclamation bond to ensure compliance with the terms and conditions of the

ROW authorization, consistent with the requirements of 43 CFR 2805.12(g). The “Performance and Reclamation” bond would consist of three components. The first component would be hazardous materials; the second component would be the decommissioning and removal of improvements and facilities; and the third component would address reclamation, revegetation, restoration, and soil stabilization.

2.7 BEST MANAGEMENT PRACTICES AND BUILT-IN MITIGATION

The Project would use standard construction procedures pursuant to the BLM IM-2011-003 that advises developers to refer to the Solar Energy Development Programmatic EIS (currently in draft format), which provides “potential BMPs that could mitigate or reduce adverse impacts from solar energy development on the public lands.” In addition, construction of the Project would be subject to agency-required mitigation measures that are intended to guide construction activities and development of facilities to minimize environmental and operational impacts. BMPs include standards associated with overall Project management, surface disturbance, facilities design, erosion control and revegetation, hazardous materials, Project monitoring, and responsibilities for environmental inspection. The switchyard would be constructed in conformance with Western’s construction standards. An example of one of Western’s standard construction guidelines, Construction Standard 13: Environmental Quality Protection, is provided in Appendix B.

2.7.1 Stormwater Drainage

The proposed Project area has an incline that slopes at less than 1 percent. The stormwater drainage system would be designed to separate the “offsite” stormwater flows from “onsite” stormwater flows. The offsite flows are considered the flows generated from rain that fall outside of the developed area of the solar generating facility. The onsite flows are considered the flows generated from rain that fall inside the developed area of the solar generating facility.

Offsite flows are sourced from an area east of the site, originating in the Plomosa Mountains. Two offsite drainage watersheds pass storm flows through the Project area. The drainage watersheds are 3,484 and 2,603 acres, respectively. The stormwater runoff from these watersheds sheet flows towards the Project area through desertscrub landscape and existing washes.

Due to the type of terrain, the minor slopes, and the offsite flows being isolated, the stormwater management would be achieved with limited sized ditches, swales, and berms. Based on site visits and a review of aerial photos, it appears that the offsite storm flows have not been redirected in the past. A collector ditch and dike system would divert offsite flows around the solar generating facility and discharge these flows to pre-existing locations downslope from the developed area and to the existing swale crossings on SR 95. These offsite flows would then follow the existing drainage patterns.

Onsite stormwater runoff within the heliostat field would be allowed to sheet flow along its current drainage pattern to the west end of the heliostat field. At this location, an expansive and shallow detention basin would be constructed to detain any increase in storm flows, and to allow a location for sediment control. The detention area shall attenuate the post-developed 100-year, 24-hour storm event runoff, and discharge at the pre-developed 100-year, 24-hour storm event flow rate. The detention facility, to be located in the western portion of the solar field, would be constructed in order to slow the water, allow it to infiltrate, and promote flow patterns into their existing drainage patterns.

The stormwater drainage system would be designed using the Soil Conservation Service method (TR-55) to determine the amount of rainfall during a specific rainfall event, and in accordance with requirements specified in the most current version of the La Paz County design requirements.

All surface water runoff during and after construction would be controlled in accordance with the requirements of the National Pollution Discharge Elimination System (NPDES) permits for Stormwater Discharges Associated with Construction Activity and Stormwater Discharges Associated with Industrial Activity, the requirements of La Paz County, and all other applicable laws, ordinances, regulations, and standards.

2.7.2 Erosion and Dust Control

Construction and industrial operations at the site would be subject to NPDES permits for Stormwater Discharges Associated with Construction Activity and Stormwater Discharges Associated with Industrial Activity. Compliance with these permits would require preparation and implementation of construction and operation SWPPPs that address the following requirements (among others):

- Identification of activities that may pollute stormwater
- Identification of BMPs to control stormwater pollution, including water erosion and wind erosion
- BMP inspection, maintenance, and repair
- Training
- Site inspection and monitoring

Erosion and sedimentation control BMPs would be designed and implemented to meet the requirements of the NPDES permits, as well as any requirements specified by Western and the BLM. In addition, grading and earthwork would follow the general requirements of La Paz County.

The area of soil disturbance for the Project would be kept to a minimum to limit wind and water erosion and enhance successful site rehabilitation/restoration. The areas of soil disturbance would be limited to perimeter ditch alignments, access roads, construction support areas, and the heliostat, power block, and operational support facilities.

Soil stabilization measures would be used to prevent soil being detached by stormwater runoff or wind erosion. QSE's construction contractors would employ temporary and permanent BMPs to protect the soil surface by covering or binding soil particles or preventing the concentration of runoff. The Project would incorporate erosion-control measures required by regulatory agency permits and contract documents, as well as other measures selected by the engineer. Site-specific

BMPs would be identified in the SWPPP, with final selection and design by the engineer, and associated figures to be included in the final active Project SWPPP.

Project design features and/or mitigation measures that would aid in the protection of soil resources could include, at a minimum, the following:

- Erosion and sedimentation control calculations performed to verify acceptable stormwater velocities, calculate BMP clean-out frequencies, and size rip rap.
- Construction and final drainage designed to promote sheet flow, avoid unnecessary concentration of runoff, and control runoff velocity.
- Stone filters and check dams strategically placed throughout the site to provide areas for sediment deposition and to promote the sheet flow of stormwater prior to leaving the site boundary. Where available, native materials (rock and gravel) would be used for the construction of the stone filter and check dams.
- Diversion berms, culverts, and water bars would be utilized to redirect stormwater.
- Diversion channels would be armored as required to prevent erosion and scouring.
- Flat detention/infiltration ponds and ditches would be used.
- Where possible, maintenance roads would be designed not to disrupt regional flow patterns.
- Silt fences would be utilized extensively during each phase of construction to minimize wind and water erosion. Silt fence locations have yet to be determined and would be provided in the Project SWPPP.
- In areas of temporary disturbance (e.g., transmission line alignment, temporary construction support areas), the surface would be recontoured to promote sheet flow and restore and match the original or surrounding drainage function. Native vegetation would be restored to promote rehabilitation of the landscape.
- Periodic maintenance conducted as required after major storm events and when the volume of material behind the check dams exceeds 50 percent of the original volume. Stone filters and check dams are not intended to alter drainage patterns, but are intended to minimize soil erosion and promote sheet flow.
- Erosion and Sedimentation control BMP design would be in accordance with applicable government codes and standards.

Dust control measures implemented to meet or exceed ADEQ requirements are expected to include, but would not be limited to:

- Frequent application of water to active earthmoving areas
- Restriction in construction vehicle speeds on unpaved roadways (i.e., less than 15 mph)

- Application of gravel or other surface palliatives to most-used unpaved areas and roadways
- Restriction or cessation of construction activities during “high wind” events
- Covering or otherwise shielding stock piles of soil or similar construction materials
- Installation of vehicle “track out” areas or wash down areas to prevent fine dust from being tracked onto adjacent paved roads

For the point sources involved in the construction phase, such as the optional concrete batch plants and aggregate plant, dust collectors would be used to control particulate matter emissions from the loading and unloading of silos. Additional controls would include water sprays, enclosures, hoods, curtains, shrouds, and chutes. The movement of heavy trucks over unpaved or dusty surfaces in and around these onsite plants would be controlled by good maintenance, wetting of the road surface with water, and/or the use of dust suppressants.

2.7.3 Vegetation Treatment and Weed Management

The developed portions of the Project area would be cleared of vegetation, grubbed, and graded level to the extent necessary. Prior to clearing, native plants would be assessed and salvaged per Arizona Department of Agriculture policies.

Key considerations for vegetation treatment of the Project area include:

- Soil disturbance in support of construction would increase likelihood of noxious weed introductions. Regular weed monitoring and management during construction would be required. Ongoing maintenance activities at the heliostat locations would also have the potential for ongoing introduction of weedy species through soil disturbance and equipment entrance. As a result, ongoing weed management would be implemented.

- Where temporary access is needed to install facilities or site leveling is not required for drainage or access, no dedicated removal of existing vegetation or grading would occur. Rather, trucks and equipment would drive over and crush existing desertscrub vegetation without direct removal or the vegetation would be cut to ground level, leaving the root system in place for soil stabilization.

- Revegetation with native species would be implemented to the extent feasible. Areas of temporary disturbance—such as temporary construction roads, temporary construction support, and staging and laydown areas—would be recontoured and revegetated.

- Topsoil would be stockpiled from the Project area for use in revegetation of the disturbed soils. The topsoil excavated would be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. The upper 1 inch of topsoil, which contains the seed bank, would be scraped and stockpiled for use as the top-dressing for the revegetation area. An additional 6 to 8 inches of soil below the top 1 inch of soil would also be scraped and separately stockpiled for use in revegetation areas. Topsoil would be replaced in its original vertical orientation following ground disturbance, ensuring the integrity of the top 1 inch in particular.

The Applicant would develop a Weed Management Plan that describes the non-native, noxious, or invasive weed species that occur or are likely to occur within the Project area, and prescribes management actions that may be taken to monitor for and eradicate specified species, including mechanical and chemical methods. The Weed Management Plan would also describe applicable regulations for the use of herbicides on federally managed land in Arizona, and provide the basis for proper management and use of herbicides at the site.

Typical operations and maintenance requirements for native landscapes are low, once established. The Weed Management Plan would include weeding, annual pruning, and soil monitoring if necessary. Weeding should occur frequently, typically weekly, during the initial growth period to ensure that invasive plants do not mature and set seed. Weeding activities would follow the approved Weed Management Plan. Once the native plant species are established, weeding frequency would drop to less frequent intervals.

2.7.4 Wildlife Resources

The following BMPs have been established to minimize the impacts to wildlife resources as a result of activities associated with construction and operation of the Project:

- In areas where sensitive biological resources have been identified, biological monitors would be assigned during construction operations. Responsibilities would include: (1) promoting avoidance, to the maximum extent possible, of impacts to sensitive species, wildlife habitat, or other unique resources; (2) as appropriate, flagging boundaries of areas to be excluded from construction activities to protect wildlife or sensitive species; (3) monitoring such restricted areas during construction.

- In order to comply with the MBTA, nest clearance surveys would be conducted by a qualified biologist prior to all surface-disturbing activities taking place during avian nesting season (February 15 to September 15) (Corman and Wise-Gervais 2005). All nests would either be protected in place until the chicks had fledged or relocated into suitable habitat, in compliance with any USFWS permit requirements.

- Caution signs, indicating the potential for wildlife crossing, would be posted periodically along each access route. Particular locations for these signs would be at the beginning and end of each access road and where roads intersect xeroriparian washes. If signs and speed limits are ineffective, speed bumps would be installed to further limit the speed of vehicles.

- All steep-walled excavations would be covered at the end of each day to prevent wildlife entrapment. A biological monitor would inspect all open excavations a minimum of twice a day and immediately prior to backfilling. Any animals found in excavations would be safely removed and relocated out of harm’s way.

2.7.5 Hazardous Materials and Waste Management

There would be a variety of chemicals and hazardous substances stored and used during construction and operation of the Project. The storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, and regulations. The following planning documents would specify procedures for the proper storage and management of these substances at the site.

Health and Safety Requirements – To comply with regulations set forth by OSHA and the Arizona Division of Occupational Safety and Health, health and safety programs would be established for construction and operations at the site that would document potential hazards and requirements for establishing and maintaining a safe working environment during construction and operation. The programs would include identification of all hazardous substances and chemicals used at the site, including Material Safety Data Sheets, a communication and training program, labeling, and identification of hazards and safe work practices. In addition, safety showers and eyewashes would be provided adjacent to, or in the vicinity of, chemical storage and use areas. Plant personnel would use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures to follow, in case of a chemical spill or accidental release. Supplies of absorbent material would be stored onsite for spill cleanup.

Construction and Operating Stormwater Pollution Prevention Plans – The Project would prepare and implement a SWPPP and file a Notice of Intent with the ADEQ to comply with the General Construction and General Industrial Stormwater NPDES permit. The plans would include procedures to be followed during construction to prevent erosion and sedimentation, non-stormwater discharges, and contact between stormwater and potentially polluting substances.

Hazardous Materials Business Plans – Hazardous Materials Business Plans would be filed with La Paz County for the construction and operation of the facility. The plans would inventory the hazardous materials and waste properties, quantities, storage containers and locations, and contingency planning and emergency response procedures.

Spill Prevention Control and Countermeasure Plans – SPCC Plans would be prepared for construction and operation of the Project. The plans would include spill prevention and countermeasures procedures to be implemented, including, but not limited to, a spill record (if applicable), analysis of potential spills, description of containment facilities, fill and overfill prevention facilities, spill response procedures, and personnel training.

The solar facility would require the use of a mixture of sodium and potassium nitrate salts. To ensure worker safety, the hot and cold HTF tank areas would be designed such that any release would be contained in a basin. The Construction SWPPP would specify procedures to prevent contact between HTF and stormwater during processing of this material prior to plant startup. In addition, the processing area would be cleaned to ensure residual HTF is removed from surface soil after processing.

Industrial wastewater would consist of a relatively small amount of blowdown from the steam system and RO treatment return flow. This wastewater would be disposed of in evaporation ponds at the site. A technical document would be submitted to the ADEQ to permit evaporation ponds for industrial wastewater disposal at the site. The technical document would include waste characterization, impoundment design, leak collection and detection, construction and operating parameters for the ponds, and closure requirements.

Domestic wastewater would be treated and disposed of at the site using a septic disposal system consisting of septic tanks and leach field permitted with the ADEQ and La Paz County. Up to two separate septic and leach field systems may be constructed: one located in the power block to service the Operations and Control Building, and the other located outside the heliostat field near the facility entrance to service the Administration Building.

Project operations would produce maintenance and plant wastes typical of a power generation plant. These wastes would be managed in accordance with a Waste Management Plan. Wastes may include oily rags, broken and rusted metal and machine parts, defective or broken solar mirrors and electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers. These materials would be collected by a local waste disposal company and disposed of at a landfill permitted to receive these wastes. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects, prevent leaks and spills, and prevent potential contact with stormwater.

Several methods would be used to properly manage and dispose of hazardous wastes generated by the Project. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Spent lubrication oil filters would be disposed of in a Class I landfill. Workers would be trained to handle hazardous wastes generated at the site.

Chemical cleaning wastes would consist of alkaline and acid cleaning solutions used during pre-operational chemical cleaning of heat exchangers piping systems after the units are put into service. These wastes, which can contain elevated metal concentrations, would be temporarily stored onsite in portable tanks, and disposed of offsite by a chemical cleaning contractor, in accordance with applicable regulatory requirements.

2.7.6 Health and Safety Program

A health and safety program would be established for construction and operation at the site. The program would include the following components:

- Policies and responsibilities
- Emergency response and contingency planning
- Hazard identification and job safety analysis
- Hazard communication
- Safe work practices
- Personal protective equipment
- Hazardous work permitting systems
- Special considerations for electrical safety, hazardous materials and wastes, fall protection, confined spaces, and mobile equipment safety
- Training requirements

- Incident reporting and investigation
- Record keeping requirements

The Project would also develop and implement a construction safety training program that would be adapted to serve as an operations safety training program as the Project transitions from construction into routine power generation facility operations. The elements of the safety training program would be essentially the same for operations as for construction, but specifics of the training would be adapted as needed to be suitable for the specific work activities associated with operations to the extent that the various activities differ between the two phases. Typical training courses and the employees who are required to receive the training are provided in Table 2-4.

Table 2-4 Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All employees
Emergency Action Plan Training	All employees
Personal Protective Equipment Training	All employees
Heavy Equipment Safety Training	Employees working on, near, or with heavy equipment
Forklift Operation Training	Employees working with forklifts
Excavation and Trenching Safety Training	Employees involved with trenching or excavation operations
Fall Protection Training	All employees
Scaffolding and Ladder Safety Training	Employees required to use or erect scaffolding and employees using ladders
Hoist and Rigging Program	Employees and supervisors responsible for conducting hoists and rigging operations
Crane Safety Training	Supervisors and crane operators
Fire Protection and Prevention Training	All employees
Blood Borne Pathogens Training	First responders
Hazard Communication Training	Employees working with or handling hazardous materials
Electrical Safety Training	Employees performing work with electrical systems, equipment, or electrical extension cords; additionally, employees working with lockout/tagout activities
Hand and Portable Power Tool Safety Training	All employees
Heat Stress and Cold Stress Safety Training	All employees
Hearing Conservation Training	All employees
Back Injury Prevention Training	All employees
Safe Driving Training	All employees

Table 2-4 Training Program	
Training Course	**Target Employees**
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized vessel, pipes, or equipment
Respiratory Protection Training	All employees required to wear respiratory protection equipment
Hot Work Training	All employees working with welding, heating, or other equipment that generates ignition sources

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CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the affected environment associated with the construction, operation, and decommissioning of the Project and the BLM's proposed plan amendment. As explained in Appendix A, the direct, indirect and cumulative effects of the Proposed amendment to the YFO RMP and alternatives identified in Appendix A are the same as those for the Applicant's Proposed Project because: (i) the proposed plan amendment only changes the VRM designation for the project area, and (ii) the change in VRM designation simply allows the project to be built so impacts associated with the proposed amendment are really the impacts of the project itself. As a result, for purposes of Chapters 3 and 4 references to the impacts of the Applicant's Proposed Project incorporate both the Project and the proposed YFO RMP amendment that is being considered concurrently.

The affected environment is the physical area that bounds the environmental, sociological, economic, or cultural features of interest that could be impacted by the Applicant's Proposed Project or alternatives. When preparing this EIS, the best available information was used to describe existing environments and the proposed facilities and activities. The information serves as a baseline from which to identify and evaluate environmental changes resulting from construction and operation of the Project. The baseline conditions, for the purposes of analysis, are the conditions that currently exist.

In the following sections, the term "Project area" refers to the area that encompasses the Project footprint and associated Project components, such as the solar field, access road, and Western's switchyard, as well as the area immediately adjacent to the proposed facilities. The study area, or Region of Influence (ROI), varies depending on the resource being analyzed and the predicted locations of direct and indirect impacts from the Applicant's Proposed Project or alternatives. The Project area for purposes of the proposed RMP amendment is described in Appendix A.

The following resources are considered in the evaluation of the Applicant's Proposed Project and alternatives in the Draft EIS and Proposed YFO RMP Amendment:

- Section 3.2 – Land Use
- Section 3.3 – Special Management Areas
- Section 3.4 – Recreation
- Section 3.5 – Transportation and Traffic
- Section 3.6 – Air Quality and Climate
- Section 3.7 – Geological Resources
- Section 3.8 – Soil Resources
- Section 3.9 – Paleontological Resources
- Section 3.10 – Vegetation and Special Status Species
- Section 3.11 – Wildlife and Special Status Species
- Section 3.12 – Water Resources
- Section 3.13 – Cultural Resources
- Section 3.14 – Social and Economic Conditions
- Section 3.15 – Environmental Justice

- Section 3.16 – Visual Resources
- Section 3.17 – Noise
- Section 3.18 – Public Health and Safety
- Section 3.19 – Hazardous Materials

The following resources do not occur in the Project area and are not addressed further in this EIS.

Lands with Wilderness Characteristics – Under Section 201 of FLPMA, the BLM has the authority to inventory all public land and resources or other values, including areas with wilderness characteristics (43 USC § 1711 (a)). Inventories are completed to identify land with wilderness characteristics and to provide consideration of those values in land-use planning. Inventories may also be completed to provide an assessment of the effects of an action on land with wilderness characteristics. Wilderness characteristics are defined by Section 2(c) of the Wilderness Act as follows:

- **Naturalness:** The area must be in a generally natural condition.
- **Size:** The area must be at least 5,000 contiguous, roadless acres or large enough to preserve as wilderness.
- **Opportunities for solitude or primitive recreation:** The area must provide outstanding opportunities for solitude or a primitive or unconfined type of recreation.
- **Special features:** The area may contain ecological, geological, or other features of scientific, scenic, or historic value.

The wilderness characteristics inventory for the Applicant's Proposed Project was updated in March 2011 and the Project area does not contain land with wilderness characteristics.

Wild and Scenic Rivers – The National Wild and Scenic Rivers System was created by Congress in 1968 (PL 90-542; 16 USC 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The nearest federally designated Wild, Scenic, or Recreational Rivers are portions of the Verde River in Yavapai County, Arizona, and Fossil Creek near Childs, Arizona.

Prime and Unique Farmlands – Prime and unique farmlands are designations assigned by the U.S. Department of Agriculture (USDA). Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. According to 7 CFR 657.5, unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. There are no prime and unique farmlands in or near the Project area.

Indian Trust Assets – Indian Trust Assets are legal interests in property held in trust by the United States for Indian tribes or individuals. There are no Indian Trust Assets within the Project area (Briceño 2011).

3.2 LAND USE

This section of the EIS characterizes the existing and future land use within the ROI. For analysis purposes, the ROI for land use was considered to be the Project area plus a 2-mile buffer. The 2-mile buffer is the distance within which existing or proposed land uses could be directly or indirectly affected by the proposed Project components, considering the location and height of the solar collecting tower, and the level of noise expected during construction, operation, and maintenance of the Project.

3.2.1 Applicable Plans, Policies, and Regulations

The primary legal basis for authorizing a ROW grant on BLM land is Section 302 of FLPMA. Under FLPMA, the Secretary of the Interior is authorized to grant, issue, or renew rights-of-way over, on, or through such land for utilities, roads, trails, highways, railroads, canals, etc. FLPMA provides the BLM with authority to issue ROW grants for the use, occupancy, and development of public land. The regulations establishing procedures for the processing of these grants are found in 43 CFR § 2800.

The following are the Federal, State, regional, and local land use planning documents applicable to the Project:

- *Yuma Field Office, Record of Decision and Approved RMP* (BLM 2010a). This plan identifies existing and future management direction in the form of objectives and management for 1.3 million acres of Federal land in southwestern Arizona and southeastern California. All public land within the planning area, unless otherwise classified as an Area of Critical Environmental Concern (ACEC), Wilderness, or WSA, is available for land use leases and permits under Section 501 of FLPMA. Land use lease or permit applications are addressed on a case-by-case basis, where consistent with other resource management objectives and local land use.

- *The Taylor Grazing Act of 1934*. The Taylor Grazing Act provides the basis for the BLM to provide public land for livestock grazing. In Arizona, the BLM's activities for the grazing and rangeland program include "… resource monitoring, conducting land health assessments and evaluations, use authorizations, allotment planning and administration, developing vegetation objectives, integrating weed management and activity plan development in connection with land use planning" (BLM 2010b).

- *The Public Rangelands Improvement Act of 1978 (43 USC § 1901 et seq.)*. The Public Rangelands Improvement Act establishes and reaffirms the national policy and commitment to (1) inventory and identify current public rangeland conditions and trends; (2) manage, maintain, and improve the condition of public rangeland so that they become as productive as feasible for all rangeland values, in accordance with management objectives and the land use planning process; (3) charge a fee for public grazing use that is equitable; and (4) continue the policy of protecting wild free-roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free-roaming horses and burros that pose a threat to themselves, to their habitat, and to other rangeland values.

- *La Paz County Comprehensive Plan* (La Paz County 2005). This plan was developed to "conserve the natural resources of the county, to ensure efficient expenditure of public funds, and to promote the health, safety, convenience, and general welfare of the public" (ARS11-806). The plan comprises a series of elements that are intended to work together to provide policy direction on the county's growth and development.

- *Town of Quartzsite General Plan* (Town of Quartzsite 2003). This plan was created to serve as a guide for policy decisions relating to the relationships between land use, transportation, quality of life, the environment, and the economy desired by the community of Quartzsite. The plan is intended to be both long-range and visionary, and provides guidance to where Quartzsite wants to be in the future.

3.2.2 Data Collection and Methods

Existing land use data were collected through analysis of aerial photography, field verification, review of existing studies and plans, and coordination with local and county agencies. Individuals from the BLM were contacted and the BLM Legacy Rehost database was utilized to verify land use resources on BLM land within the ROI (BLM 2010c).

Planned land use information was collected through review of existing plans for La Paz County and the Town of Quartzsite. Local, county, and Federal agencies were contacted to identify potential or approved developments near the Project.

Land jurisdiction does not necessarily imply land ownership; however, in some cases the authority that has jurisdiction may also own the land. Three categories of land ownership were identified and mapped within the land use ROI: Federal, State, and private. This information was obtained from available maps, planning documents, and discussion with agencies.

3.2.3 Existing Conditions

3.2.3.1 **Federal**

The Project area falls within the planning area managed by the BLM YFO. The BLM YFO planning area encompasses more than 1.3 million acres, extending northward along the lower Colorado River from the United States–Mexico International Boundary at San Luis, Arizona, to north of Blythe, California, and Ehrenberg, Arizona. The planning area also includes a narrow strip of land in Imperial and Riverside counties, California, Yuma County, and portions of Maricopa and La Paz counties, Arizona (BLM 2010a). Land uses within the YFO planning area are characterized by livestock grazing, recreation, military, and undeveloped land.

A variety of leases, easements, and rights-of-way have been granted by the BLM on land they manage within the YFO planning area. Table 3-1 lists those that have been authorized or are pending within a 2-mile buffer around the Project area, none of which are in conflict with the

Project. All rights-of-way listed below, except the proposed Boulevard Associates, LLC, Solar facility, are at least partially contained within an existing (Parker-Blaisdell) ROW corridor.

The BLM YFO is responsible for the management of grazing allotments in both the YFO and the adjacent BLM Lake Havasu Field Office. There are approximately 428,300 acres available for livestock grazing in the YFO, along with approximately 215,200 acres in the Lake Havasu Field Office (BLM 2010a).

Table 3-1 Authorized and Pending Rights-of-Way

Serial Number	Status	Right-of-Way Type	Description	Holder/Applicant/Contact
AZA 032504	Authorized	Power Transmission	69-kV transmission line	Arizona Public Service
AZA 032506	Authorized	Water Facility	Water pipeline	Patch Living Trust
AZA 010201	Authorized	Telephone	Buried cable line	Southwestern Telephone Co.
AZA 034335	Pending	Solar Development	Solar facility using CSP	Boulevard Associates, LLC
AZA 032505	Authorized	Roads	Road to mining facility	Cyprus Copperstone
AZA 010121	Authorized	Power Transmission	69-kV transmission line	Arizona Public Service
AZA 032825	Authorized	Roads	0.894-acre roadway	Richard Oldham
AZPHX 0086406	Authorized	Power Transmission	161-kV transmission line	DOE, Western
Source: BLM 2010c				

The Project area is located within the Weisser Ephemeral designated BLM grazing allotment that totals 64,674 acres (Figure 3-1). The Project area is also located within 2 miles of the Martinez Allotment (64,044 acres) and the Nine Mile Allotment (109,879 acres). Neither the Weisser Ephemeral nor the Martinez Allotment is active. The Nine Mile Allotment is an active allotment with a carrying capacity of 468 Animal Unit Months (AUM). An AUM is the amount of forage required by an animal unit for 1 month or the tenure of one animal unit for a 1-month period.

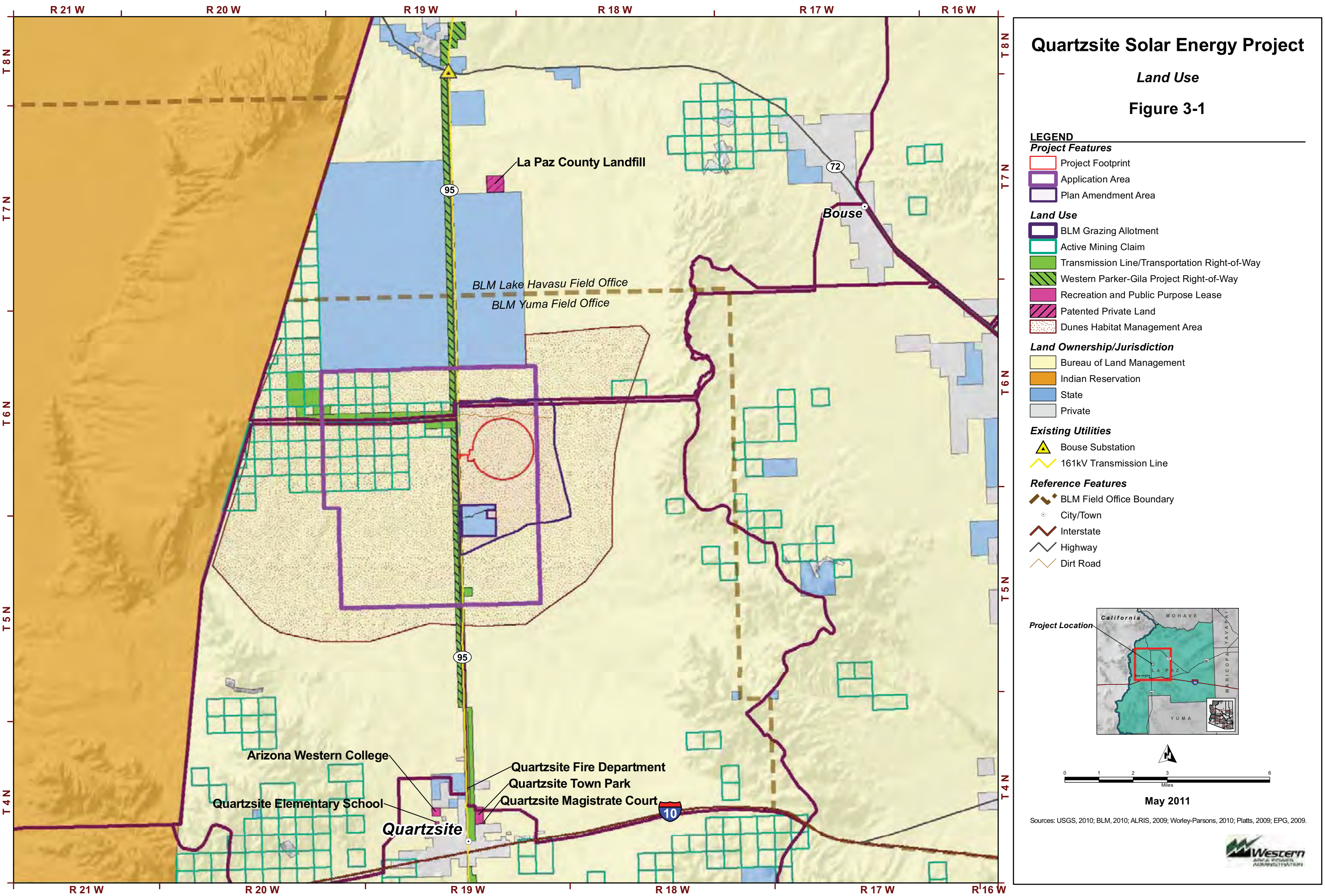
3.2.3.2 State of Arizona

Approximately 600 acres of Arizona State Trust Land are located within the Project's ROI. No existing or planned developments or rights-of-way exist on the Arizona State Trust Land parcel.

3.2.3.3 Local Land Ownership and Use

The Project area is located within La Paz County, and as such, is a component of the La Paz County planning area. La Paz County (the La Paz County planning area) covers 4,518 square miles, bounded on the west by the Colorado River, on the east by Yavapai and Maricopa counties, Yuma County to the south, and the Bill Williams River separating La Paz and Mohave counties to the north (La Paz County 2005).

La Paz County is Arizona's third smallest county, with the lowest population density. Approximately one-third of La Paz County's population resides within the municipalities of


Quartzsite Solar Energy Project
Land Use
Figure 3-1
LEGEND
Project Features
Project Footprint
Application Area
Plan Amendment Area
Land Use
BLM Grazing Allotment
Active Mining Claim
Transmission Line/Transportation Right-of-Way
Western Parker-Gila Project Right-of-Way
Recreation and Public Purpose Lease
Patented Private Land
Dunes Habitat Management Area
Land Ownership/Jurisdiction
Bureau of Land Management
Indian Reservation
State
Private
Existing Utilities
Bouse Substation
161kV Transmission Line
Reference Features
BLM Field Office Boundary
City/Town
Interstate
Highway
Dirt Road
Project Location
California
MOHAVE
LA PAZ
YUMA
MARICOPA
YAVAPAI
0 1 2 3 6
Miles
May 2011
Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.
Western
R 21 W
R 20 W
R 19 W
R 18 W
R 17 W
R 16 W
T 8 N
T 7 N
T 6 N
T 5 N
T 4 N
La Paz County Landfill
95
72
Bouse
BLM Lake Havasu Field Office
BLM Yuma Field Office
Arizona Western College
Quartzsite Fire Department
Quartzsite Town Park
Quartzsite Magistrate Court
Quartzsite Elementary School
Quartzsite
10

Quartzsite and Parker. La Paz County anticipates population growth in residential areas, concentrated in dispersed pockets throughout the County. Commercial development there varies. Quartzsite is characterized as experiencing seasonal commercial activity serving the influx of winter visitors and tourists (La Paz County 2005).

As shown in Table 3-2, land ownership in La Paz County consists largely of publicly-owned land, with the BLM owning approximately 1,690,000 acres. The DOD is the second largest land holder in La Paz County, owning approximately 400,000 acres, followed by the State of Arizona owning approximately 255,000 acres (La Paz County 2005).

Table 3-2 Land Ownership/Jurisdiction in La Paz County

Land Owner/Jurisdiction	Acres	Percentage
BLM	1,683,489	58.3
Department of Defense	396,819	13.7
State	255,195	8.8
Colorado River Indian Tribes	232,627	8.1
Wildlife Refuge	168,616	5.8
Private	149,075	5.3
Other	4,144	0.1

Source: La Paz County 2005

Land uses within the La Paz County planning area are distinguished by sparse residential and commercial development and undeveloped open space. Much of the residential and commercial development is located in or around the communities of Parker and Quartzsite, as well as on the Colorado River Indian Tribes Reservation (La Paz County 2005).

The Project area can be characterized as undeveloped land with uses limited to primitive unconfined recreational uses. Because the Project area is located on BLM-managed land, it is not zoned by La Paz County; however, private parcels located in the vicinity are zoned as Rural Area 40 Acres (rural parcels 5 to 40 acres in size) (La Paz County 2010).

The Project area is located outside of the Town of Quartzsite (approximately 10 miles north) and is not within the Town's planning boundaries. The Town of Quartzsite's General Plan land use designations consist of rural, residential, commercial, and industrial uses, but the General Plan recommends designating areas for future open space, public/semi-public, and professional office uses.

The Town's General Plan Land Use Element does include mention of the vast public land surrounding Quartzsite (Town of Quartzsite 2003); at the Town's nearest location to the Project area along SR 95 (approximately 5 miles south), the Town's Land Use designation characterizes the land as Heavy Industrial. Additionally, Quartzsite's General Plan also suggests that industrial developments should be encouraged along major transportation routes.

3.2.4 Planned Land Use

Planned or future land use refers to the planned and future land uses designated within the ROI Federal (BLM) and local (La Paz County) jurisdictional entities' plans. These land management plans reflect the goals and policies that guide the physical land development.

The BLM retains planning authority and control over its land; unless it is determined that disposal of a particular parcel or parcels would serve the public interest. Land disposal is made on a case-by-case basis and accomplished by the most appropriate disposal authority. Several tracts of land—totaling approximately 11,900 acres—are available for disposal in the BLM YFO, with most of the areas immediately in or surrounding the Town of Quartzsite (BLM 2010a).

According to the *La Paz County Comprehensive Plan* (2005), maintaining open space and encouraging land use planning is the ultimate objective of the Land Use Plan. Therefore, the proposed future land use pattern focuses new development around currently incorporated and unincorporated communities, including Quartzsite. The Town of Quartzsite is identified as one of five "Growth Areas" anticipated for future development. Quartzsite has a land base with a significant amount of privately-held land, and has taken steps to develop water and wastewater systems and other infrastructure to accommodate future development. The La Paz County Future Land Use Map maintains the Project area designated as Public Land (La Paz County 2008).

3.3 SPECIAL MANAGEMENT AREAS

This section identifies Special Management Areas (SMA) in the regional area. SMAs refer to areas in BLM land use planning that are either administratively or congressionally designated. Examples of congressionally designated areas can include National Wilderness Areas, WSAs, National Wild and/or Scenic Rivers, National Conservation Areas, National Scenic Trails, National Historic Trails, National Recreation Trails, and National Byways. Examples of administrative designations can include ACECs and WHAs. SMAs are managed to protect their unique values and uses. These areas typically require a more intensive management emphasis than is applied to surrounding public land.

3.3.1 Applicable Plans, Policies, and Regulations

FLPMA (43 USC § 1701 et seq.) provides the authority for BLM land use planning. It requires that public land be managed in a manner that would protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; that, where appropriate, [the BLM] would preserve and protect certain public lands in their natural condition.

The following are the Federal, State, regional, and local land use planning documents applicable to the Project:

- *Yuma Field Office, Record of Decision and Approved RMP* (BLM 2010a). The YFO RMP outlines and describes the 16 SMAs contained within the YFO planning area, and details the desired future conditions and management and administrative actions associated with each.

- *BLM Yuma Field Office Wilderness Area Descriptions* (BLM 2009a). The BLM YFO Wilderness Area Descriptions report provides a listing and description of the Wilderness Areas found within the YFO planning boundaries.

3.3.2 Data Collection and Methods

The SMA ROI includes lands within a 30 mile radius of the Project area. Although the Project would not directly impact SMA's in the ROI, the larger geographic area was selected based on potential visual effects to SMAs from the solar towers associated with the Applicant's Proposed Project.

3.3.3 Existing Conditions

There are 11 SMAs within the ROI. These include six Wilderness Areas, one WSA, two ACECs, and two National Byways (Table 3-3) (BLM 2007b; BLM 2010a). These SMAs are shown on Figure 3-2.

Table 3-3 Regional Special Management Areas

SMA	Area/Length	Distance from Project Area
Designated Wilderness		
Big Maria Mountains	1,600 acres	19 miles west
New Water Mountains	24,700 acres	13 miles southeast
Riverside Mountains	1,100 acres	20 miles northwest
East Cactus Plain (Lake Havasu Planning Area)	14,630 acres	17 miles northeast
Gibraltar Mountain (Lake Havasu Planning Area)	18,790 acres	18 miles north
Swansea (Lake Havasu Planning Area)	16,400 acres	28 miles northeast
Wilderness Study Area		
Cactus Plain (Lake Havasu Planning Area)	59,100 acres	10 miles north
Areas of Critical Environmental Concern		
Big Maria ACEC	4,500 acres	18 miles west
Dripping Springs ACEC	11,700 acres	13 miles southeast
National Byways		
Plomosa Back Country Byway	10 miles	4 miles south
Highway 95 Scenic Byway	64 miles	10 miles south
Source: BLM 2007b; BLM 2010a; BLM 2011a		

3.3.3.1 **BLM Wilderness Areas**

A Wilderness Area, according to the Wilderness Act of 1964, is an "area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural condition…" Designated by Congress, Wilderness Areas within the BLM YFO planning area are managed according to the Wilderness Act of 1964, the Arizona Desert Wilderness Act of 1990, the California Desert Protection Act of 1994, regulations for wilderness management at 43 CFR 6300, BLM Manuals 8560 and 8561, BLM Handbook H-8560-1, and individual Wilderness Management Plans.

There are six designated Wilderness Areas in the ROI; the New Water Mountains Wilderness, Big Maria Mountains Wilderness, the Riverside Mountains Wilderness, East Cactus Plain Wilderness, Gibraltar Mountain Wilderness, and the Swansea Wilderness. These Wilderness Areas are shown on Figure 3-2 and are described below.

The New Water Mountains Wilderness, located approximately 13 miles southeast of the Project area, was created in part for its importance as a desert bighorn sheep habitat, including the New Water and Dripping Springs lambing areas.

The Big Maria Mountains Wilderness is located approximately 19 miles west of the Project area and is managed by the BLM for recreation and nature reserve protection.

The Riverside Mountains Wilderness, located approximately 20 miles northwest of the Project area, was created to preserve the natural character and condition of the area, aiding in the protection of a small herd of burro deer and sensitive plant species, including the Foxtail cactus and the California barrel cactus.

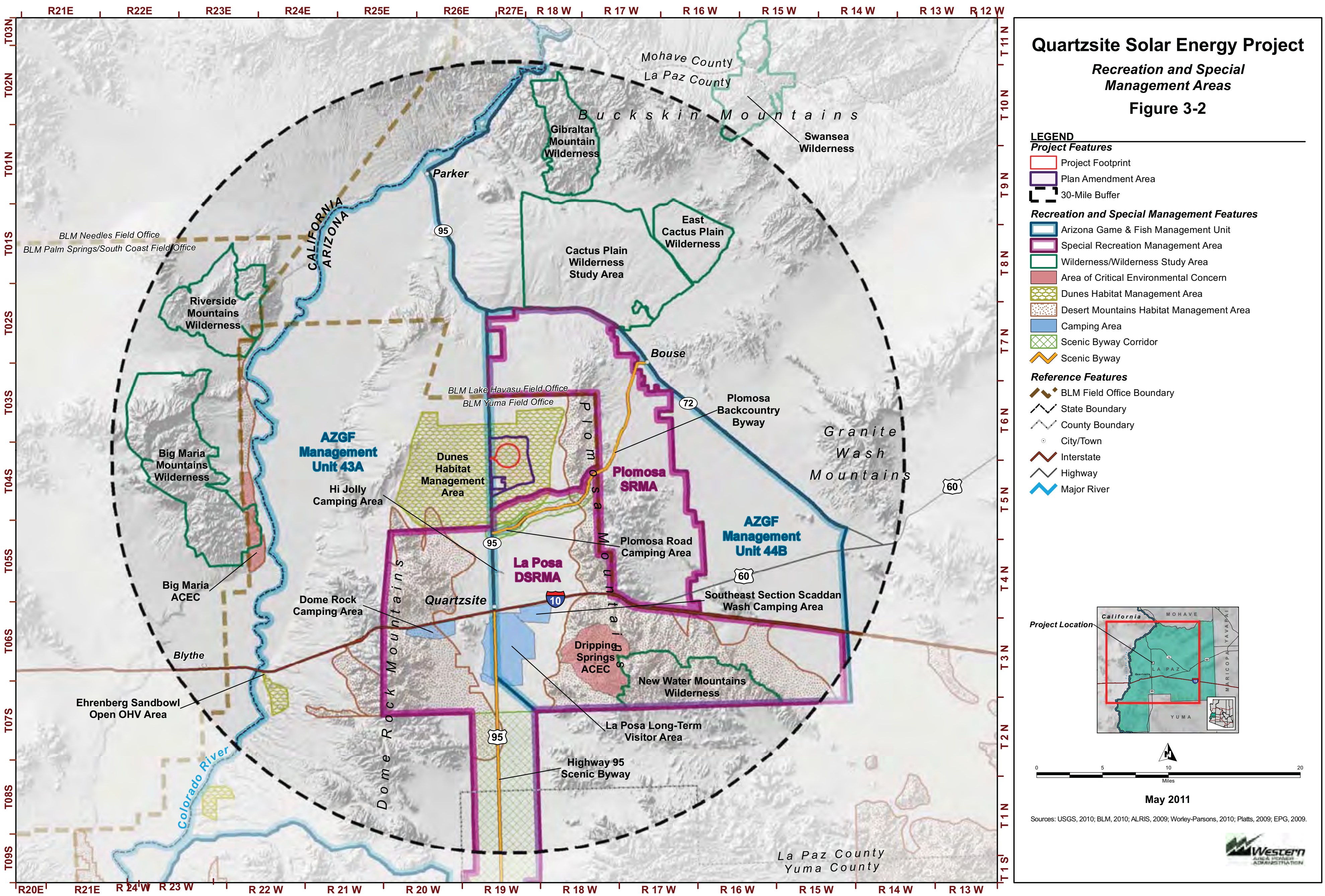
The East Cactus Plain Wilderness, located approximately 17 miles northeast of the Project area, was created to aid in the protection of the intricate crescent dune topography and dense dune-scrub vegetation known only from this area in Arizona.

The Gibraltar Mountain Wilderness and Swansea Wilderness, located approximately 18 miles north and 28 miles northeast of the Project area, respectively, were created to preserve the natural character and condition of the areas, assisting in the protection of the biological and cultural elements of their rugged, volcanic-rock dominated landscapes.

3.3.3.2 **Wilderness Study Areas**

WSAs are areas of public land that the BLM has determined possess the wilderness qualities described in the Wilderness Act of 1964. The WSA system was established under Section 603 of FLPMA as a means of identifying for Congress those public lands that possess wilderness characteristics described by the Wilderness Act of 1964. Congress can designate WSAs, release them from study status, or maintain their wilderness study status (BLM 2007b).

There is one WSA in the ROI: the Cactus Plain WSA, located approximately 10 miles north of the Project area. As part of the 1990 Arizona Desert Wilderness Act, Congress designated Cactus Plain as a WSA to protect the stabilized sand dune complex and the associated vegetation within the area. As a result, this area is managed in accordance with the BLM's Interim Management Policy and Guidelines for Lands under Wilderness Review H-8550-1, until Congress designates



Quartzsite Solar Energy Project

Recreation and Special Management Areas

Figure 3-2

it as part of the National Wilderness Preservation System or removes it from its Congressional Wilderness Study status (BLM 2007b).

3.3.3.3 **Areas of Critical Environmental Concern**

BLM regulations (43 CFR part 1610) define an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards." Congress mandated the designation of ACECs through FLPMA to manage areas containing truly unique and significant resource values.

There are two ACECs within the ROI: Dripping Springs ACEC, located adjacent to the New Water Mountains Wilderness, approximately 13 miles southeast of the Project area; and the Big Maria ACEC, located adjacent to the Big Maria Mountains Wilderness, approximately 19 miles west of the Project area.

The Dripping Springs ACEC was designated to protect a perennial water source, desert bighorn sheep habitat, an important petroglyph site, and the remains of several historic stone structures. The Big Maria ACEC was designated to protect the high concentration of nationally significant intaglio features and a density of other prehistoric archaeological features including petroglyphs, pictographs, trail networks, campsites, and artifact scatters (BLM 2010a).

3.3.3.4 **National Byways**

The National Byways program was established by the United States Department of Transportation and Federal Highways Authority under the Intermodal Surface Transportation Efficiency Act of 1991, and reauthorized under the Transportation Equity Act for the 21st Century in 2003. Back Country Byways are designated by local BLM units, while National Byways are a designation conferred by Federal and State agencies.

There is one Back Country Byway and one National Byway within the ROI (see Figure 3-2). The Plomosa Back Country Byway, located approximately 4 miles south of the Project area, is approximately 10 miles in length and allows for adjacent public use of a cultural site, provides views of the Plomosa Mountains, and provides connectivity to a nominated Back Country Byway in the BLM Lake Havasu Field Office. The Highway 95 Scenic Byway, located approximately 10 miles south of the Project area, is approximately 64 miles in length and provides passing motorists with exceptionally scenic landscape viewing opportunities on land administered by the BLM, Kofa National Wildlife Refuge, and USAG-YPG.

The Project would not contain any designated Back Country Byways or National Byways.

3.4 RECREATION

The recreation setting and opportunities for recreation in the region and the Project area are described below.

3.4.1 Applicable Plans, Policies, and Regulations

Section 201 of FLPMA states that "the Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including but not limited to outdoor recreation and scenic values), giving priority to areas of critical environmental concern" (43 USC § 1711[a]). Section 202 of FLPMA provides the authority, through the land use planning process, to consider management of lands for their recreational opportunities.

Federal, State, and local recreation data were obtained from planning, management, and informational documents. These documents consist of the following:

- *BLM Yuma Field Office, Record of Decision and Approved RMP* (BLM 2010a). The YFO RMP outlines and describes the recreation areas and opportunities contained within the YFO planning area, and details the desired future conditions and management and administrative actions associated with each.

- *BLM Lake Havasu Field Office RMP* (BLM 2007b). The BLM Lake Havasu Field Office RMP outlines and describes the recreation areas and opportunities contained within the Lake Havasu Field Office planning area, and details the desired future conditions and management and administrative actions associated with each.

- *BLM Yuma Field Office Wilderness Area Descriptions* (BLM 2009a). This document provides a listing and description of the recreational opportunities of the Wilderness Areas found within the YFO planning boundaries.

- *BLM National Management Strategy for Off-Highway Vehicle Use on Public Lands* (BLM 2001). This document was created as an approach to determine and implement better on-the-ground motorized OHV management solutions designed to conserve soil, wildlife, water quality, native vegetation, air quality, heritage resources, and other resources, while providing for appropriate motorized recreational opportunities.

- *United States Department of Agriculture, Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research* (Clark and Stankey 1979). This document describes the combination of physical, biological, social, and managerial conditions that give value to a place, including qualities provided by nature (vegetation, landscape, topography, scenery), qualities associated with recreational use (levels and types of use), and conditions provided by management.

- *Final Range Wide Environmental Impact Statement* (Yuma Proving Grounds 2001). This document presents the impacts associated with the direct, indirect, and cumulative impacts of mission diversification and changes to land use for YUMA PROVING GROUNDS, and provides descriptions of the recreational opportunities within the Project ROI.

- *Arizona Game and Fish Department, Game Management Unit 44B and 43A Descriptions*. Describes the location, extent, habitat, and species of each game management unit.

- *La Paz County Comprehensive Plan* (La Paz County 2005). This plan was developed to "conserve the natural resources of the county, to ensure efficient expenditure of public funds, and to promote the health, safety, convenience, and general welfare of the public" (ARS11-806). The Plan outlines the recreational opportunities for areas within the Project ROI.
- *Town of Quartzsite General Plan* (Town of Quartzsite 2003). This plan was created to serve as a guide for policy decisions concerning the relationships between land use, transportation, quality of life, the environment, and the economy desired by the community of Quartzsite. The Plan provides description of the cause for, and magnitude of, the region's seasonal visitors.

3.4.2 Data Collection and Methods

The recreational ROI includes land within area 30 mile radius of the Project area. The larger geographic area was selected based on potential visual effects to recreation users from the solar towers associated with the Applicant's Proposed Project.

3.4.3 Existing Conditions

A recreation setting includes the features provided by nature or management and associated with recreational use. Providing a wide range of recreation settings varying in the degree of scenery, topography, development, and access ensures that the broadest segment of the public would find quality and diverse recreational experiences and opportunities.

The recreation setting in the ROI includes ecologically diverse landscapes, large expanses of open space, and is roughly bordered by the Plomosa and New Water Mountains to the east and the Kofa and Dome Rock Mountains to the south. The ROI is characterized by mostly broad, flat valleys, sandy washes, and widely-scattered, small mountain ranges dominated by low shrubs, grasses, and cacti. Elevations range from approximately 1,200 feet at New Water Mountains Wilderness, 13 miles southeast of the Project area, to just a few hundred feet at the Colorado River (BLM 2009a).

The recreation settings in the ROI vary from urban to primitive. The urban recreation setting typically has a high level of development, human activity, and natural resource modification. The primitive recreation setting has very little development, human activity, or natural resource modifications (BLM 2010a). During the winter months the region experiences a tremendous influx of temporary residents, estimated at more than 100,000 people, camped in recreational vehicles (RV) (La Paz County 2005). This massive, seasonal population increase is attributed to the mild winter temperatures, and the Town of Quartzsite's annual hosting of one of the largest gem and mineral shows in the nation, attracting people from around the world (La Paz County 2005).

There are five BLM-designated 14-day camping areas, one Long-term Visitor Area (LTVA), one day use area, and one designated OHV area within the ROI (see Figure 3-2). Recreation opportunities in these areas include camping, hiking, picnicking, biking, wildlife viewing, OHV use, boating, fishing, and horseback riding. On an annual basis, approximately 250,000 visitors use the La Posa LTVA and the five surrounding 14-day campgrounds (BLM 2010a).

The Recreation Opportunity Spectrum is the combination of physical, biological, social, and managerial conditions that give value to a place. A recreation opportunity includes qualities provided by nature (vegetation, landscape, topography, scenery), qualities associated with recreational use (levels and types of use), and conditions provided by management (developments, roads, regulations). By combining variations of these qualities and conditions, management can provide a variety of opportunities for recreationists. The Project area is located within the Rural Natural Recreation Opportunity Spectrum Class. Recreation experiences in this setting tend to be more resource-dependent and attract those seeking unconfined recreation opportunities (BLM 2010a). Nearby, small areas to the east and west of SR 95 are within the Rural Developed Recreation Opportunity Spectrum Class. This recreation setting is associated with the increased amount of development, human activity, and natural resource modifications related with SR 95.

OHVs are used within the ROI for recreation (e.g., motorcycle racing, rock climbing, and rockhounding) and for transportation to recreation sites (e.g., to hunting or camping sites). The BLM objectives for OHV management are to protect the resources of public land, promote the safety of all users of the land, and minimize conflicts among the various uses of the land (BLM 2001). Land can be designated as open to OHV use, closed to OHV use, open to OHV use but limited to existing roads and trails, and open to OHV use but limited to designated roads and trails. The only area designated as an Open OHV Management Area is the 400-acre Ehrenberg Sandbowl located south of I-10 near the Colorado River, approximately 23 miles southwest of the Project area (see Figure 3-2). OHV use in the ROI is limited to existing roads and trails. There are no existing roads or trails within the Project area; however, one unpaved secondary road is located immediately north of the Project area. This road (LP089) runs east-west and exists within 250 yards of the north edge of the proposed Project footprint (BLM 2009b). The BLM has also digitized one potential road that has been detected through aerial imagery, but has not been confirmed through ground surveys. This road (LP2739) dead-ends approximately 200 yards southwest of the proposed Project footprint (BLM 2009b). The YFO intends to leave LP089 open while LP2739 will be closed (personal communication, Joseph Raffaele 2011).

Rockhounding is a common recreational activity in the Quartzsite area; it is most common along the hills and mountains in western Arizona. There are minimal resources for rockhounders located on the valley floors. No inventoried routes or commonly used rockhounding areas are located within the Project area (personal communication, Joseph Raffaele 2011).

As described in Section 3.3; Special Management Areas, there are six designated Wilderness Areas and one WSA in the ROI; the New Water Mountains Wilderness, Big Maria Mountains Wilderness, the Riverside Mountains Wilderness, East Cactus Plain Wilderness, Gibraltar Mountain Wilderness, and Swansea Wilderness, and the Cactus Plain WSA (see Figure 3-2). Recreation opportunities in these areas include backpacking, camping, hiking, wildlife viewing, horseback riding, and hunting.

Within the ROI are the Dripping Springs and Big Maria ACECs, located approximately 13 miles southeast and 19 miles west, respectively, of the Project area. These ACECs provide recreation opportunities for hiking, backpacking, wildlife viewing, hunting, and cultural resource viewing (BLM 2010a).

Special Recreation Management Area (SRMA) designations intensify management of areas where outdoor recreation is a high priority. An SRMA designation helps direct recreation program priorities toward areas with high resource values, elevated public concern, or significant amounts of recreational activity (BLM 2010a).

The Plomosa SRMA is located approximately 3 miles northeast of the Project area. This SRMA encompasses 102,053 acres and provides semi-primitive, rural developed and rural natural recreation settings with diverse recreation opportunities (BLM 2007b).

The La Posa SRMA, located approximately 2 miles south of the Project area, contains three Recreation Management Zones; the Back Country Byway, Plomosa Mountains, and the Bouse Plain. The Back Country Byway Recreation Management Zone provides a rural developed recreation setting and provides opportunities for pleasure driving, cultural resource viewing, wildlife viewing, photography, mountain biking, and OHV use. The Plomosa Mountains Recreation Management Zone provides a semi-primitive recreation setting and opportunities for unconfined recreation such as OHV use, hunting, hiking, wildlife viewing, and mountain biking. The Bouse Plain Recreation Management Zone provides a rural natural recreation setting and offers opportunities for primitive unconfined recreation. Primary recreation activities include dispersed camping, OHV use, wildlife viewing, hiking, rockhounding, and hunting. No SRMAs are within the Project area.

Extensive Recreation Management Areas are areas outside of SRMAs and emphasize traditional dispersed recreation use of public land. Except for special designations, all areas that are not managed specifically to maintain recreational values are, by default, part of the Extensive Recreation Management Area. The Extensive Recreation Management Area is open to recreational activities and is generally managed by the BLM to limit use conflicts and resource damage. They have an undeveloped character that allows visitors to experience solitude and an unconfined recreation experience. The BLM management actions are limited to custodial actions and do not require any additional implementation level planning. The majority of the YFO planning area is managed as an Extensive Recreation Management Area, including all land within the Project area.

There are two designated WHAs in the ROI: the 664,000-acre Desert Mountains WHA near the Dome Rock Mountains, and the 57,500-acre Dunes WHA. The Desert Mountains WHA contains important habitat for self-sustaining populations of native wildlife species (i.e., desert bighorn sheep, desert tortoise [Sonoran and Mojave populations], raptors, and bats (BLM 2010a).

The Project area is located within the Dunes WHA. The Dunes WHA includes four areas of dune habitat that support native wildlife and plant species. These species include, but are not limited to, Cowle's fringe-toed lizard (Uma notata rufopunctata), scaly sandplant (Pholisma arenarium), flat-tailed horned lizard (Phrynosoma mcallii), and sand food (Pholisma sonorae) (BLM 2010a).

Game Management Units are areas established by the AZGFD to effectively manage and control seasonal hunting. The AZGFD has set forth legal regulations that govern each Game Management Unit to provide hunters with an optimal experience while managing game populations from year to year. The Project area is located within AZGFD Game Management Unit 44B and adjacent and east of Game Management Unit 43A. According to the AZGFD, the biggest draw for hunting, trapping, scientific or non-commercial collection, and viewing in both units includes Gambel's quail, desert bighorn sheep, mule deer, white-wing and mourning dove, and waterfowl in Unit 43A (AZGFD 2010a). Access to both Game Management Units is relatively unrestricted via four-wheel drive jeep trails.

Portions of the Yuma Proving Grounds Cibola Region, located approximately 18 miles south of the Project area, allow for hunting during designated hunting seasons (Yuma Proving Grounds 2010).

La Paz County manages an extensive system of parks and recreation facilities in the ROI. The system of parks includes La Paz County Park (25 miles north of Project area); Patria Flats Park (24 miles north of Project area); and three community parks, with the nearest, Bouse Community Park, located approximately 11.5 miles east of the Project area. Recreation opportunities in these areas are diverse and include camping, picnicking, hiking, wildlife viewing, OHV use, horseback riding, biking, fishing, and athletic activities.

The Town of Quartzsite, approximately 10 miles south of the Project area, offers recreational facilities including the Town Park and a portion of the Quartzsite School District, which is used for field game activities (Town of Quartzsite 2003).

3.5 TRANSPORTATION AND TRAFFIC

This section identifies existing transportation and motorized vehicle access conditions in the Project area. The ROI for transportation is within 15 miles of the Project area.

The Project would be constructed and operated on currently undeveloped BLM land approximately 10 miles north of Quartzsite, on the east side of SR 95. The main access to the Project area would be located on the west end of the Project area, approximately 5 miles north of the intersection of SR 95 and Plomosa Road. The Project would entail construction of a 1.5-mile long two-lane paved roadway between the main gate and SR 95.

Because of the layout of the existing roadway network in the Project area, the majority of traffic to and from the Project area is expected to pass through the town of Quartzsite via I-10 and SR 95. The secondary potential access road from the town of Parker along SR 72/SR 95 is meant to provide an alternative access.

Based on construction and operational considerations described in Chapter 2, the ROI for transportation and traffic includes the Project area (footprint) and extends to the access road that is anticipated to be used during construction and operation, including SR 95 both north and south of the Project area, I-10, and SR 72. These highways would constitute the primary and secondary access to the Project area.

3.5.1 Applicable Plans, Policies, and Regulations

The *ADOT Traffic Engineering Policies, Guides, and Procedures Section 240, Traffic Impact Analyses* stipulate that a traffic impacts analysis be conducted for all new developments and for additions to existing developments that generate 100 or more trips during any one hour of the day.

A traffic impact analysis was completed for the Project in 2010 (Southwest Traffic Engineering [SWTE] 2010). Because of the expected high levels of traffic during the peak construction, a modified Category IIa traffic impact analysis was completed and includes the peak construction year of the Project (assumed to be 2012) and the commercial operation year (2014). The results of this analysis are discussed in Chapter 4 – Environmental Consequences, in Section 4.5 (Transportation and Traffic).

3.5.2 Existing Conditions

Level of Service (LOS) is a qualitative measure that characterizes how well traffic is flowing and the perception of traffic conditions by motorists and passengers through intersections with an impediment to movement (e.g., stop sign, traffic signal). LOS range from LOS A, which indicates little or no congestion; to LOS F, which indicates congestion and traffic jam conditions stopping traffic on particular road segments. A study by Lima and Associates (2009) reported that all roads within La Paz County, except for two roads north of Parker, are classified as LOS A and LOS B. This can be interpreted as all roads within the Project area as having a LOS of free flow to reasonably free flow and are under capacity. Lima and Associates (2010) estimated that by the year 2030 all roads in the Project area will still be under capacity.

3.5.2.1 **Primary Roadways in the Project Vicinity**

I-10

I-10 is the southernmost east-to-west, coast-to-coast interstate highway in the United States. It begins in Santa Monica, California and ends in Jacksonville, Florida. It is a major thoroughfare between the Los Angeles and Phoenix metropolitan areas. Within La Paz County, I-10 is classified as a freeway with two lanes in each direction. Access from I-10 to the Project area is provided through Quartzsite via two exits: Quartzsite Boulevard and Riggles Road.

Average daily traffic volumes developed by ADOT in 2008 show approximately 20,000 vehicles utilize I-10 daily in La Paz County (Lima and Associates 2009).

Figure 3-3 View of I-10 east of Quartzsite facing west.

SR 95

SR 95 is an ADOT-administered two-lane, rural highway located approximately 0.5 mile west of the Project area. It provides north-south access on the Arizona side of the Colorado River between I-10 and I-40.

The Project area is located east of SR 95 approximately 5 miles north of Plomosa Road. Access to the solar field will be from a new 1.5-mile long access road from SR 95.

Average daily traffic volumes developed by ADOT in 2008 show 2,454 vehicles utilized SR 95 between Quartzsite and the junction with SR 72. A 2009 La Paz County study found that 2,488 vehicles utilized the same area daily. These studies also reported that between 4,432 and 4,860 vehicles utilized SR 95 daily between Parker and the junction with SR 72 (Lima and Associates 2009).

Figure 3-4 View of SR 95 adjacent to the Project area facing south.

SR 72

SR 72 is an ADOT-administered, two-lane rural highway that is approximately 37 miles long. It runs from Hope, Arizona at the junction with SR 60 to the junction with SR 95 approximately 13 miles southeast of Parker, Arizona. SR 72 is unlikely to be used by Project-generated vehicles, but would be impacted at the intersection of SR 72/SR 95.

Average daily traffic volumes developed by ADOT in 2008 show between 1,957 and 2,796 vehicles utilized SR 72 daily. A 2009 La Paz County study found that between 1,202 and 3,155 vehicles utilized SR 72 daily (Lima and Associates 2009).

Figure 3-5 View of SR 72 east of the junction with SR 95.

Additional Roadways

There are two exits on I-10 from which vehicles can access SR 95. Vehicles approaching Quartzsite from the west would utilize the Quartzsite Boulevard exit (Exit #17). These vehicles would then go east on Main Street to intersect with SR 95. Vehicles approaching Quartzsite from the east would utilize the Riggles Road exit (Exit #19). These vehicles would then go west on Main Street to intersect with SR 95.

Within the Project area there are no unimproved/dirt roads. Immediately north of the Project area is an existing dirt road that is used by OHVs. This road is referred to as LP089 by the YFO and is open to use (personal communication, Joseph Raffaele 2011) (see Figure 3-1).

3.5.3 Data Collection and Methods

To form a basis for analysis of the traffic related impacts of the Project, weekday morning and afternoon peak hour turning movement counts were conducted at the eight intersections that are anticipated to be utilized by Project-generated traffic.

The weekday turning movement counts were conducted from 7:00 to 9:00 in the morning and 4:00 to 6:00 in the afternoon in November 2010. Due to high seasonal fluctuations in traffic in the area during the winter months, the traffic counts were adjusted from the actual November counts to the potential January peak traffic volume levels in this area, using established ADOT factors to account for seasonal variations.

Analysis of current intersection operations was conducted for the weekday morning and afternoon peak hours using the nationally accepted methodology set forth in the Transportation Research Board's 2000 Highway Capacity Manual (SWTE 2010). The computer software, Highway Capacity Software, was utilized to calculate the LOS for individual movements, approaches, and for the intersections as a whole.

Existing LOS for the Project area intersections currently operate at an adequate LOS of C or better in the weekday morning and afternoon peak hours (Table 3-4).

Table 3-4 Existing Peak Hour Levels of Service

Intersection	Morning Peak		Afternoon Peak	
	LOS	Delay	LOS	Delay
Signalized Intersections				
SR 95/Main Street				
Eastbound Approach	C	25.1	B	15.4
Westbound Approach	C	26.0	B	15.9
Northbound Approach	B	16.2	C	21.9
Southbound Approach	B	17.1	C	22.7
Un-signalized Intersections				
I-10 Westbound Ramps/Quartzsite Boulevard				
Northbound Left/Through	A	7.9	A	8.5
Westbound Left/Through/Right	B	11.0	B	13.0
I-10 Eastbound Ramps/Quartzsite Boulevard				
Southbound Left/Through	A	7.9	A	8.2
Eastbound Left/Through	B	11.8	C	15.5
Eastbound Right	A	9.1	A	9.7
I-10 Westbound Ramps/Riggles Avenue				
Northbound Left	A	7.9	A	8.2
Westbound Left	B	10.1	B	10.6
Westbound Through	B	11.4	B	12.4
Westbound Right	A	9.1	A	9.5
I-10 Eastbound Ramps/Riggles Avenue				
Southbound Left	A	7.9	A	7.9
Eastbound Left	B	12.5	B	13.6
Eastbound Through	B	13.4	B	14.5

Table 3-4 Existing Peak Hour Levels of Service				
Intersection	**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay**	**LOS**	**Delay**
Eastbound Right	A	8.7	A	8.7
Quartzsite Boulevard/Main Street				
Eastbound Left/Through/Right	A	8.0	A	9.2
Westbound Left	A	10.0	C	17.1
Westbound Through/Right	A	7.8	A	8.9
Northbound Left/Through	A	9.0	A	9.6
Northbound Right	A	7.5	B	11.6
Southbound Left/Through/Right	A	8.5	A	9.6
Riggles Avenue/Main Street				
Eastbound Left	B	11.6	B	13.3
Eastbound Right	A	9.4	A	10.0
Northbound Left	A	7.7	A	7.9
SR 72/SR 95				
Eastbound Left	A	7.6	A	7.5
Westbound Left	A	8.0	A	8.1
Northbound Left	B	10.8	B	11.2
Northbound Through/Right	A	8.8	A	9.0
Southbound Left	B	10.7	B	10.7
Southbound Through/Right	A	0.0	A	8.7
Delay – seconds per vehicle Source: SWTE 2010				

3.6 AIR QUALITY AND CLIMATE

This section identifies existing air quality and climatic conditions within and adjacent to the Project area. Air quality data were obtained from existing literature, agency files, and meteorological data from local monitoring stations.

3.6.1 Applicable Plans, Policies, and Regulations

The Federal Clean Air Act passed by the United States Congress in 1970, and amended in 1990, authorized the EPA to establish National Ambient Air Quality Standards (NAAQS) for pollutants that threaten human health and the environment (40 CFR, Part 50). The EPA has delegated authority to administer and enforce the Clean Air Act and implement regulations in Arizona to the ADEQ.

The Clean Air Act established two types of NAAQS: (1) primary standards to protect public health, including the health of "sensitive populations" such as individuals with respiratory conditions, children, and elderly; and (2) secondary standards that set limits to protect the environment, including protection against "decreased visibility, damage to animals, crops, vegetation, and buildings" (EPA 2010a). The following six pollutants, referred to as "criteria pollutants," currently have a NAAQS (EPA 2010a):

1. Ozone (O_3)
2. Carbon monoxide (CO)
3. Nitrogen dioxide (NO_2)
4. Sulfur dioxide (SO_2)
5. Particulate matter
    a. Particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10})
    b. Particulate matter with an aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$)
6. Lead (Pb)

The EPA Office of Air Quality Planning and Standards has set NAAQS for the six criteria pollutants, as described in Table 3-5.

Table 3-5 National Ambient Air Quality Standards

Pollutant	Primary Standards: Concentration	Primary Standards: Averaging Time	Secondary Standards: Concentration	Secondary Standards: Averaging Time
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour (1)	None	
	35 ppm (40 mg/m^3)	1-hour (1)		
Lead	0.15 µg/m^3 (2)	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m^3	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 ppb(3)	Annual (Arithmetic Mean)	Same as Primary	
	100 ppb	1-hour(4)	None	
Particulate Matter (PM_{10})	150 µg/m^3	24-hour (5)	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual (6) (Arithmetic Mean)	Same as Primary	
	35 µg/m^3	24-hour (7)	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour (8)	Same as Primary	

Table 3-5 National Ambient Air Quality Standards				
Pollutant	Primary Standards		Secondary Standards	
	Concentration	Averaging Time	Concentration	Averaging Time
	0.08 ppm (1997 std)	8-hour (9)	Same as Primary	
	0.12 ppm	1-hour (10)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	0.5 ppm	3-hour (1)
	0.14 ppm	24-hour (1)		

mg/m^3 = milligrams per cubic meter; $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion

std = ozone standard

NOTES: (1) Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.

(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purposes of clearer comparison to the 1-hour standard.

(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

(5) Not to be exceeded more than once per year on average over 3 years.

(6) To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$.

(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$ (effective December 17, 2006).

(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

(9) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(9) (b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as the EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

(10) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than 1.

(10) (b) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard (“anti backsliding”).

SOURCE: EPA National Ambient Air Quality Standards website: http://www.epa.gov/air/criteria.html. Last updated on April 16, 2009 (EPA 2010a).

O_3 is not emitted directly into the atmosphere from emission sources; it is produced through photochemical (light catalyzed) reactions in the atmosphere, involving hydrocarbons and nitrogen oxides known generically as O_3 precursors. Because O_3 formation results from large-scale atmospheric processes, O_3 formation and transport is a regional concern and not directly associated with individual, localized sources of pollution. In 2008, the EPA promulgated a new O_3 standard; and as of January 2010, is considering changes to the standard that will be more stringent.

CO is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances. The primary sources of CO are motor vehicles and stationary combustion sources. Secondary sources include aircraft emissions and agricultural and/or forest burning. CO is more of a localized pollution issue, due to its ability to react in the atmosphere under normal conditions. However, during those periods when the air is stagnant, such as with a ground-based inversion, local levels of CO can increase. Such inversions are caused when a layer of colder air at higher elevations traps relatively warmer air near the ground, preventing normal air circulation.

SO_2 is formed during the combustion of sulfur-bearing materials, such as the sulfur in metal ores or fossil fuels.

Nitrogen oxides (NO_x)—consisting primarily of nitric oxide and NO_2—and volatile organic compounds (VOC) emissions readily react in the atmosphere as precursors to O_3, and to a lesser extent particulate matter, and are major contributors of acid rain. The NAAQS is specific to NO_2; although total NO_x is usually quantified for emission sources.

Historically, the main sources of Pb emissions are vehicles fueled with leaded gasoline and lead smelters.

3.6.2 Existing Ambient Air Quality

Air quality in a given location is described by the concentrations of various pollutants in the atmosphere, expressed in units of parts per million or micrograms per cubic meter. Air quality is determined by the type and amount of pollutants emitted into the atmosphere; the size, surface cover, and topography of the air basin; and meteorological conditions related to the prevailing winds, which are predominantly from the south-southwest according to meteorological monitoring stations located in Kingman and Yuma, Arizona (the closest monitoring stations with wind data to the Project area) (Western Regional Climate Center 2010c). The significance of a pollutant concentration is determined by comparison with Federal and/or State air quality standards. These standards represent the maximum allowable concentrations of various pollutants necessary to protect public health and welfare with a reasonable margin of safety.

The EPA assigns classifications to geographic areas with respect to air quality conditions. When an area is considered for classification, there are three possible outcomes of the designation process for each of the criteria pollutants:

- **Attainment –** Any area that meets the national primary or secondary ambient air quality standard for the pollutant.
- **Non-attainment –** Any area that does not meet (or that contributes to ambient air quality in an area that does not meet) the national or secondary standard for the pollutant.
- **Unclassified –** Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. With respect to major source pre-construction permitting, such areas are treated as attainment areas.

The ADEQ currently collects data from one air monitoring station located within La Paz County. This monitoring station is located in the northeast section of La Paz County, approximately

44 miles northeast of the Project area. La Paz County is designated as attainment for all criteria pollutants.

All areas throughout the United States are assigned to one of three different classes of air quality protection. These are called prevention of significant deterioration Classes I, II, and III (EPA 2010b). Essentially, they help to ensure that the air quality in clean air areas remains clean and does not deteriorate to NAAQS levels.

- Class I areas include wilderness areas (larger than 5,000 acres), national memorial parks (larger than 5,000 acres), and national parks (larger than 6,000 acres).
- Class III status is assigned to attainment areas to allow maximum industrial growth while maintaining compliance with NAAQS. Note that no Class III Areas have ever been designated within the United States.
- All other areas within the United States are designated Class II.

Class I areas are to receive special protection from degradation of air quality and the most stringent prevention of significant deterioration increments apply in these areas. No areas designated as Class I air sheds are present in the Project area. The closest Class I areas are designated wilderness areas shown on Figure 3-2.

3.6.3 Existing Sources of Air Pollutants

The main sources of air pollutants within the vicinity of the Project area are vehicles traveling along SR 95 and I-10, OHV use in the area, and winds that entrain dust.

The ADEQ Air Quality Division has jurisdiction over air quality programs in all counties in the state, with the exception of stationary sources within Pima, Pinal, or Maricopa counties. The ADEQ issues two operating permits: Class I and Class II permits. Class I permits are issued to major sources, affected sources, and solid waste incineration units. A Major source is any source that has the potential to emit 100 tons per year of any criteria air pollutant, or 25 tons per year of any combination of hazardous air pollutants. An affected source is a source that includes one or more units that are subject to the emission reduction requirements of limitations under Title IV of the Clean Air Act. A Class II permit is required if a source does not qualify for a Class I permit and that meets the requirements in the AAC Title 18, Chapter 2, Article 302(B)(2). This includes sources that have the potential to emit significant quantities of regulated air pollutants. Significant quantities of regulated air pollutants are defined in the AAC Title 18, Chapter 2, Article 101(106)(a).

There are no permitted sources within the Project vicinity.

3.6.4 Climate and Meteorology

The Project area is located approximately 130 miles west of Phoenix in La Paz County. The closest meteorological monitoring station to the Project area is located approximately 10 miles to the south, in Quartzsite, Arizona (only temperature, humidity, precipitation, and solar radiation are monitored at this site—no wind speed or direction data are available from this station).

The summer season in Quartzsite displays classic Southwest desert characteristics: daily high temperatures typically exceed 90°F and occasionally 110°F, with lows averaging 77°F (Western Regional Climate Center 2010a). The summer heat in Arizona is tempered somewhat by the extremely low relative humidity; however, humidity can increase markedly for several weeks each summer in association with a moist "monsoonal flow" from the south, typically during July and August. These moist winds support the development of desert thunderstorms associated with significant flash flooding and/or strong downburst winds. Strong wind episodes in the summertime are usually connected with thunderstorms and are thus isolated and localized (Western Regional Climate Center 2010b).

Overall, winters are mild and pleasant, with afternoon average temperatures near 53°F and skies that are mostly clear. Pacific storms occasionally produce rainfall in Arizona, but in general the average winter rainfall in Quartzsite is less than 2 inches per year. Snow accumulation is rare in Quartzsite. Flurries are observed an average of 7 days during most winters, but snowfall of an inch or more has only occurred twice in the last century; freezing temperatures rarely occur (Western Regional Climate Center 2010a).

3.6.5 Climate Change

Climate change refers to changes in many climatic factors such as temperature, precipitation, or wind lasting for an extended period. There continues to be a degree of uncertainty surrounding the contemporary causes of climate change, but it may result from:

- Natural factors such as solar and orbital variations
- Natural processes within the climate system (e.g., ocean circulation changes)
- Human activities that change the atmosphere's composition (e.g., land use changes, burning fossil fuels) and the land surface

A large number of scientists believe that global warming is occurring and causing climate change. They also believe greenhouse gases (GHG) are major contributors to global warming and climate change. Assessments by the Intergovernmental Panel on Climate Change (IPCC) suggest that the Earth's climate has warmed between 0.6 and 0.9 degrees Celsius over the past century, and that human activity affecting the atmosphere is "very likely" an important driving factor. The IPCC's Fourth Assessment Report (Summary for Policymakers) states, "Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations." It goes on to state, "The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone."

According to the IPCC Fourth Assessment Report (IPCC 2007), most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations. The GHG emissions related to human activities increased 70 percent from 1970 to 2004, according to the report.

According to EO 2010-06 the Governor's Policy on Climate Change, Arizona is a growing state in which GHG emissions have been projected to rise. More than three-fourths of Arizona's GHG emissions are produced by the transportation and electricity sectors. As a member of the Western Climate Initiative, Arizona will begin participating in a GHG cap-and-trade program on January 1, 2012.

The United States DOI, Secretary of Interior Order Number 3289, made effective September 14, 2009, establishes a Department-wide approach for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes, land, water, ocean, fish and wildlife, and cultural heritage resources that the Department manages.

Currently, there are no emission limits for GHG, and no technically defensible methodology for predicting potential climate changes from GHG emissions. However, there are and will continue to be several efforts to address GHG emissions from Federal activities.

3.7 GEOLOGICAL RESOURCES

This section summarizes the findings of a data review of the geology, geological hazards, and mineral resources that occur within the Project area and ROI. The ROI includes the entire ROW application area (approximately 26,000 acres). The affected environment is considered the Project area footprint where ground disturbance would occur, as well as the vertical extent of subsurface construction impacts.

3.7.1 Applicable Plans, Policies, and Regulations

NEPA and FLPMA serve as the primary Federal legislation requiring assessment and mitigation of potential impacts to geological resources on federally-administered land. The General Mining Law of 1872, Mineral Leasing Act of 1920, and Mineral Materials Act of 1947 specifically govern the discovery, disposition, and extraction of mineral resources throughout the western United States.

The General Mining Law of 1872 (30 USC §§ 22, 28, 28b) was the first formal, large-scale demarcation of mining claim law in the United States. In general, the law allows United States citizens to locate lode or placer mining claims on Federal land that has been opened to mineral entry. Lode claims are located within rock formations or veins of ore, whereas placer deposits are deposits of minerals that have been washed by water into alluvial deposits. The Mineral Leasing Act of 1920 (30 USC §§ 181-187, 187a-b, 188-195, et al.) separated the governance of coal, petroleum, natural gas, and other hydrocarbons away from the jurisdiction of the General Mining Law, and provided regulation and guidance for their leasing on public land. The Mineral Materials Act of 1947 (30 USC §§ 601-604) regulates the sale and disposal of mineral material resources from public land, including common varieties of sand, gravel, stone, pumice, pumicite, cinders, clay, other minerals, and petrified wood. Many of the mineral resources governed by this law are most often used for construction or industrial purposes.

The Project area is located on BLM-administered land. As such, an approved ROW is required for the Project, and all of the previously listed Federal laws regarding geological resources must be adhered to throughout the construction and operation of the Project.

3.7.2 Data Collection and Methods

The geological inventory for the Project presents an overview of the regional geology and the specific geological features that occur within the ROI. Information for the inventory was obtained from the scientific literature (publications and maps) and discussions with agency specialists at the U.S. Geological Survey (USGS) and the BLM.

Locality information pertaining to geological formations, local seismicity, recent earthquakes, and known areas of Quaternary faulting was compiled into a Geographic Information System (GIS). Geological formations within the Project area were identified from a geological map of Arizona; landslide and fault data were compiled from the USGS Atlas (USGS 2006); earthquake data between 1973 and the present were acquired from the National Earthquake Information Center (USGS 2010); and seismicity data were obtained from the Geological Hazards Team at the USGS Earthquake Hazard Program (USGS 2010).

The mineral resource inventory presents an overview of the locatable, leasable, and salable resources present in the ROI. Locatable resources are typically metallic mineral deposits such as copper and gold. Leasable resources include energy resources such as petroleum, natural gas, and coal. Salable resources include sand and gravel. Information for the inventory was obtained primarily from the Geocommunicator online database that is operated by the BLM and U.S. Forest Service (2010). Additional information was obtained from publications and maps of the USGS, Arizona Department of Mines and Mineral Resources, Arizona Geological Survey, and the BLM.

3.7.3 Topography

The Project area is located within the southern part of the Basin and Range Physiographic Province, which is characterized by north-south trending mountain ranges that are separated by alluvium-filled, nearly flat to gently sloping valleys (Fenneman 1931). The Basin and Range Province formed through crustal heating, followed by crustal extension of the western North American continental plate, with fault blocks sliding downward forming basins that are separated by ranges (Eaton 1982).

The Project would be located on lands managed by the BLM within the La Posa Plain, on the distal portion of alluvial fans at the western foot of the Plomosa Mountains. A small mountain range, the Moon Mountains, separates the Colorado River floodplain from the main part of the La Posa Plain. The topography of the Project area generally slopes to the southwest, with ground surface elevation ranging from approximately 685 feet above mean sea level (amsl) in the southwestern corner of the site to approximately 960 feet amsl in the northeastern corner of the site. The La Posa Plain is bounded by the Bouse Wash to the north, the Plomosa Mountains to the east, the Castle Dome Mountains to the south, and the Dome Rock Mountains to the west.

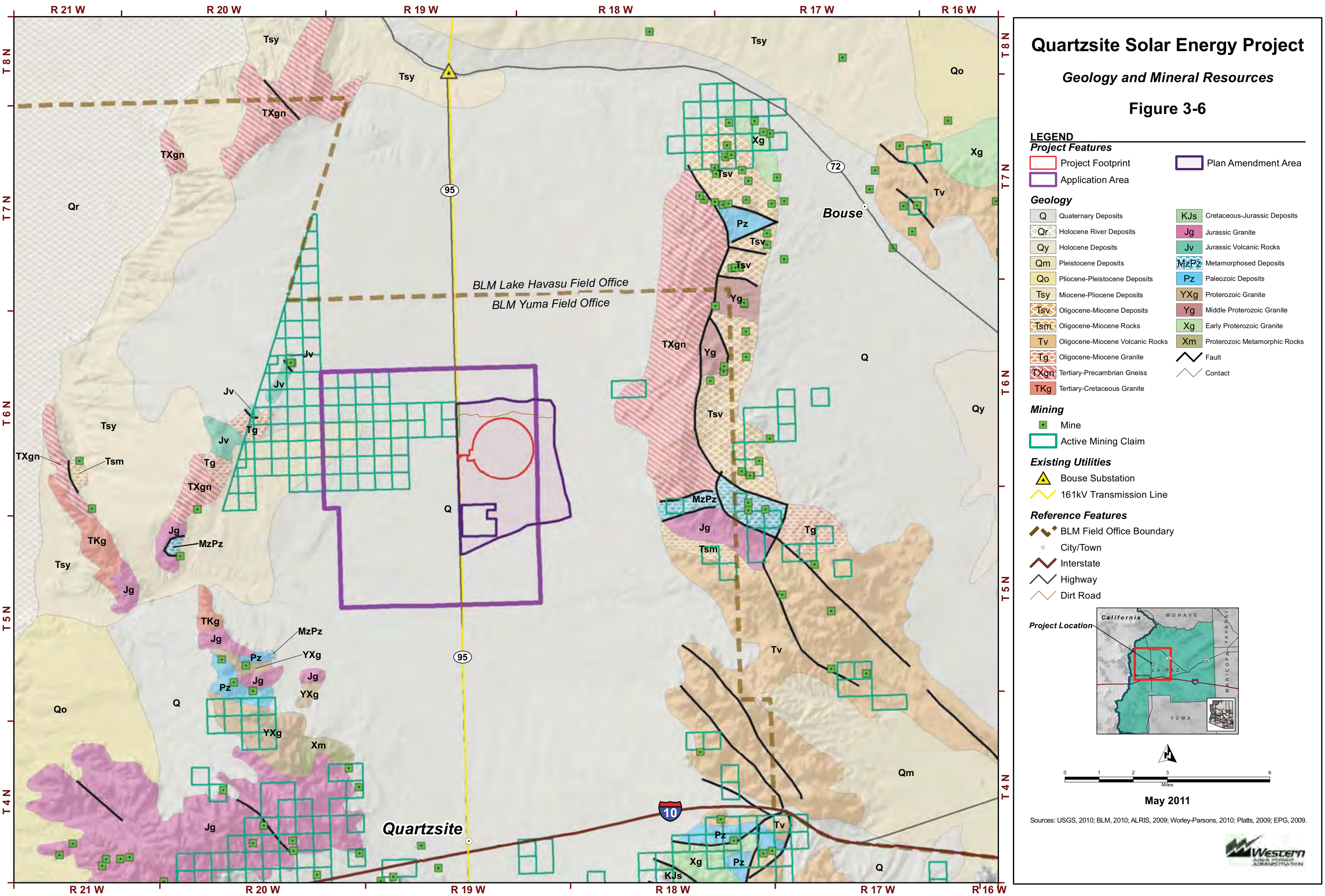
3.7.4 Geological Setting

The Project area is located in a depositional basin that consists of alluvial, colluvial, and eolian (wind-deposited), unconsolidated deposits of Quaternary age (Wilson 1960). Unconsolidated sediments within depositional basins of the Basin and Range Physiographic Province in Arizona are typically 100 feet to more than 1,000 feet in thickness. The Plomosa Mountains, which border the La Posa Plain to the east, consist of sedimentary and volcanic rocks of Mesozoic age. The Moon Mountains, which border the site to the west, consist of volcanic, metamorphic, and sedimentary rocks of Mesozoic age. The geological units of the ROI, which includes the Project area, are shown on Figure 3-6. These geological units are mapped as (1) Quaternary alluvium, consisting of sand, silt, and gravel of Quaternary age; and (2) sedimentary deposits of late Tertiary age, which are present in the western part of the Project application area (Arizona Geological Survey 2000).

The La Posa Plain contains in its northern half a large area of dunes, which is approximately 142,000 acres in size. This dune field is bordered by the Colorado River Valley to the west, the Bouse Wash to the north, the Plomosa Mountains to the east, and Tyson Wash (in part) to the south. This dune field is even larger if the dune field present in the Cactus Plain to the north is considered to be a part of the La Posa Plain dune field; the two dune fields being divided by the Bouse Wash. The eolian deposits in the La Posa Plain dune field are of Quaternary age and consist primarily of wind-transported sand sheets and transverse dunes. The most likely source of this sand is the Colorado River, located to the west (Zimbelman and Williams 2002). The sand sheets mantle underlying Quaternary alluvium derived from alluvial fans from the bordering mountain ranges. The transverse dunes generally trend in a northeastern-southwestern direction; orientation of the transverse dunes suggests that the sand comprising the dunes was blown in from the Colorado River to the northwest. The Colorado River would then be the ultimate source of most of the sand on the La Posa Plain (Spaulding 2009). The dune field is not actively forming, but is a relict dune system that was most likely last active during the Pleistocene, sometime before 12,000 years ago (WorleyParsons 2010a).

3.7.5 Geological Hazards

Geological hazards include earthquakes, faults, seismicity, and ground subsidence. Earthquake data have been compiled by the USGS National Earthquake Information Center since 1973 (USGS 2010). The USGS maintains archives of all earthquakes of detectable magnitude and have made this earthquake catalog available to the public.



Quartzsite Solar Energy Project

Geology and Mineral Resources

Figure 3-6

3.7.5.1 **Seismicity**

The Project area is located in an area with generally low seismicity. No active faults are known within the region of the Project area (ENSR 2008; WorleyParsons 2010a; USGS 2010). It will, however, be subjected to ground shaking associated with earthquakes on one or more of the regional active faults in the future, most of which are located at a considerable distance from the Project area in southern California. A preliminary seismic-hazard analysis by WorleyParsons indicated that the peak ground acceleration with a probability of exceedance of 10 percent in 50 years is 0.03 gravity units. Therefore, the Project area is subject to a low-seismic, ground shaking hazard (WorleyParsons 2010a).

3.7.5.2 **Landslides**

Landslides or permanent ground displacement is considered to be unlikely at the Project area, because surface topography there is relatively flat. The alluvial-fan surfaces of late Pleistocene age show no evidence of displacement that may be associated with landslide-head scarps. Furthermore, these surfaces only dip approximately 0.4 degree toward the south (WorleyParsons 2010a). Landslides are, therefore, not considered to be a significant hazard at the Project area.

3.7.5.3 **Liquefaction and Subsidence**

Liquefaction is a phenomenon that occurs when ground shaking causes sandy soil or sediment that is saturated with water to lose its shear strength. The potential for liquefaction at the Project area is considered to be low because the depth to groundwater beneath the Project area is 500 to 550 feet below ground surface (bgs) (ENSR 2008; WorleyParsons 2010a).

Land subsidence in Arizona is generally due to compaction of alluvium caused by the lowering of the water table as a result of groundwater pumping. As the water table declines, pore space in the alluvium once held open by water pressure is no longer supported and, therefore, collapses. Based on information from the ADWR, the Project area is not in an area undergoing active land subsidence (ENSR 2008).

Collapsible soil conditions can occur in arid and semi-arid environments when the moisture content of alluvial soils increases (ENSR 2008; WorleyParsons 2010a). Soils that are particularly susceptible to collapse in a desert environment tend to be loose, dry, eolian sand and silt that contain a significant fraction of water soluble salts (WorleyParsons 2010a). WorleyParsons concluded that the Project area does not have a significant potential for collapsible soil conditions because the eolian deposits within the Project area are not thick enough to pose a threat, being only a thin surface veneer overlying alluvial-fan deposits. However, they could not rule out the possibility that deeper, and possibly thicker, eolian deposits with collapsible conditions may exist in the Project area.

Expansive soils are predominantly composed of clay minerals capable of absorbing water into their crystal structure (ENSR 2008; WorleyParsons 2010a). These soils are, therefore, subject to swelling and shrinkage as water is added and then removed as the soils dry out. According to WorleyParsons (2010a), the likelihood that expansive clay or soil would be encountered in the near surface in the Project area is low.

Erosion is the displacement of soil and rock by wind, water, or ice, as well as by mass wasting due to gravity. Due to the generally flat terrain of the Project area, it is not considered to be prone to significant mass wasting or to slope stability problems. The Project area does exist in an eolian sand environment, with moderate potential for sand-bearing wind erosion, particularly from the Superstition-Rositas association, as discussed in the soil resources section (ENSR 2008; WorleyParsons 2010a).

3.7.6 Mineral Resources

An inventory of mineral resources was conducted in and around the Project area to determine if known mineral resources are present, or if there is a possibility of discovering mineral resources in the future. The inventory included locatable, leasable, and salable mineral resources and was conducted using information from the USGS, BLM, Arizona Department of Mines and Minerals Resources, and Arizona Geological Survey. Active mining claims and mineral-materials areas are mapped by the Geocommunicator online mapping system maintained by the BLM and U.S. Forest Service. The known mineral resources within the ROI consist of precious metals, non-precious metals, and sand/gravel.

There are no mining claims located within the Project area; however, there are several active and closed mine sites, prospect sites, and other mining features located in the ROI (USGS 2010). The majority of mine sites are located east of the Plomosa Mountains and a few are located near Copper Peak (USGS 2010). The mine sites and mineral deposits located near the Project area include Federal mineral reserves, mineral districts, potential mining claims, and historic mining areas. There is an active gold mining operation called Copperstone located approximately 5 miles northwest of the Project area; it is owned and operated by the American Bonanza Gold Corporation. There are 66 active mining claims and 26 closed mining claims associated with this mining operation. The active mining claims are predominantly for gold and silver.

3.7.6.1 Locatable Mineral Resources

There are no active mining claims in the Project area (BLM and U.S. Forest Service 2010).

3.7.6.2 Leasable Mineral Resources

No leases for leasable mineral resources (oil, gas, and coal resources) are recorded within the Project area (BLM and U.S. Forest Service 2010).

3.7.6.3 Salable Mineral Resources

No mineral-material contracts for salable mineral resources (sand, gravel, topsoil, and clay) are recorded within the Project area (BLM and U.S. Forest Service 2010).

3.8 SOIL RESOURCES

This section presents an overview of soil types and characteristics, including areas of potential wind and/or water erosion in the Project area. The affected environment, or ROI for soil resources, is the Project area footprint where ground disturbance would occur, as well as the vertical extent of subsurface construction impacts.

3.8.1 Applicable Plans, Policies, and Regulations

Federal regulations pertaining to agricultural land and soils include the Farmland Protection Policy Act. The program identifies and designates lands according to categories defined in the Farmland Protection Policy Act (7 USC 4201, et seq.). Agricultural regulations, however, do not pertain to the proposed Project because it is not located on prime farmland.

Construction and industrial operations at the site would be subject to NPDES permits for Stormwater Discharges Associated with Construction Activity and Stormwater Discharges Associated with Industrial Activity. Compliance with these permits would require preparation and implementation of construction and operation SWPPPs. Components of the Project-specific SWPPP is described in Section 2.5.2.

3.8.2 Data Collection and Methods

Information on soil resources was collected from databases and maps published by the USGS, BLM, USDA, and Arizona Geological Survey.

3.8.3 Soils in the Project Area

A soil map unit represents an area dominated by one or more major soil types. The objective of mapping is not to delineate pure taxonomic soil classes, but rather to separate the landscape into landforms that have similar use and management requirements. The different kinds of soils found within a map unit are called soil series. Map units commonly consist of two or more soil series. A soil series is a group of soils that have similar horizons and properties that vary over a relatively narrow range. The Soil Survey Geographic database (USDA 2010a) was available for only a part of the study area. Therefore, the State Soil Geographic database (USDA 2010b) was used for this analysis. The State Soil Geographic data are a more regional database than Soil Survey Geographic data and do not provide specific engineering and physical property information for each soil map unit.

Soil resources within the Project area consist only of the Superstition-Rositas association soil type. The Superstition-Rositas association soil type consists predominantly of fine sandy soils with moderate to high erosion potential by surface runoff and eolian processes.

The Superstition series consists of very deep, somewhat excessively drained soils that formed in sandy eolian deposits. Superstition soils are on dunes and have slopes of 0 to 10 percent. This soil association has low runoff potential.

The Rositas series consists of very deep, somewhat excessively drained soils formed in sandy eolian material. Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent, with hummocky or dune micro relief.

3.9 PALEONTOLOGICAL RESOURCES

Paleontological resources are any fossilized remains, traces, or imprints of organisms that are preserved in the Earth's crust and provide information about the history of life on Earth. Fossils include bones, teeth, shells, leaves, wood, and trackways originally buried in sedimentary deposits. Paleontological resources include not only the actual fossils, but also the sedimentary deposits that contain the fossils.

This section presents an overview of the paleontological resources, the location of any known paleontological localities, and the possibility of discovery of fossil resources within the Project area. This section also discusses the regulatory framework for paleontological resources, describes the methods used in the study, and presents a summary of the inventory results. The purpose of this inventory is to identify localities of known significant paleontological resources and to infer where potential significant paleontological resources may be present and potentially affected by construction-related activities.

3.9.1 Applicable Plans, Policies, and Regulations

Paleontological resources are afforded protection by Federal, State, and local environmental laws and regulations. Protection of paleontological resources includes (1) assessment of the area of interest containing significant non-renewable paleontological resources that may be directly or indirectly impacted, damaged, or destroyed by development; and (2) formulation and implementation of measures to mitigate adverse impacts, including permanent preservation of the site and/or permanent preservation of salvaged materials in established repositories. The inventory and analysis of the paleontological resources in the Project area was conducted in accordance with the following Federal and State regulations and professional standards.

The Antiquities Act of 1906 has long been used as the basis for Federal protection of paleontological resources on Federal land. The act authorizes the government to regulate the disturbance of objects of antiquity on Federal land through the responsible managing agency and to prosecute unauthorized damage or removal. NEPA requires that important natural aspects of our national heritage be considered in assessing the environmental consequences of any proposed project. FLPMA requires that public land be managed in a manner that protects the quality of scientific values.

Paleontological resources are also afforded Federal protection under 40 CFR 1508.27 as a subset of scientific resources. The most explicit Federal protection for paleontological resources was enacted under the Paleontological Resources Preservation Act of 2009, which regulates who may collect fossils on Federal land, permitting of collecting, and where fossils collected under a permit must be curated.

The BLM policy for addressing potential impacts to paleontological resources on federally administered land also applies, which includes the following documents: (1) the Paleontological Resource Management Handbook (H-8270); (2) the General Procedural Guidance for Paleontological Resource Management (H-8270-1); (3) the Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands (IM 2008-009); and (4) the Assessment and Mitigation of Potential Impacts to Paleontological Resources (IM 2009-011).

ARS 41 § 841-847 serves as the primary legislation providing for the protection of vertebrate paleontological resources on land owned or controlled by the State or any State agency. This law includes provisions for limiting permits to academic institutions and corporations involved in environmental monitoring and mitigation, disposition of collected paleontological specimens, and legal consequences for violation of this law.

3.9.2 Data Collection and Methods

The Project area refers to the area that encompasses the proposed ROW and associated components. The ROI for paleontological resources includes a 1-mile buffer around the Project area. Information for the inventory was obtained from a review of the scientific literature and from record searches at paleontological institutions, and of relevant published and unpublished geological and paleontological reports. No field work was conducted as part of this inventory. The literature search found no recorded paleontological localities within the ROI.

3.9.3 Assessment of Paleontological Potential

Information about the geological units and known fossil localities in the region were used to identify the paleontological potential of areas within the Project area. Paleontological potential levels were assigned to each geological unit using the PFYC system adopted by the BLM in 2007 for assessing paleontological potential on Federal land. The PFYC is a five-tiered system that classifies geological units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate and plant fossils and their potential to be adversely impacted, with a higher class number indicating a higher potential level. This classification system is applied to the geological formation, member, or other distinguishable map unit, preferably at the most detailed mappable level. This approach was followed in recognition of the direct relationship that exists between paleontological resources and the geological units within which fossils are entombed. By knowing the geology of a particular area and the fossil productivity of particular geological units that occur in the area, it is possible to predict where fossils would likely be found. Each class is briefly defined below:

- **Class 1 –** Very Low Potential. Geological units not likely to contain recognizable fossil remains. These units include igneous, metamorphic, and Precambrian rocks.

- **Class 2 –** Low Potential. Sedimentary geological units not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils. These units include eolian, diagenetically altered, and Holocene sediments.

- **Class 3 –** Moderate or Unknown Potential. Fossiliferous sedimentary geological units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.

- **Class 4 –** High Potential. Geological units that contain a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability.

- **Class 5 –** Very High Potential. Highly fossiliferous geological units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils.

3.9.3.1 **Potential for Paleontological Resources in the Project Area**

The ROI for paleontological resource is characterized by areas of low relief between north-south trending hills or mountains. The Project area is located on the La Posa Plain, which slopes westward, away from the Plomosa Mountains that are located to the east. The geological units in the Project area are mapped as (1) Quaternary alluvium, consisting of sand, silt, and gravel of Quaternary age; and (2) sedimentary deposits of late Tertiary age, which are present in the western part of the Project application area (Arizona Geological Survey 2000). A detailed description and overview of the geology of the ROI is provided in Section 3.7.

The results of the paleontological assessment were used in conjunction with the PFYC system to determine the potential for paleontological resources in the Project area. Pleistocene, Pliocene, and Permian fossil vertebrate localities are known from La Paz County (Gass 1963; McCord 2002; Mead 2005; Mead et al. 2005; Saunders 1970; Todd 1976). Only one geological unit, Quaternary alluvium, occurs in the Project area. According to the BLM, Quaternary alluvium has a PFYC of 2, meaning that this geological unit has a low potential for containing paleontological resources. However, fossils have been found in Quaternary alluvium elsewhere in La Paz County. In addition, although surficial alluvium may be too young to contain fossils, deeper deposits in the Project area may have a greater potential for containing scientifically significant paleontological resources, such as those associated with the Bouse Formation. This formation contains fossiliferous sediments of limestone and mudstone that formed approximately 5.5 million years ago when the Colorado River may have flowed into a geologically short-lived chain of lakes (Spencer and Pearthree 2005).

3.10 VEGETATION AND SPECIAL STATUS SPECIES

The ROI for the vegetation resources assessment is a 1-mile buffer surrounding the Project area. This assumes that vegetation impacts in this sparsely vegetated area would not extend much beyond the area of impact associated with construction of the Applicant's Proposed Project.

3.10.1 Applicable Plans, Policies, and Regulations

Federal and Arizona State legislation applicable to vegetation resources in the ROI includes the ESA, BLM Policy 6840, EO 13112, and Arizona Native Plant Law (ANPL). Additionally, NEPA (42 USC 4321) and FLPMA (43 USC 1701) require Federal agencies to consider biological resources in project planning and land management activities. Brief summaries of each regulation are presented below.

- **The ESA of 1973, as amended (16 USC 460 et seq.) –** authorizes the USFWS to protect plant and wildlife species and habitats on which these species depend. The ESA requires Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat for any listed species

- **BLM Manual 6840 –** Special Status Species Management authorizes each BLM State Director to designate and protect sensitive species on land managed by the BLM. Equal weight is given to federally listed threatened and endangered species and designated critical habitat, federally proposed species and proposed critical habitats, species proposed for Federal listing, State listed species, and sensitive species designated as such by BLM State Directors (BLM 2008, 2010a). This last category is generally used for species that occur on BLM-administered land for which the agency could, through its management, significantly affect a species' conservation status.

- **EO 13112 (Invasive Species) –** requires that Federal agencies prevent the introduction and spread of invasive species and that they "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species."

- **Arizona Native Plant Law –** administered by the Arizona Department of Agriculture, manages native plant resources and impacts to ANPL listed plant species, and is regulated under ARS § 3-901 – 3-916. This statute classifies ANPL-listed plants into the following protection categories: Highly Safeguarded, Salvage Restricted, Salvage Assessed, and Harvest Restricted. ANPL provisions prevent the transport of listed native species from any lands without permission/permit from the Arizona Department of Agriculture.

3.10.2 Data Collection and Methods

Several sensitive biological resources were identified as potentially occurring within the Project area through the resource inventory process and discussions with biologists from the BLM, USFWS, and AZGFD. Vegetation resource issues raised include: potential depletion of water resources, alteration of site hydrology, and minimization of impacts to habitat within the Dunes WHA.

Vegetation data evaluated for the analysis included information about land cover and vegetation, special status plant species, noxious weeds, and important habitats and communities. Information on special status species was obtained from a variety of sources, including: Arizona sensitive species lists (AZGFD 2010b), the BLM YFO RMP (BLM 2010a), and Federal agency species lists (USFWS 2010a; BLM 2006).

The Arizona Ecological Services Field Office of the USFWS internet site was accessed in spring 2009 and reviewed again in November 2010 to obtain the current list of federally listed ESA species with records of occurrence in La Paz County. The current list contains no ESA candidate, proposed, or listed plant species (USFWS 2010b).

The AZGFD's Heritage Data Management System Online Environmental Review Tool (referred to as AZHGIS) was accessed to obtain records of sensitive species within the ROI. The AZHGIS indicated one sensitive plant species (scaly sandplant [*Pholisma arenarium*]), a BLM sensitive species, as occurring within 5 miles of the Project area (AZGFD 2010c). Due to the sensitive nature of the database, it does not provide the actual location where the species has been identified.

Based upon a review of pertinent literature, topographic maps, aerial photography, Project area visits, and biologists' professional experience in the Project vicinity, suitable habitat was identified within the Project area for the scaly sandplant.

The classification of vegetation communities in the Project area is based upon the description of Sonoran Desertscrub by Turner and Brown (1982) and GIS data obtained from the Southwest Regional Gap Analysis Project (Lowry et al. 2005). Other information was obtained through field investigations and review of aerial photography and USGS topographic maps.

3.10.3 Regional Setting

The Sonoran Desert region, bounded by the higher elevation Peninsular Ranges to the west and by the Mojave Desert to the north, has a uniquely "tropical" warm desert climate influenced by summer monsoonal rains. This creates a bi-modal rainfall pattern, with cooler late fall and winter rains that originate in the North Pacific Ocean, and tropical summer storms from southern Mexico. The unique position of the region at the junction with the Neotropic ecozone to the south contributes to a suite of Sonoran endemic plants and vegetation communities specially adapted to this bi-modal rainfall pattern. Physiographic differences led to the creation of vegetation subdivisions within the Sonoran Desert (Center for Sonoran Desert Studies 2010).

The vegetation ROI is located within a low gradient bajada west of the Plomosa Mountains on the La Posa Plain, which exhibits vegetation characteristic of the Lower Colorado River Valley subdivision of the Sonoran Desertscrub biome (Turner and Brown 1982). High temperatures and minimal precipitation make this the driest Sonoran Desert subdivision. Owing to the extreme competition for scarce water resources, vegetation in the area is typically open and simple.

Hydrology of the Lower Colorado River Valley typically can be classified as either anastomosing drainage channels (i.e., a network of shallow rills), or dendritic, being characterized by minor channels lined with small trees and shrubs not characteristic of surrounding drier interfluves. The more arid regions of this subdivision are characterized by large expanses of open "desert pavement," areas of soil covered by a thin layer of tightly-packed pebbles that support few perennial plants. Water infiltration on such areas is poor, with runoff directed to shallow runnels that often support heavy growth of perennial shrubs such as creosote bush (*Larrea tridentata*), white bursage or burrobush (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), and ocotillo (*Fouquieria splendens*). Additionally, sand substrates are common, with some areas exhibiting important dune features, such as those on the Cactus Plain east of Parker and north of Bouse, Arizona (Turner and Brown 1982). Dune features within and around the Project area comprise the major component of the four unit BLM-designated Dunes WHA, but are of smaller stature than those described by Turner and Brown (1982) and others (Muhs et al. 2003; Hendricks 1985).

3.10.4 Vegetation Communities

The most widespread vegetation community within the Lower Colorado River Valley subdivision is the creosote bush-white bursage series (Turner and Brown 1982). The Southwest Regional Gap Analysis Program classification system refers to this vegetation series as the Sonora-Mojave Creosote Bush-White Bursage Desertscrub (Lowry et al. 2005). This series occurs primarily in broad valleys, plains, and lower bajadas of the Mojave and lower Sonoran deserts. This vegetative community is characterized by sparse, microphyllous (tiny-leaved), arid-adapted shrubs. Creosote bush and white bursage are commonly co-dominant, with other associates such as saltbush, ocotillo, and a variety of cactus species. In addition to the Creosote Bush-White Bursage series, the Project area contains a small portion of the Sonoran Paloverde-Mixed Cacti Desertscrub series (Lowry et al. 2005).

3.10.4.1 **Invasive Plant Species**

As part of the biological surveys conducted within the Project area, non-native species were recorded (EPG 2009). Two invasive, non-native plant species were observed on the Project area: Asian mustard (*Brassica tournefortii*) and schismus (*Schismus* sp.), an annual grass, are common throughout the Project area and ROI. Both species are identified as invasive species by the Natural Resources Conservation Service (2010). Asian mustard is designated a BLM invasive species of concern (BLM 2011b).

Asian mustard was first introduced into the United States in southeastern California in 1938, reached the Arizona side of the Colorado River by 1957, and is now established in much of the warmer, lower elevation portions of southern California and Arizona (Chambers and Hawkins no date). It is a common disturbed-ground colonizer and commonly invades areas of non-cohesive soils, such as dune areas and washes. The species germinates very early in the spring and out-competes native plant species for water and nutrients. In years of significant winter precipitation, populations of the species may become almost monotypic stands, all but obscuring native vegetation. The dried plants increase the extent, frequency, and intensity of fire by contributing to the fine fuel load. The plants have a stabilizing effect on dunes and likely adversely affect habitat for sensitive dune residents such as the Mojave fringe-toed lizard. The plants are prolific seed producers, with their small, sticky seeds readily transported by wildlife and humans (via vehicles), and by wind when plants tumble across the landscape.

Schismus spp. were first introduced in the United States in the early 1900s, and reached California by 1935. The plants are disturbed-ground colonizers and are commonly spread by livestock, OHVs, and linear utility developments (California Invasive Plant Council 2010). *Schismus* is a winter annual grass that displaces native grasses and has adversely affected the abundance of annual native desert grass species in much of the Southwest. The plants are shade intolerant and typically colonize open areas among native vegetation. The plants increase the fine fuel load and may allow fire to reach areas of native vegetation that are not fire adapted. Seeds are commonly spread by sheet flooding or wind (California Invasive Plant Council 2010).

3.10.4.2 Arizona Native Plant Law Listed Species

A select group of perennial native desert plants are afforded protection under ANPL. Arizona-protected native plants are present in the Project area. The list of protected species is divided into four categories:

- Highly Safeguarded — In danger of extinction or likely to become endangered in the foreseeable future
- Salvage Restricted — High potential for damage through theft or vandalism; afforded protection in part through issuance of salvage permits, tags, and seals
- Salvage Assessed — Require salvage tags and seals or annual salvage permits to be legally salvaged
- Harvest Restricted — Intrinsic value as wood or fiber resources subject them to excessive harvesting or overcutting; protected through issuance of harvest permits and wood receipts

ANPL-listed plants known to occur in the Project area are shown in Table 3-6.

Table 3-6 Arizona Native Plant Law Listed Species Known to Occur in the Project Area

Scientific Name	Common Name	ANPL Classification
Carnegia gigantea	Saguaro*	Highly Safeguarded
Cylindropuntia echinocarpa	Wiggins' cholla	Salvage Restricted
Cylindropuntia leptocaulis	Christmas cactus	Salvage Restricted
Cylindropuntia ramosissima	Branched pencil cholla	Salvage Restricted
Echinocereus engelmannii	Engelmann's hedgehog cactus	Salvage Restricted
Ferocactus cylindraceus	California barrel cactus	Salvage Restricted
Fouquieria splendens	Ocotillo	Salvage Restricted
Hesperocallis undulata	Ajo lily	Salvage Restricted
Parkinsonia microphylla	Yellow paloverde	Salvage Assessed
Prosopis glandulosa	Honey mesquite	Salvage Assessed Harvest Restricted
Olneya tesota	Ironwood	Salvage Assessed Harvest Restricted

Common names are according to USDA Plants Database (http://plants.usda.gov/classification.html)
* Only fan-topped or crested saguaros are Highly Safeguarded. All other saguaros are Salvage Restricted.
Source: EPG 2009

3.10.5 Special Status Species

Special status species include species that are listed as (1) endangered, threatened, proposed, or candidates for listing, pursuant to the ESA; or (2) listed as sensitive by the BLM or the State of Arizona. The La Paz County list of federally threatened, endangered, proposed, and candidate species (USFWS 2010a) and State sensitive species (AZGFD 2010b), and the BLM State-wide list of sensitive species (BLM 2006) were reviewed to identify any special status plant species of potential occurrence in the Project area. A letter received from the USFWS dated February 22, 2011, stated that no known threatened, endangered, proposed, or candidate species are likely present within the Project area (Appendix C). Table 3-7 lists special status species with the potential to occur in the ROI.

Table 3-7 Special Status Plant Species with Potential for Occurrence in the Project Area

Species	Status	Habitat	Species Occurrence within Project Area	
			Known	Potential
Scaly Sandplant *(Pholisma arenarium)*	BLM Sensitive Species; Arizona Department of Agriculture Highly Safeguarded Species	Dunes and sandy soils at edges of washes	No	Very Low

Status: BLM Sensitive Species – 2006 Arizona BLM list – Yuma Office only; not broken down by county.

Source: BLM 2006; AZGFD 2010b

3.10.5.1 Scaly Sandplant

Scaly sandplant is an Arizona BLM sensitive species and an Arizona Department of Agriculture highly safeguarded species. Significant threats to the scaly sandplant include habitat degradation, fragmentation, and loss, primarily from irresponsible OHV use and urban and agricultural development (AZGFD 1999).

Scaly sandplant is known from southern California, western Arizona, and Baja California del Norte, Mexico. The species' range in Arizona is entirely within La Paz County along Bouse Wash, in the Cactus and La Posa Plains, and in the Parker Valley.

As described by the AZHGIS, habitat for this plant within Arizona is sand dunes within creosote bush desertscrub, at elevations between 470 and 900 feet (AZGFD 1999). Scaly sandplant is an uncommon parasitic plant that occurs on sand dunes and sandy or loose, gravelly soils along washes. Scaly sandplant is described as a root parasite of shrubs such as white bursage, narrowleaf yerba santa (*Eriodictyon angustifolium*), burrobrush (*Hymenoclea salsola*), *Haplopappus* spp., *Croton* spp., and a few other species (AZGFD 1999; Jepson Interchange for California Floristics 2009; Yatskievych 1982; Yatskievych and Mason 1986). This species is generally not abundant, even in locations where it is known to occur (Munz 1974), which limits the likelihood of detection.

The growth form is typically an unbranched stem of at least 6 to 12 inches long (Jepson Interchange for California Floristics 2009), although Yatskievych and Mason (1986) describe the stem length as 12 to 31 inches long. Only 4 to 8 inches are typically visible above ground. The plant emerges above ground to flower from April through July, and occasionally again in October (Jepson Interchange for California Floristics 2009). Typically, only the plant's inflorescence appears above ground and is either spicate (spike-like) or thyrsoid (similar to an inverted strawberry) in shape, although it can also appear more globular. The inflorescence is tightly packed with small lavender to bluish-purple, white-tipped flowers.

Potential for Occurrence in the Project Area

Due to a general lack of developed dune habitat within the Project area, the potential for occurrence of the scaly sand plant is very low. The species' distribution extends primarily from southern California into Baja California del Norte, Mexico. To the east of the California and Mexico, distribution is a small concentration of specimen collection locations near Parker, Arizona. The nearest known occurrence of the species in relation to the Project area is nearly 7 miles to the north. Biologists surveyed the Project area in spring 2009 (EPG 2009), fall of 2009 (EPG 2010a), and in the spring of 2010 (EPG 2010b) to search for evidence of scaly sandplant and other BLM sensitive species. The second spring-time survey was conducted to coincide with the species' bloom period, and because conditions were considered optimal for detection of the species, if present, on the Project area. Precipitation during the 2009-2010 winter was above average (following a drier than normal period immediately preceding). Scaly sandplant was not found in the Project area during any of the surveys. However, reconnaissance surveys conducted for scaly sandplant near Parker, Arizona in spring 2010 confirmed above-ground emergence and flowering of the plants at historic locations. Because no scaly sandplants were observed in the Project area when the species was in flower and evident elsewhere and all occurrence records are from well north of the Project area, it is highly unlikely that the species occurs within the Project area.

3.11 WILDLIFE AND SPECIAL STATUS SPECIES

The ROI for general wildlife resources assessment is a 5-mile buffer surrounding the Project area. This buffer includes portions of the Plomosa Mountains as well as the unnamed wash area along Plomosa Road. Species that may pass through the Project area while moving to these areas of higher elevation.

The ROI for the golden eagle covers a larger area and is based upon the USFWS guidelines for assessment of potential impacts to golden eagles. The USFWS recommends a 10-mile area around a project be surveyed for nesting eagles.

The ROI for the Mojave fringe-toed lizard encompasses the entire Dunes WHA and includes other discontiguous sand dune habitat in the La Posa and Cactus Plains. This larger area of analysis was evaluated based on recommendations from the BLM, USFWS, and AZGFD biologists, in order to facilitate an adequate assessment of the Mojave fringe-toed lizard and their habitat within Arizona.

3.11.1 Applicable Plans, Policies, and Regulations

Federal and Arizona State legislation applicable to biological resources in the ROI includes the ESA, the MBTA, EO 13112, EO 13186, the BGEPA, BLM Policy 6840, ARS 17-102, ARS 17-231, and ARS 17-309. Additionally, NEPA (42 USC 4321) and FLPMA (43 USC 1701) require Federal agencies to consider biological resources in project planning and land management activities. Brief summaries of each regulation are presented below.

- **The ESA of 1973, as amended (16 USC 460 et seq.) –** authorizes the USFWS to protect plant and wildlife species and habitats on which these species depend. The ESA requires Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat for any listed species

- **The MBTA (16 USC 703 et seq.) combined with EO 13186 –** protects more than 800 migratory bird species by making it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird, or the parts, nests, or eggs of such a bird; except as authorized under a valid permit (50 CFR 21.11).

- **The BGEPA, as amended in 1972 –** prohibits any form of possession or take of bald or golden eagles, including any part, nest, or egg; unless allowed by permit (16 USC 668c; 50 CFR 22).

- **BLM Manual 6840 –** Special Status Species Management authorizes each BLM State Director to designate and protect sensitive species on land managed by the BLM. Equal weight is given to federally listed threatened and endangered species and designated critical habitat, federally proposed species and proposed critical habitats, species proposed for Federal listing, State listed species, and sensitive species designated as such by BLM State Directors (BLM 2008, 2010a). This last category is generally used for species that occur on BLM-administered land for which the agency could, through its management, significantly affect a species' conservation status.

- **ARS Title 17 –** wildlife, both resident and migratory, native or introduced, found in this state, except fish and bullfrogs impounded in private ponds or tanks or wildlife and birds reared or held in captivity under permit or license from the commission, are property of the State and may be taken at such times, in such places, in such manner, and with such devices as provided by law or rule of the commission. ARS Title 17 and associated rules regulate the lawful taking and handling of wildlife.

3.11.2 Data Collection and Methods

Several sensitive wildlife species were identified as potentially occurring within the Project area through the resource inventory process and discussions with biologists from the BLM, USFWS, and AZGFD. Wildlife resource issues raised include: wildlife habitat connectivity, potential depletion of water resources and alteration of site hydrology, occupation or use of the site by special status species and migratory birds, potential impacts to golden eagles, and minimization of impacts to habitat within the Dunes WHA.

Information on general wildlife and special status species was obtained from a variety of agency sources, including: Arizona sensitive species lists (AZGFD 2010b), the YFO RMP (BLM 2010a), and Federal agency species lists (USFWS 2010a; BLM 2006).

The Arizona Ecological Services Field Office of the USFWS internet site was accessed in spring of 2009 and reviewed again in November 2010 to obtain the current list of federally listed ESA species with records of occurrence in La Paz County. The current list contains eight ESA candidate, proposed, or listed wildlife species (USFWS 2010b). In addition, the AZHGIS was queried to identify if sensitive wildlife species have been reported to occur in or near the Project area.

3.11.3 Wildlife Resources

Wildlife species diversity in the Project area is typical of desert environments of western Arizona. Bird diversity is not particularly high, with few resident species. Typically observed species include common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), black-throated sparrow (*Amphispiza bilineata*), mourning dove (*Zenaida macroura*), and red-tailed hawk (*Buteo jamaicensis*). The most readily observable reptiles are lizards, primarily tiger whiptail (*Aspidoscelis tigris*), common side-blotched lizard (*Uta stansburiana*), Mojave fringe-toed lizard, and desert iguana (*Dipsosaurus dorsalis*). Diurnal mammals are Harris' antelope ground squirrel (*Ammospermophilus harrisii*), desert cottontail (*Sylvilagus audubonii*), and black-tailed jackrabbit (*Lepus californicus*); while nocturnally active species include kangaroo rats (*Dipodomys* spp.) and pocket mice (*Perognathus* spp.). The coyote (*Canis latrans*) can be active in the Project area day or night. Mule deer (*Odocoileus hemionus*) and kit fox (*Vulpes macrotis*) may occur within the Project area with low frequency. Bighorn sheep (*Ovis canadensis mexicana*) may occasionally range from the mountains when foraging or moving between mountain ranges.

3.11.3.1 **Wildlife Linkages**

The concept of wildlife linkages identifies the importance of corridors connecting large areas of relatively undisturbed, protected natural habitat (wildland blocks) that are threatened by fragmentation resulting from a variety of human-induced impacts. Habitat fragmentation and loss are currently recognized as the principal threats to biodiversity. Conservation of large wildland blocks that still support functional ecological communities, often retaining their full suite of native species, are in many cases dependent on movement corridors that provide connectivity between subcomponents of species' metapopulations. Without corridors between wildland blocks, ecological balance regulated by large predators cannot function. Inter-specific competition, mutualism, energy flow, nutrient cycling, pollination, species dispersal, and long-term gene flow within metapopulations may be inhibited or lost. Additionally, the presence of corridors allow ecosystems to recover from stochastic events such as fire, flooding, exotic species invasion, and climate change by allowing escape to adjacent blocks, or for species with more limited home ranges within corridors themselves.

The Arizona Wildlife Linkages Workgroup, a collaborative effort of nine public agencies and non-profit organizations initiated in 2004, resulted in the publication of Arizona's Wildlife Linkages Assessment, an analysis identifying important wildlife habitat connectivity areas, or linkage zones, as well as the associated threats (ADOT 2010; Corridor Design 2010). The Wildlife Linkages Assessment identified 152 potential linkage zones (corridors) that are important to Arizona’s wildlife and natural ecosystems (ADOT 2010). Subsequently, the Arizona Missing Linkages Project, operated through Northern Arizona University, created detailed linkage designs for 16 identified priority areas identified in the Wildlife Linkages Assessment.

A review of Arizona’s Wildlife Linkages Assessment revealed the presence of one potential wildlife corridor linkage zone, the La Posa Plains Linkage (Linkage 45), within the La Posa Plain north of Quartzsite (ADOT 2010). Linkage 45 was not one of the priority linkages, and an analysis has not been refined and published as a detailed Linkage Design Report.

3.11.4 Special Status Species

Special status species include plant and animal species that are listed as (1) endangered, threatened, proposed, or candidates for listing, pursuant to the ESA, or (2) listed as sensitive by the BLM or the State of Arizona. A list of special status species that potentially occur within the ROI was compiled from several sources, including: (1) La Paz County list of federally threatened, endangered, proposed, and candidate species (USFWS 2010a); (2) La Paz County list of State sensitive species (AZGFD 2010b); and (3) the BLM state-wide list of sensitive species (BLM 2006). A letter received from the USFWS dated February 22, 2011, stated that no known threatened, endangered, proposed, or candidate species are likely present within the Project area (Appendix C). Table 3-8 lists special status wildlife species with the potential to occur within the Project area.

Table 3-8 Special Status Wildlife Species with Potential for Occurrence in the Project Area

Species	Status	Habitat	Species Occurrence within Project Area	
			Known	**Potential**
BIRDS				
Golden Eagle *(Aquila chrysaetos)*	BGEPA; MBTA	Inhabits open, mountainous, or hilly terrain.	No	Low
American Peregrine Falcon *(Falco peregrinus anatum)*	DM; SC; BLMS; MBTA; BCC; WSC; SGCN	Open habitats in rugged country, usually near lakes, rivers, or streams and with rocky outcrops or cliffs nearby.	No	Very Low
Prairie Falcon *(Falco mexicanus)*	MBTA; BCC	Dry, open country; prairies	No	Moderate

Table 3-8 Special Status Wildlife Species with Potential for Occurrence in the Project Area

Species	Status	Habitat	Species Occurrence within Project Area	
			Known	Potential
Western Burrowing Owl *(Athene cunicularia hypugaea)*	MBTA; BCC; SC; BLMS	Open areas of low slope where low vegetation provides good visibility. Usually associated with colonial burrowing rodents.	No	Low
Costa's Hummingbird *(Calypte costae*	MBTA; BCC	Low elevation desertscrub habitats.	No	Low
Gila Woodpecker *Melanerpes uropygialis)*	MBTA; BCC	Desertscrub habitats, along wooded streams and urban areas.	No	Low
Gilded Flicker *(Colaptes chrysoides)*	MBTA; BCC	Desert woodlands; preferential to saguaro deserts.	No	Low
Bell's Vireo *(Vireo bellii)*	MBTA; BCC	Low, dense vegetation of lowland desert streams.	No	Low
Gray Vireo *(Vireo vicinior)*	MBTA; BCC	Dry, hot scrub habitats.	No	Low
Bendire's Thrasher *(Toxostoma bendirei)*	MBTA; BCC	Open grassland, scrub, or woodland habitats.	No	Low
LeConte's Thrasher *(Toxostoma lecontei)*	MBTA; BCC	Sparsely vegetated low elevation Sonoran Desert.	Yes	Present
Lucy's Warbler *(Vermivora luciae)*	MB MBTA; TA; BCC	Arid lowland scrub, primarily mesquite or mesquite-cottonwood along streams and washes.	No	Low
REPTILES				
Mojave Fringe-toed Lizard *(Uma scoparia)*	BLMS; WSC; SGCN	Eolian sands associated with creosote bush in the Mojave and northern Colorado deserts.	Yes	Present
Banded Gila Monster *(Heloderma suspectum cinctum)*	SC	Steep rocky terrain; along washes; primarily in desert scrub, but also in other habitats up to chaparral elevations.	No	Very Low
INVERTEBRATES				
Cheese-weed Moth Lacewing *(Oliarces clara)*	BLMS	Bajadas in creosote bush desert in the Colorado River drainage of southwestern Arizona.	No	Moderate

Table 3-8 Special Status Wildlife Species with Potential for Occurrence in the Project Area

Species	Status	Habitat	Species Occurrence within Project Area	
			Known	Potential
MacNeil Sooty Wing Skipper *(Hesperopsis gracielae)*	BLMS	Desert washes, alkali flats, and arid canyons where the larval host plants (various species of saltbush) occur; along the Colorado River.	No	Low

Status:

Federal (ESA):
DM = Delisted Taxon - Recovered

Federal (non-ESA):
BCC = USFWS Bird Species of Conservation Concern
SC = Species of Concern

BLM:
BLMS = BLM Sensitive Species – 2006 Arizona BLM list – YFO only; not broken down by county

AZGFD:
WSC = Wildlife Species of Concern: species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines (AZGFD 1996)
SGCN = Species of Greatest Conservation Need: identified through a multiple criteria analysis in the State Wildlife Action Plan (AZGFD 2006a)

Further discussion below focuses only on Federal (ESA), BLM, and other special status species that were found or are likely to occur within 5 miles of the Project area. These species will be analyzed further to determine effects and any associated mitigation, if necessary.

3.11.4.1 **Mammals**

The only mammal species appearing on the Arizona BLM Sensitive Species List (BLM 2005) are bats. The information below is presented as a description of the suitability of the Project area to support bat use.

The lack of saguaro cacti or agave plants in the area precludes the use of the Project area by nectarivorous (nectar drinking) bat species; therefore, they are eliminated from further discussion. Insectivorous (insect feeding) bat species, many of which commonly occur in desert habitats, range throughout western Arizona. In general, insect feeding bats forage within 6 to 9 miles of their roost; however, some may travel in excess of 50 miles in a night (Davis et al. 1962). Roosts in desert environments include caves, cliffs, rocky habitats (e.g., talus), and a variety of human-constructed facilities (e.g., abandoned mines barns, bridges, attics). The nearest potential roost habitat to the Project area is approximately 5 miles to the northeast in the Plomosa Mountains.

Distance between water sources and roosting and foraging habitat is important in roost selection for many species (Hinman and Snow 2003). The nearest identified large body of open water, the Colorado River, is approximately 18 miles to the west. There are multiple livestock water tanks or other unidentified water sources located nearer to the Project area. No waters are known within the Project area. Availability of open water may be an important habitat selection criterion for many bat species, but several other species can be found in areas lacking surface water (Hinman and Snow 2003).

Use of the Project area by a number of bat species cannot be discounted; however, the incidence of foraging bats in the area is likely sporadic. Given the lack of open water on, or near, the Project area and the lack of roosting structures, potential use of the Project area by bats is considered minimal.

3.11.4.2 **Birds**

Golden Eagle

The golden eagle (*Aquila chrysaetos*) receives protection under both the BGEPA and the MBTA. The species is threatened by habitat loss, poisoning (from consuming carrion of poisoned animals), human disturbance (during nesting and occasionally from shooting), and highway deaths when the birds are feeding on road kill (AZGFD 2002a). Because these birds are sensitive to human disturbance, this may be a significant factor in nest site selection (Corman and Wise-Gervais 2005).

Golden eagles occur throughout the northern hemisphere. In Arizona, they winter and nest across the state from the low elevation southwestern deserts to the high northern forests (Glinski 1998a). They occupy the foothills of “sky island” mountains of southeastern Arizona year round, and may be seen during courtship displays in January and February over volcanic crags and alluvial fans of desertscrub areas (Glinski 1998a). Although migratory in the more northern limits of their range, golden eagles south of 55 degrees north latitude (i.e., Canada) are non-migratory (Kochert et al. 2002).

The key habitat requirement for the golden eagle is broad open spaces for hunting. The chief prey is medium-sized mammals; principally jack rabbits as well as cottontails, skunks, prairie dogs, and rock squirrels. Golden eagles take prey from corvids and raptors, occasionally take larger mammals, and consume carrion (Glinski 1998a; Kochert et al. 2002).

Pair bonds are maintained year-round in non-migratory pairs (Kochert et al. 2002). Nesting territories are generally not established before age four; however, new nests may not be used during the first year of construction. It is not uncommon for nests to be unused for several years following construction, as most territories contain multiple (up to 14) nests (Kochert et al. 2002).

The most common nest substrates in Arizona are cliff ledges. Large trees, rock piles, and utility structures are frequently used in other areas (Corman and Wise-Gervais 2005; Glinski 1998a). Although regularly encountered in the north, central, and southeastern Arizona mountains, golden eagles occur much less frequently in the lower Colorado River Valley and lower Gila River drainage, nesting much less frequently in these areas, and only in higher desert mountain ranges in the region (Corman and Wise-Gervais 2005).

Potential for Occurrence in the Project Area

Golden eagles prefer wide open habitats for foraging. While the Project area meets this criterion, there may not be a sufficient prey base in the area that would be attractive to foraging golden eagles. Based on field observations, mammals such as jack rabbits and cottontails are uncommon within the Project area. Larger burrowing mammals such as kit fox and badger are rare in the area, as evidenced by a general lack of burrows of these species (EPG 2009). Golden eagles forage over large distances, and could forage in the area from roosts at a considerable distance from the Project area.

The AZGFD and BLM have adopted a metric for identification of suitable nesting substrate as slopes with a 45-degree incline or greater within 10 miles of a project. Digital elevation data indicate that the nearest cliff ledges that could provide nesting habitat for golden eagles are approximately 5 miles to the east of the Project area in the Plomosa Mountains. The Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) shows no confirmed golden eagle breeding evidence for the entirety of La Paz County. Helicopter surveys conducted by the AZGFD in 2011 found no evidence of active golden eagle nesting sites within 10 miles of the Project area. With an apparently meager prey base in the area and no suitable nesting substrate, the potential for golden eagles using the Project area is low.

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) was formerly listed as an endangered species under the ESA, but was delisted in 1999 due to its recovery. It is currently protected under the MBTA and is a USFWS Bird of Conservation Concern (USFWS 2008) and an Arizona BLM sensitive species. It is also an Arizona Wildlife Species of Concern (WSC) and Species of Greatest Conservation Need (SGCN) (AZGFD 2010b; 2006a). Historically, the primary threats to peregrines has been from pesticides, which accumulate in the birds and cause failure of nesting efforts resulting from egg shell thinning (AZGFD 2002b). Rock climbing near eyries can disturb peregrines.

Peregrine falcons have a nearly global distribution, and range from tropical habitats to tundra (White et al. 2002). It inhabits open country where prey is abundant (Ehrlich et al. 1988; Glinski 1998b). Their diet includes primarily birds, particularly rock doves (*Columba livia*), but also many aquatic bird species, game birds, passerines, rodents, bats, and occasionally flying insects (Glinski 1998b; Terres 1980; White et al. 2002). Peregrines commonly hunt cooperatively as a pair (Glinski 1998b). They do not construct their own nests, but modify old nests of raptors and corvids. In Arizona, nests are primarily on cliff ledges, but elsewhere nests in trees are used (Glinski 1998b; Terres 1980). The nest is often not much more than a scrape in the soil/gravel present on ledges (Glinski 1998b). The birds lay three to four eggs between March and June.

Potential for Occurrence in the Project Area

Peregrines rarely nest in the low profile mountains of the deserts in southwestern Arizona (Corman and Wise-Gervais 2005), and are therefore uncommon in the regional area. While there is suitable avian prey for peregrines along the Colorado River, approximately 18 miles to the west, it is unlikely that peregrines would occur in the Project area, so far from better foraging habitat along the river. The species was not observed during any site visits. Potential for peregrines occurring in the Project area is very low.

Western Burrowing Owl

The western burrowing owl is a Federal species of concern, an Arizona BLM sensitive species, a Bird of Conservation Concern, and is protected under the MBTA (AZGFD 2010b; EPA 2005). Widespread declines in the range and abundance of burrowing owls have been attributed to habitat loss and fragmentation, and to control and extermination of colonial burrowing mammals (Hjertaas et al. 1995; Dechant et al. 2003).

Potential nesting habitat for burrowing owls has also been reduced through conversion of land to agricultural and urban uses (Hjertaas et al. 1995). However, in Arizona, some agricultural areas have become a source of important habitat for the species. In addition to removing potential nest sites, habitat fragmentation may increase the density of predators such as foxes and coyotes, and make it more difficult for unpaired burrowing owls to find mates (NatureServe 2010). Increased urbanization may result in an increase in predation by domestic dogs and cats. Pesticides may harm burrowing owls through direct toxicity, secondary toxicity from ingesting poisoned prey, and reduction in the abundance of prey (Dechant et al. 2003).

Burrowing owls are opportunistic feeders, preying on a variety of arthropods and small vertebrates (Hjertaas et al. 1995; Dechant et al. 2003). They may forage during the day or night, but tend to forage closer to the nest during the day. Foraging habitat is variable, depending on prey availability and abundance.

Migratory burrowing owls arrive on their breeding grounds in April (Dechant et al. 2003; Hjertaas et al. 1995). The owls may line their burrow with dry grass, weeds, feathers, or livestock dung (Ehrlich et al. 1988; NatureServe 2010).

The western burrowing owl breeds in North America from southern Alberta, Saskatchewan, and Manitoba, south to Baja California and central Mexico, and east to western Minnesota, western Kansas, and western Texas (American Ornithological Union 1998). Burrowing owls can be found throughout Arizona in suitable habitat (deVos 1998). California, New Mexico, and Arizona are important wintering areas for the species in the United States (NatureServe 2010).

Burrowing owls inhabit open areas in deserts, grasslands, and agricultural and range lands. They use well-drained areas with gentle slopes and sparse vegetation, and may occupy areas near human habitation such as golf courses and airports (Terres 1980; Ehrlich et al. 1988; Dechant et al. 2003). Burrowing owls often select burrows where surrounding vegetation is kept short by grazing, dry conditions, or burning (Hjertaas et al. 1995; Dechant et al. 2003). In Arizona, burrowing owls prefer grasslands, creosote bush/bursage desertscrub communities, and agricultural lands (deVos 1998).

Burrowing owls are semi-colonial and usually occupy burrows excavated by small mammals, often at the edges of active colonies of prairie dogs (*Cynomys* spp.) or ground squirrels (*Spermophilus* spp.). In areas that lack colonial burrowing mammals, burrowing owls use excavations made by other mammals such as badgers (*Taxidea taxus*), skunks, foxes, and coyotes. They may also use natural cavities in rocks. In addition to the nest burrow, these owls may also use several satellite burrows. Satellite burrows may serve as protection from predators and parasites (Dechant et al. 2003).

Potential for Occurrence in the Project Area

While there is abundant, suitably open habitat in the Project area that might be attractive to burrowing owls, a general lack of colonial burrowing rodents or larger mammals, which typically provide starter burrows for the owls, decreases the potential of burrowing owl occurrence in the Project area. This species was not observed during any site visits, and there is a low potential for burrowing owls occurring in the Project area.

3.11.4.3 **USFWS Bird Species of Conservation Concern**

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973." *The Birds of Conservation Concern* list, developed in 2008, was a measure to comply with this mandate (USFWS 2008). The Birds of Conservation Concern document does not provide any legal protection for these species, but all of these species receive protection under the MBTA.

The USFWS Birds of Conservation Concern lists bird species for the Sonoran and Mojave deserts (United States) portion of Bird Conservation Region 33 (USFWS 2008). According to this list, the following nine species of birds have some potential for occurring in the Project area: prairie falcon (*Falco mexicanus*), Costa's hummingbird (*Calypte costae*), Gila woodpecker (*Melanerpes uropygialis*), gilded flicker (*Colaptes chrysoides*), Bell's vireo (*Vireo bellii*), gray vireo (*Vireo vicinior*), Bendire's thrasher (*Toxostoma bendirei*), LeConte's thrasher (*T. lecontei*), and Lucy's warbler (*Vermivora luciae*). LeConte's thrasher is known to occur within the Project area while the prairie falcon has a moderate potential for occurring in the Project area. The remaining seven species have only a low potential for occurrence. These species have no other status than protection under the MBTA.

3.11.4.4 **Amphibians**

A lack of wetland or riparian habitats, in or near the Project area, precludes special status amphibian species occurrence in or near the Project area.

3.11.4.5 **Reptiles**

Sonoran Population Desert Tortoise

The Sonoran population of the desert tortoise is a Federal candidate species for listing under the ESA (USFWS 2010a). It is currently a USFWS species of concern, a BLM sensitive species in Arizona, and an AZGFD WSC and SGCN (AZGFD 2010b; 2006a).

Desert tortoises are facing numerous threats to their survival, including livestock grazing, recreational OHV use, highway fatalities, military training activities, urban development, road construction, agriculture and mineral development, takes of tortoises for commercial sale as pets, vandalism (shooting, crushing or mutilation), effects of invasive plant species, increase in native predators (common raven and coyotes), and upper respiratory tract disease (Jacobson 1992; USFWS 1994; Brooks and Pyke 2001; Boarman 2002; Lovich 2010).

Sonoran population desert tortoises may be found in Mojave and Sonoran desertscrub plant communities, in creosote bush communities in the Mojave Desert, and paloverde and saguaro (*Carnegiea gigantea*) communities in the Sonoran Desert (Lawler no date). They may also be present in ecotonal areas with elements of Sonoran desertscrub mixed with Mojave desertscrub, juniper woodland, interior chaparral, or semidesert grassland. These tortoises prefer rocky slopes and bajadas at the base of desert mountain ranges. They may be found at elevations between approximately 510 feet in Mojave desertscrub and approximately 5,300 feet in semidesert grassland and interior chaparral (AZGFD 2001).

Desert tortoises are primarily herbivores, consuming a wide variety of plant materials. In descending order of consumption, Sonoran desert tortoises feed on dicot annuals, grasses, herbaceous perennials, trees and shrubs, subshrubs/woody vines, and succulents (AZGFD 2001).

The annual cycle of the Desert tortoise begins in February or March when they emerge from hibernation (AZGFD 2001). Mating generally takes place in the spring, and eggs are laid in an excavated nest near a shrub or burrow entrance between May and July. The Sonoran population has a single clutch of eggs per season. Young turtles emerge from the eggs after incubating for 90 to 135 days (Lawler no date). Hatchling and juvenile mortalities are very high, and it has been estimated that only one hatchling for every 15 to 20 nests survive to reach sexual maturity (*ibid*).

Potential for Occurrence in the Project Area

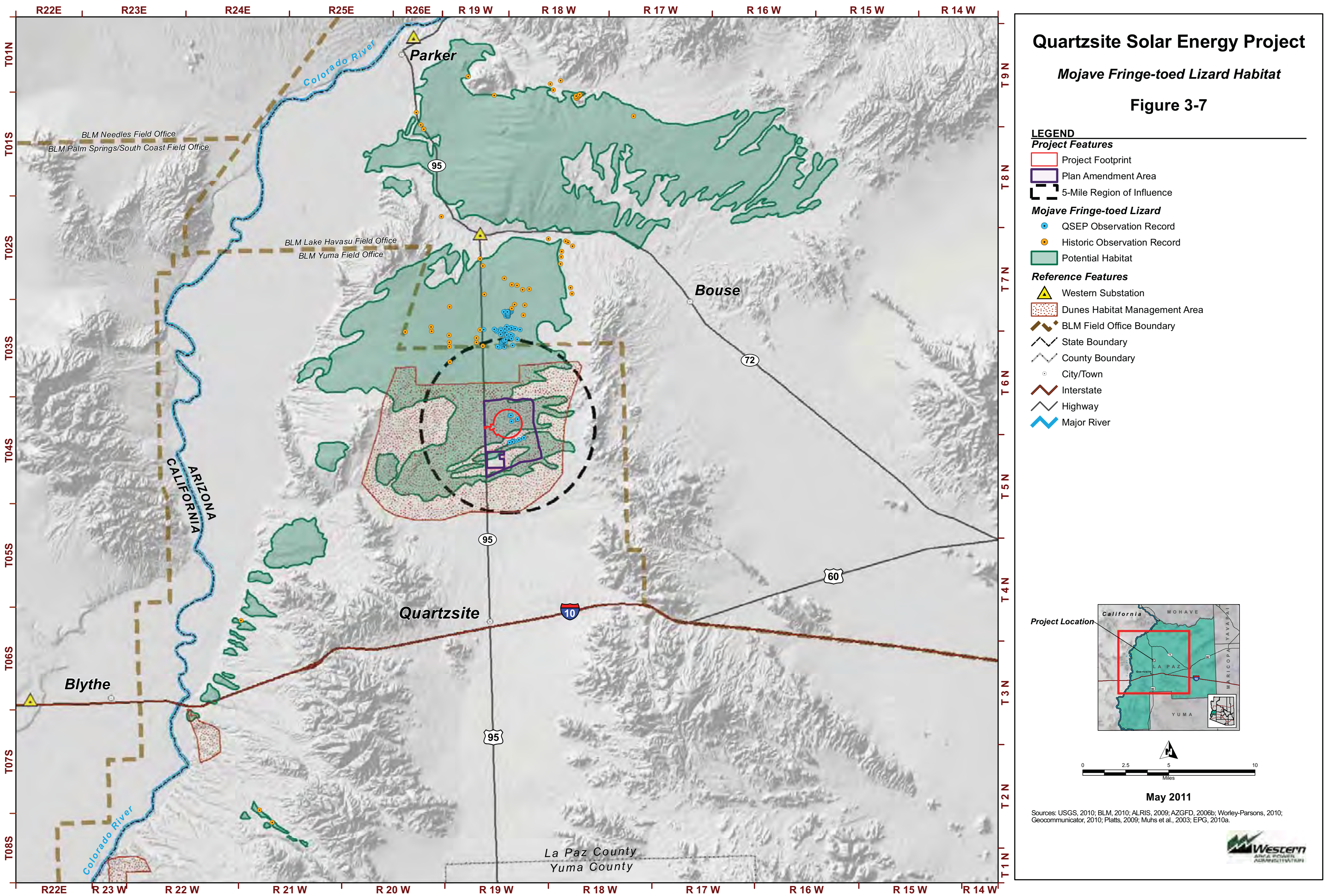
There is no suitable habitat for the Desert tortoise in the Project area. The nearest potential habitat is in the foothills of the Plomosa Mountains, nearly 5 miles to the east. Because of very low rainfall and sparse vegetation in the Plomosa range, the desert tortoise population is likely to be very small. On occasion, individual tortoises may wander out into the La Posa Plain. Encountering a tortoise within the Project area would be an exceptional occurrence.

Mojave Fringe-toed Lizard

The Mojave fringe-toed lizard is an Arizona BLM sensitive species and an AZGFD WSC and a SGCN (AZGFD 2010b; 2006a). Significant threats to the Mojave fringe-toed lizard include habitat degradation, fragmentation, and loss, primarily from irresponsible OHV use and urban and agricultural development (AZGFD 2003a). Colonization of dune habitat by invasive plants, particularly Asian mustard, is likely contributing to habitat degradation.

The Mojave fringe-toed lizard occurs in the Mojave Desert of southern California and extreme western Arizona (NatureServe 2010) (Figure 3-7). This lizard is strictly confined to fine, windblown sand dunes, flats, riverbanks, and washes of very arid desert with low-growing vegetation (generally within creosote bush scrub desert habitat). As with other *Uma* species, the Mojave fringe-toed lizard's several morphological adaptations make it well-suited to life in this environment.

Within Arizona, the species occurs only in La Paz County at the extreme western edge of the state near Parker, into the Cactus Plain, Parker Dunes (also known as the Bouse Dunes), Bouse Wash area, and the La Posa Plain from elevations of approximately 300 to 3,000 feet (AZGFD 2003a; Stebbins 2003). Within these areas, however, suitable habitat is typically present only as numerous, discrete (often quite small) patches of eolian sand.



Quartzsite Solar Energy Project
Mojave Fringe-toed Lizard Habitat
Figure 3-7
LEGEND
Project Features
Project Footprint
Plan Amendment Area
5-Mile Region of Influence
Mojave Fringe-toed Lizard
QSEP Observation Record
Historic Observation Record
Potential Habitat
Reference Features
Western Substation
Dunes Habitat Management Area
BLM Field Office Boundary
State Boundary
County Boundary
City/Town
Interstate
Highway
Major River
Project Location
California
MOHAVE
YAVAPAI
MARICOPA
LA PAZ
YUMA
0
2.5
5
10
Miles
May 2011
Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; AZGFD, 2006b; Worley-Parsons, 2010; Geocommunicator, 2010; Platts, 2009; Muhs et al., 2003; EPG, 2010a.
Western
R22E
R23E
R24E
R25E
R26E
R 19 W
R 18 W
R 17 W
R 16 W
R 15 W
R 14 W
T01N
T01S
T02S
T03S
T04S
T05S
T06S
T07S
T08S
T 9 N
T 8 N
T 7 N
T 6 N
T 5 N
T 4 N
T 3 N
T 2 N
T 1 N
R22E
R 23 W
R 22 W
R 21 W
R 20 W
R 19 W
R 18 W
R 17 W
R 16 W
R 15 W
R 14 W
Parker
Colorado River
BLM Needles Field Office
BLM Palm Springs/South Coast Field Office
95
BLM Lake Havasu Field Office
BLM Yuma Field Office
Bouse
72
ARIZONA
CALIFORNIA
95
60
Quartzsite
10
Blythe
95
Colorado River
La Paz County
Yuma County

Contract biologists' onsite observations confirmed that dunes within the Project area are much smaller, more heavily vegetated, and more compacted than those observed to the north in the La Posa and Cactus plains (EPG 2009; 2010a,b).

A comparative study of sand habitat between the Project area and an alternative site—State Land Site—was conducted in 2010 (EPG 2010a). Far greater numbers of Mojave fringe-toed lizards were observed on the alternative site than within the Project area, purportedly because of the presence of larger, more "active" dunes at the State Land Site. In comparison, the Project area contains a very small number of dunes that are smaller in size and stature (EPG 2010a). Within the Project area, Mojave fringe-toed lizards were found only in a few isolated locations, containing slightly elevated loose sand dunes.

Using graphic depictions of eolian sands in the area (provided in Muhs et al. 2003 and AZGFD 2006b), aerial photograph interpretation, and site visits, the amount of potential Mojave fringe-toed lizard habitat (same as eolian sand habitat) is estimated to be approximately 181,150 acres in Arizona (Figure 3-7). This estimate is most likely in excess of actual suitable Mojave fringe-toed lizard habitat given the gross scale at which the estimate was made, and the species' preference for loose dunes (commonly discrete features) over generally sandy plains. Although the distribution of eolian sand habitat is presented here for context, actual occupancy by Mojave fringe-toed lizard within such habitat is unknown.

In order to focus this analysis on a smaller scale more specific to the Project area, information presented in a site-specific geomorphology report (CH2M Hill 2009) was used. Delineations presented in that report indicate 536 acres of non-sand habitat (desert pavement) and 1,127 acres of sand habitat within the Project area. Limiting the estimate of Mojave fringe-toed lizard habitat in the Project area to only those areas known to contain dunes (preferred habitat), not merely sand sheets, yields approximately 12 acres, less than 1 percent of the Project area. All documented Mojave fringe-toed lizard occurrences were within those 12 acres (EPG 2010a).

Norris (1958) reported no *Uma* specimens had ever been captured more than 50 yards from the nearest sand dune. Applying such a buffer around the identified sand dunes in the Project area increases the estimate of suitable habitat (dunes and non-dune areas used by the lizards) to 51.5 acres, 3 percent of the Project area.

As mentioned above, invasive plants such as Asian mustard can alter the botanical composition of the lizard's habitat by competing with native cover and forage species. Asian mustard invasions pose a significant negative impact to species associated with active (high eolian sand movement) sand dunes by increasing sand stabilization. Asian mustard establishment on dunes within the Project area may account, at least in part, for the low numbers of fringe-toed lizards observed there.

By implementing mustard removal experiments and monitoring the response of a few select native plant and animal species, Barrows et al. (2009) investigated the level of threat Asian mustard poses to regional biodiversity protection efforts. Of the species evaluated, the only one that "demonstrated a negative response to mustard abundance" was the Coachella Valley fringe-toed lizard (*Uma inornata*), a close relative of the Mojave fringe-toed lizard with nearly identical habitat requirements. Although the negative impact declined after the mustard's dominance waned (following a drought period), the study's results indicate a possibility of improving fringe-toed lizard habitat via removal of the mustard.

Potential for Occurrence in the Project Area

The Mojave fringe-toed lizard is present in the Project area; however, less than 1 percent of the Project area is covered by the species' preferred sand dune habitat.

All observed lizards were restricted to the few small, poorly-developed dunes in the eastern portion of the Project area (EPG 2010a).

Banded Gila Monster

The banded Gila monster is a Federal species of concern (AZGFD 2010b). Habitat loss, particularly urban development, threatens the Gila monster over much of its range (Beck 2005). Residential housing developments and road mortality reduces population density and isolates population segments (*ibid*). Non-native invasive plants are threats in some areas, when they lead to more frequent burns and eventual succession of semi-desert grasslands to mesquite shrublands. This may have population-level effects on Gila monsters. Illegal collection for the pet trade is another source of loss from wild populations.

The banded Gila monster occurs from far southwestern Utah and southern Nevada, including a small adjacent portion of southeastern California, south into western Arizona (including all of La Paz and Yuma counties), to the Mexican border.

The Gila monster is most common from sea level to approximately 4,100 feet (Beck 2005). The densest populations are in Sonoran desertscrub (Arizona Upland subdivision) and semi-desert grassland; but Gila monsters also occur in pine-oak forest, tropical deciduous forest, and thorn forest, with specific vegetative communities including cottonwood-willow riparian, mesquite bosque, mixed riparian scrub, and Mojave desertscrub (New Mexico Department of Game and Fish 2008). Gila monsters seem to prefer undulating rocky foothills, bajadas, and canyons, and tend to avoid open sandy plains (Beck 2005). In New Mexico, the species occurs among rocky foothills and canyons in desertscrub and grassland, and occasionally up into the lower limits of open pinyon-juniper and oak woodlands (Beck 2005; Degenhardt et al. 1996).

Gila monsters feed on eggs of birds and reptiles, nestlings of birds and mammals, small lizards, insects, and carrion (Beck 2005; Brennan and Holycross 2006; Stebbins 2003). Gila monsters normally produce a clutch of eggs only every other year, during the summer rainy season of July and August; clutches may contain up to 12 eggs (Brennan and Holycross 2006).

Potential for Occurrence in the Project Area

Gila monsters prefer lower foothills and rocky canyons where there is abundant cover vegetation. They seldom wander onto low valley floors, except when following drainages out of the mountains. Since habitat for the species in the Project area is marginal at best, the potential for the banded Gila monster occurring in the Project area is very low. During site visits, there were no observations of this species.

3.11.4.6 Fish

No special status fish species occur in or near the Project area, because of a total lack of perennial surface waters on or near the Project area. The nearest perennial water that supports fish species is the Colorado River, approximately 18 miles west of the Project area.

3.11.4.7 Invertebrates

Cheese-Weed Moth Lacewing

The cheese-weed moth lacewing is a BLM sensitive species. Loss of habitat from development for homes and agriculture is the currently recognized threat to the species (AZGFD 2003b).

The cheese-weed moth lacewing occurs within the lower Colorado River drainage in southern Nevada, California, and southwestern Arizona (AZGFD 2003b). It is the only species in the family Ithonidae (Insecta: *neuroptera*) that occurs in North America (Borror et al. 1989). The larvae of this species feed on the roots of creosote bush. This species is seldom encountered, but there are records of periodic massive emergences that last only a few days (*ibid*).

Potential for Occurrence in the Project Area

Although the cheese-weed moth lacewing was not encountered during any site visits, there is a moderate potential for the species to occur in the Project area. The known range of the species includes the Project area. The larval host plant (creosote bush) is abundant throughout the area.

MacNeil Sooty Wing Skipper

The MacNeil sooty wing skipper is a BLM sensitive species (AZGFD 2010b). There are no identified threats to the species (Opler et al. 2010), but habitat degradation or loss could adversely affect local populations of it.

The MacNeil sooty wing skipper occurs along the Colorado River drainage from southern Utah and southern Nevada, south to the Coachella Valley near Palm Springs, California, east to the vicinity of Casa Grande, Arizona, and south into Baja California, Mexico (Opler et al. 2010).

The MacNeil sooty wing skipper frequents desert washes, alkali flats, and desert washes where saltbush species (*Atriplex* spp.), the larval food plants, occur. Males typically remain near habitat that supports the host larval plant. The larvae eat the leaves of saltbushes and make shelters by rolling leaves of the plants (Opler et al. 2010).

Potential for Occurrence in the Project Area

No saltbush plants were observed within the Project area during field reconnaissance (EPG 2009); therefore, the potential presence of the MacNeil sooty wing skipper in the Project area is low.

3.11.5 Wildlife Habitat Management Area

The YFO allocated 57,500 acres of BLM-managed land to the Dunes WHA (Figure 3-7). Identified in the allocation were: (1) “Desired Future Conditions” and “Management Actions” common to all WHAs and (2) “Desired Future Conditions,” “Management Actions,” and “Administrative Actions” specific to the Dunes WHA (BLM 2010a).

For the Dunes WHA the following were identified:

Desired Future Conditions

- WF-030: WHAs promote healthy terrestrial, aquatic, and riparian ecosystems for biological diversity, ecological integrity and sustainability, and social and cultural needs.
- WF-031: Fragmentation of land cover by land use is reduced within WHAs to sustain ecosystem composition, structure, functions, and processes.
- WF-032: Conservation measures for special status species, priority species, and other at-risk species are emphasized within WHAs, while balancing the multiple uses of public lands.
- WF-033: WHAs provide well-distributed habitats and connective corridors for a functional landscape to maintain self-sustaining, complex interacting groups of species or wildlife assemblages.
- WF-034: Additional human-caused disturbance and land-cover changes that may cause adverse effects to native and desired non-native fish and wildlife species habitats are limited within WHAs.
- WF-047: Sand dune habitats are maintained in the Dunes WHA to support native wildlife and plant species that include but are not limited to Cowle’s fringe-toed lizard (*Uma notata rufopunctata*), scaly sand plant, flat-tailed horned lizard (*Phrynosoma mcallii*), and sand food (*Pholisma sonorae*).

Management Actions

- WF-035: When impacts within WHAs are unavoidable, allow no net loss or no net impact to occur so that the ecosystem composition, structure, functions, and processes are maintained.
- WF-036: Additional uses in WHAs will be limited to compatible activities and those actions whose impacts could be mitigated to preserve or enhance wildlife values.
- WF-037: Limit developments (i.e., livestock facilities, roads, lands actions, mining and minerals) on WHAs to those that are compatible with wildlife habitat.
- WF-048: Allocate 57,500 acres to the Dunes WHA. This WHA includes four areas of dune habitat. Dunes are a sensitive and unusual habitat in the low deserts and host a variety of plants and wildlife, many of which occur in no other habitat. The principle of

managing this WHA will be that the amount of human disruption should decrease in proportion to the significance of the sand dune features, with more intensive use directed to sand dune areas of lesser significance or sensitivity.

- VM-035: Non-native invasive species (e.g., Russian thistle [*Salsola kali*] and Asian mustard) that threaten dune complexes are reduced in the Dunes WHA.
- TM-004: Within the Dunes WHA, dune areas that support sensitive, special status, and/or priority species will not be available for future Open OHV Management Area designations.
- LR-014: Lands authorizations within the Dunes WHA will avoid (to the extent practicable), minimize, or mitigate impacts to dunes with sensitive species.
- LR-028: To the extent possible, new transportation rights-of-way will avoid WHAs. Appropriate mitigation will be required when avoidance is not possible.
- LR-038: Transmission class rights-of-way within WHAs will be confined to designated ROW corridors whenever practicable.
- LR-068: Acquire non-Federal lands in WHAs from willing landowners through purchase or exchange.

Administrative Actions

- AA-118: Identify areas of high ecological sensitivity in the Dunes WHA.

To address BLM concerns regarding the Dunes WHA, emphasis was placed on identification of sand dune habitat rather than vegetative communities, since the vast majority of this area falls within a single vegetation series. Habitat type/quality was organized into four categories, primarily based on suitability for occupation by Mojave fringe-toed lizard, and to a lesser extent, scaly sandplant: (1) optimal [active dunes], (2) moderate [stabilized dunes], (3) marginal [sand sheet], and (4) non-sand habitat.

The 1,675-acre Project area represents 2.5 percent of the Dunes WHA. At a more regional scale the Dunes WHA is a portion of a larger dune area in western Arizona. The Project footprint of 1,675 acres would comprise approximately 0.9 percent of the nearly 186,000 acres of dune habitat within the ROI (30-mile buffer) (Figure 3-7).

Within the Project area, approximately 11.5 acres of dunes and 1,127 acres of sand sheet, interspersed with the remaining 536 acres of non-dune desert pavement areas, have been identified based on field surveys and interpretation of aerial photographs.

3.12 WATER RESOURCES

This section presents an overview of the surface and groundwater resources for the Project area. The analysis area for surface water is different from the groundwater analysis area based on potential effects of the Project on water resources. Surface water features in the ROI are described in Section 3.12.3, followed by a discussion of groundwater resources in Section 3.12.4. Figure 3-8 shows the major surface and groundwater features in the ROI.

3.12.1 Applicable Plans, Policies, and Regulations

Federal laws and policies establish standards for clean water, controlling development in flood plains, and protecting the environment.

The CWA 33 USC §§ 1251-1387 regulates both direct and indirect discharges, including stormwater discharges from construction and industrial activities.

3.12.1.1 **Clean Water Act**

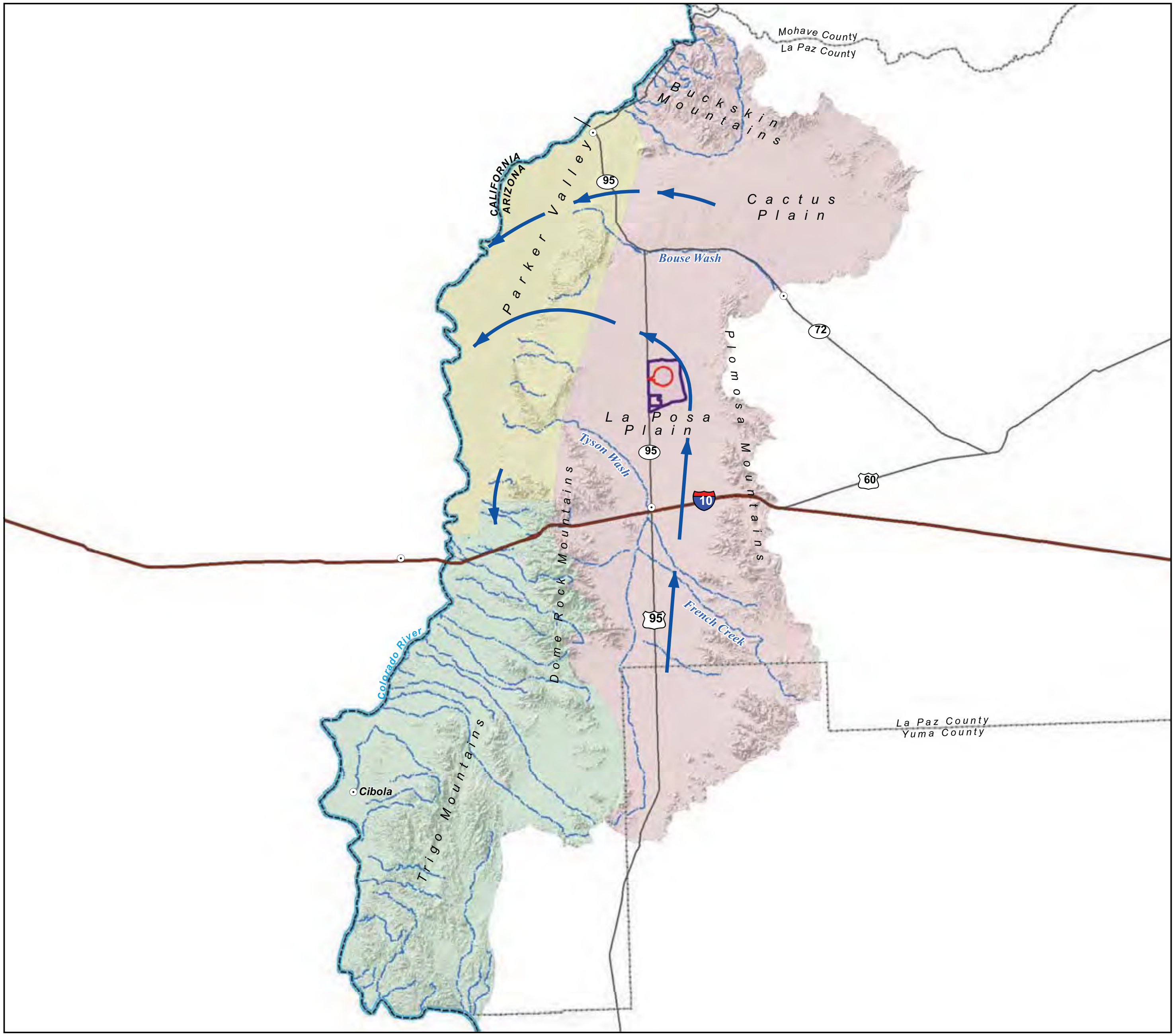
Activities resulting in the discharge of dredged and/or fill material into potentially jurisdictional waters of the U.S., which can include drainages and ephemeral washes, require authorization under a Section 404 permit issued by the USACE. In addition, an applicant for a federally permitted activity that may result in a discharge to jurisdictional waters must obtain from the State a Section 401 certification that the action will not violate State or Federal water quality standards. In Arizona, the 401 Certificate is issued by the ADEQ.

Water quality of waters of the U.S. is protected through Sections 301 and 402 of the CWA, which regulate discharges of pollutants and stormwater discharges through the NPDES. In Arizona, authority to implement the NPDES permit program has been delegated to the ADEQ.

The Safe Drinking Water Act is the main Federal law that ensures the quality of Americans' drinking water. The Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. Under this act, the EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards (EPA 2010a). The Safe Drinking Water Act does not regulate private wells that serve fewer than 25 individuals (EPA 2010a). It also mandates that a Groundwater Wellhead Protection Program be developed by each state, in order to protect groundwater resources that serve as sources for public drinking water.

3.12.1.2 **Executive Order 11990**

EO 11990, the “no net loss of wetlands” order, directs Federal management agencies to: (1) provide leadership and to take action to minimize the destruction, loss, or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize harm to wetlands. There are no wetlands in the Project area; therefore, this regulation is identified but is not further discussed.



Quartzsite Solar Energy Project

Water Resources

Figure 3-8

LEGEND

Project Features

- Project Footprint
- Plan Amendment Area

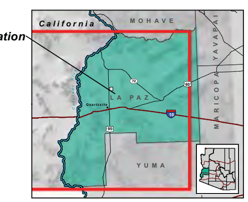
Parker Basin

- Cibola Valley Sub-Basin
- Colorado River Indian Reservation Sub-Basin
- La Posa Plain Sub-Basin
- Groundwater Flow Direction

Reference Features

- State Boundary
- County Boundary
- City/Town
- Interstate
- Highway
- Major River
- Intermittent Stream / Wash

Project Location



0 5 10 20
Miles

May 2011

Sources: USGS, 2010; ADWR, 2007; ALRIS, 2009; Worley-Parsons, 2010;

Western Area Power Administration

3.12.1.3 **Federal Emergency Management Agency/Floodplains**

The National Flood Insurance Program is administered by the Federal Emergency Management Agency, a component of the U.S. Department of Homeland Security. The National Flood Insurance Program enables property owners in participating communities to purchase insurance protection against losses from flooding. This flood insurance is designed to provide an alternative to Federal disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

In support of the National Flood Insurance Program, Federal Emergency Management Agency identifies flood hazard areas throughout the United States by identifying and mapping Flood Hazard Boundary Maps, Flood Insurance Rate Maps, and Flood Boundary and Floodway Maps. Several areas of flood hazards are commonly identified on these maps. One of these areas is the Special Flood Hazard Area, or Zone A areas, which is defined as an area of land that would be inundated by a flood having a 1 percent chance of occurring in any given year (previously referred to as the base flood or 100-year flood). Development may take place within these areas provided that development complies with local floodplain management ordinances, which must meet the minimum Federal requirements.

Based on review of the Flood Insurance Rate Map for La Paz, Arizona, and Incorporated Areas (Map Number 04012C1025C, August 2008), Designated “Zone A 100-year Floodplains” are located south and east of the Project area. A flood hazard analysis has not yet been conducted by FEMA for the Project area, so the Applicant completed a Conceptual Drainage Study. The proposed Project is not within a 100-year floodplain (WorleyParsons 2010b). Therefore, the DOE will not include a floodplain assessment in the EIS as described in the DOE Regulations for Compliance with Floodplain and Wetland Environmental Review Requirements (10 CFR Part 1022).

3.12.2 Data Collection and Methods

Water resources data referenced in this section were obtained primarily from the groundwater investigation reports prepared by WorleyParsons for the Project. Additional data sources reviewed for this EIS include USGS topographic and aerial maps; reports and studies prepared by the USGS, BLM, and other agencies; and additional water resource reports prepared by various organizations.

The references that were selected for use in this analysis are listed in Chapter 6 – References, with full bibliographic citations. The information compiled from these sources is assumed to be factual and sufficiently accurate for use in this analysis.

3.12.3 Surface Water Resources

For water planning and management purposes, the USGS has divided the United States into discrete hydrologic basins or watersheds. Watersheds generally consist of valleys that are separated by surface-water drainage divides. The Project area is located in the Tyson Wash watershed (USGS Cataloging Unit – 15030106). Tyson Wash—which drains northward along the La Posa Plain—along with Bouse Wash to the north, forms the two watersheds that drain the La Posa Plain. The La Posa Plain is bounded to the west by the Dome Rock Mountains, to the east by the Plomosa Mountains, to the north by the Buckskin Mountains, and to the south by the Kofa Mountains. The La Posa Plain extends approximately 70 miles from near the Town of Parker and the Colorado River to the north, to the Castle Dome and Chocolate mountains to the south. The width of the La Posa Plain typically ranges from approximately 10 to 25 miles.

There are no perennial streams within the Tyson Wash watershed. The nearest perennial stream in the regional area is the Colorado River, approximately 18 miles west of the Project area, and Bill Williams River, approximately 40 miles northeast of the Project area.

The Project area is situated on a low-angle bajada on the west flank of the Plomosa Mountains. The topography within the Project footprint generally slopes to the southwest, with ground surface elevations ranging from approximately 685 feet amsl in the southwest corner of the Project area to approximately 960 feet amsl in the northeast corner of the Project area. There is a slight grade (less than 1 percent) over most of the site, generally sloping downhill to the west-southwest. A number of shallow "blue line" ephemeral washes traverse the site in the direction of the prevailing grade. These washes combine to form an ephemeral drainage that flows southwestward through the western part of the Project area, joining the ephemeral Kaiser and Tyson Washes southwest of the Project area. These ephemeral washes only receive runoff during high-intensity rainfall events.

3.12.3.1 **Surface Water Quality**

Section 305(b) of the CWA requires states to make water quality assessments and provide water quality reports to the EPA; CWA Section 303(d) requires states to identify waters, through their Section 305(b) water quality assessments, that do not or are not expected to meet applicable water quality standards with Federal technology-based standards alone. Under CWA Section 303(d), states are also required to develop a priority ranking for these waters that takes into account the severity of the pollution and the designated uses of the waters. Once this listing and ranking of impaired waters is completed, states are required to develop Total Maximum Daily Loads for these waters in order to achieve compliance with the water quality standards. Arizona's 2006/2008 Section 303(d) list of impaired waters shows no CWA Section 303(d) impaired waters in the Project area.

3.12.4 Groundwater Resources

This section characterizes the local groundwater conditions and their relationship to the regional groundwater system. The Project area is located within the Parker Groundwater Basin (2,229 square miles), one of the 11 basins in southwestern Arizona that compose the Lower Colorado River Planning Area as identified by ADWR (2007). The Parker Groundwater Basin comprises three sub-basins, including the Colorado River Indian Reservation, Cibola Valley, and the La Posa Plain groundwater sub-basins. The Project area is located near the center of the La Posa Plains groundwater sub-basin, which is the eastern-most one in the Parker Basin.

The La Posa Plain sub-basin generally lies between the Dome Rock Mountains and Plomosa Mountains, and extends from Parker Dam south to the drainage divide, between Tyson Wash and

Indian Wash, excluding the Colorado River Indian Reservation. The Colorado River Indian Reservation sub-basin is the Indian Reservation. The Cibola Valley sub-basin includes the surface watersheds tributary to the Colorado River between the Colorado River Indian Reservation and McAllister Wash.

3.12.4.1 Regional Groundwater Occurrence

Groundwater occurs both along the floodplain of the Colorado River and in an alluvial aquifer system under the La Posa Plain. The Parker Basin is estimated to have between 14 and 21 million acre-feet of groundwater currently in storage to a depth of 1,200 feet (ADWR 1994; Freethey and Anderson 1986; Arizona Water Commission 1975).

Five distinct hydrostratigraphic units have been defined in the vicinity of the Town of Quartzsite (Dickens 2006) and are also applicable to the Project area. In descending order, these hydrostratigraphic units are as follows:

- Perched Aquifer
- Aquitard Unit A
- Upper Aquifer
- Aquitard Unit B
- Lower Aquifer

Perched Aquifer. The Perched Aquifer occurs within the upper Quaternary Alluvium; more than 800 wells have been completed in this aquifer in the vicinity of Quartzsite (Dickens 2006). The vertical extent of the Perched Aquifer is limited to approximately 750 feet amsl (100 feet bgs), and the depth to water ranges from 20 to 50 feet bgs in the vicinity of Quartzsite (Dickens 2006). Wells completed in the perched aquifer generally range from approximately 40 to 100 feet bgs within sub-basin. Near the Project area, the Perched Aquifer appears to occur at approximately 820 feet amsl (70 feet bgs), and the depth to water is approximately 25 feet bgs (WorleyParsons 2010b).

Aquitard Unit A. Shallow groundwater is perched upon Aquitard A, which comprises clay and sandy clay with localized thin sand and gravel lenses that retard vertical groundwater flow (Dickens 2006). Near Quartzsite, the aquitard ranges in thickness from approximately 200 to 300 feet, and on average occurs between approximately 750 and 500 feet amsl. The aquitard generally thins towards the mountains and thickens towards the valley axis. Driller’s logs from wells adjacent to the Project area suggest that the aquitard generally occurs between roughly 815 to 658 feet amsl, approximately 35 to 192 feet bgs (WorleyParsons 2010b).

Upper Aquifer. The Upper Aquifer occurs within the lower Quaternary Alluvium and appears to be regionally unconfined. Wells completed in the Upper Aquifer generally range from 500 to 750 feet bgs within a 10-mile radius from the Project area. In the vicinity of Quartzsite, the Upper Aquifer comprises predominantly thin gravel and sand lenses intermixed within finer grained sandy clay to clay. In the vicinity of Quartzsite, the upper limit of the Upper Aquifer is approximately 400 to 450 feet bgs; the thickness ranges from approximately 50 to 200 feet (Dickens 2006). Adjacent to the Project area, the top of the Upper Aquifer occurs at approximately 500 feet bgs (371 feet amsl) and ranges in thickness from approximately 100 to 130 feet (WorleyParsons 2010b).

Aquitard Unit B. Aquitard Unit B generally comprises a thick “blue clay” layer that is reportedly 200 to 500 feet thick in the Quartzsite area. The elevation of the top of the aquitard ranges from approximately 300 to 400 feet amsl near Quartzsite (WorleyParsons 2010b; Dickens 2006). Site driller’s logs suggest the top of the aquitard ranges from between 215 and 240 feet amsl. The top of the aquitard correlates with the top of the Bouse Formation, which is also reportedly marked by a “blue clay” layer (Metzger et al. 1973). Wilson and Owen-Joyce (1994) reported that the top of the Bouse Formation occurs at approximately 250 feet amsl near the Project area. The aquitard generally thins towards the mountains and thickens towards the valley axis; and within roughly 0.5 mile of the mountain fronts, the aquitard reportedly “pinches out” (WorleyParsons 2010b; Dickens 2006).

Lower Aquifer. The Lower Aquifer is likely confined and extends below Aquitard Unit B to bedrock. The upper portion of the Lower Aquifer comprises coarse sand and gravel approximately 150 to 200 feet thick (Dickens 2007). Below this interval, the basin fill sediments comprise thick sand and gravel lenses within a predominantly silt to clayey sand matrix to the maximum depth of exploration, which is approximately 1,300 feet bgs (Dickens 2006). There are no onsite wells that penetrate this aquifer; the nearest wells that penetrate it are located near the Town of Quartzsite (WorleyParsons 2010b).

3.12.4.2 **Groundwater Inflow/Recharge**

Groundwater in the La Posa Plains sub-basin reportedly flows to the north in the southern half of the sub-basin and to the west-southwest, into the Colorado River Indian Reservation sub-basin, in its northern half (ADWR 2007). Natural recharge for the Parker Basin is estimated at 241,000 acre-feet per year, and the largest source of natural recharge is the Colorado River (Freethey and Anderson 1986; ADWR 1994) followed by mountain front recharge. There are also 12 wastewater treatment facilities in the Parker Groundwater Basin, five of which discharge treated wastewater to unlined impoundments that recharge the groundwater basin (ADWR 2007). The additional volume of this recharge is not included in the above estimate.

3.12.4.3 **Groundwater Outflow/Discharge**

Water demand in the Parker Basin is approximately 4,000 acre-feet per year for groundwater and 653,000 acre-feet per year for surface water in the Parker Basin, but most of the demand is along the Colorado River or within the vicinity of Quartzsite (ADWR 2007). Agricultural groundwater demand decreased slightly between 1991 and 2003 in the basin, while municipal groundwater demand increased 13 percent from 1991 to 2003. The industrial demand in the Parker Basin is associated with sand and gravel operations. Groundwater demand in the Project area is low.

Groundwater is used as a municipal drinking water supply for the Town of Quartzsite, Arizona, which is the primary groundwater user in the La Posa sub-basin. The Town of Quartzsite supplies drinking water to its population from two wells. Additional groundwater for domestic use is supplied through numerous wells installed in the vicinity of the Town of Quartzsite. The municipal, domestic, and industrial groundwater demand is currently unknown for the La Posa Plain sub-basin.

3.12.4.4 Well Inventory

The majority of the wells within the regional area are located in the vicinity of the Town of Quartzsite and were constructed for domestic, industrial, or municipal water supply purposes. Monitoring wells have also been installed in the vicinity of the Town of Quartzsite to investigate shallow water quality.

Wells tapping the Upper Aquifer near the Town of Quartzsite are equipped with 15 to 50 gpm capacity pump units (Dickens 2006). Based on specific capacity data from four wells located adjacent to the Project, the transmissivity for the Upper Aquifer ranges from 9,000 to 38,400 gallons per day per foot (gpd/ft) (1,203 to 5,133 feet squared per day).

Well yields in the Lower Aquifer range up to 800 gpm. Based on the analysis of recovery data from a 25-hour constant discharge pumping test conducted at wells northwest of the Town of Quartzsite, the transmissivity of the Lower Aquifer was calculated to be approximately 35,000 gpd/ft (Dickens 2006). However, the ADWR indicated that this transmissivity was likely overestimated, and 6,445 gpd/ft were used for analysis in the Town of Quartzsite's Assured and Adequate Water Supply hydrologic study (Dickens 2007).

Well yields reported for wells in the vicinity of the Project area range from less than 100 gpm to between 100 and 500 gpm (ADWR 2007). According to Dickens (2006), well yields in the Perched Aquifer generally range from 1 to 25 gpm near the Town of Quartzsite.

Ten wells and several borings are reported to be located immediately adjacent to the Project area (one well is located on private land that is not part of the development area). Five of the wells are registered with the ADWR. The owners of the onsite wells are summarized in Table 3-9; their reported uses include mining, domestic use, and livestock watering. The status of the onsite wells is unknown, but based on surface reconnaissance, several of the wells located along Cypress Mine Road appear to be active.

Table 3-9 Data Regarding Wells within the Project Area

Well Registration No.	Owner	Installation Date	Approximate Ground Surface Elevation (feet)	Well Depth/Water Level (feet)	Use
Not Registered[1]	N/A	N/A	895	700/500	N/A
Not Registered[1]	N/A	N/A	862	650/500	N/A
Not Registered[1]	N/A	N/A	862	575/Dry	N/A
Not Registered[1]	N/A	N/A	873	657/521	N/A
Not Registered[1]	N/A	N/A	852	640/496	N/A
517883[2]	Cyprus Mineral Park	04/24/1987	860	650/500	Mining
908563	Bonanza Exploration	03/27/2008	886	800/521	Mining

Table 3-9 Data Regarding Wells within the Project Area					
Well Registration No.	**Owner**	**Installation Date**	**Approximate Ground Surface Elevation (feet)**	**Well Depth/Water Level (feet)**	**Use**
514526[2]	Patch Living Trust	07/02/1986	886	657/527	Mining/Domestic
514525[2]	Patch Living Trust	07/11/1986	850	640/499	Mining/Domestic
522065[2]	Weisser Cattle Co.	03/28/1989	897	612/527	Stock
Source: [1] USGS 2009; [2] ADWR 2007					

3.12.4.5 **Groundwater Quality**

Groundwater quality data within the Parker Basin is limited, but appears to degrade with depth (WorleyParsons 2010b). Total dissolved solids concentrations reported for the Town of Quartzsite increase in concentration from 1,295 to 1,500 milligrams per liter (mg/L) at shallow depths, to 1,360 to 2,010 mg/L at deeper depths (WorleyParsons 2010b). Within the Parker Basin, nitrate most frequently exceeds drinking water quality standards. Arsenic, chromium, lead, fluoride, total dissolved solids, and volatile, semi-volatile, and pesticide organic compounds also equal or exceed drinking water standards (ADWR 2007).

Table 3-10 presents the analytical results for two wells within 0.5 mile west of the Project area. Well W-8 was sampled on July 7, 1986, and well W-9 was sampled on August 2, 1986. Both wells are located within the Upper Aquifer.

Table 3-10 Groundwater Quality for Two Sampled Wells within the Project Area		
Analyte	**Well W-8**	**Well W-9**
Metals		
Antimony (mg/L)	<1	<1
Arsenic (mg/L)	<0.01	<0.01
Barium (mg/L)	<0.5	<0.5
Beryllium (mg/L)	<0.01	<0.01
Boron (mg/L)	1	1
Cadmium (mg/L)	<0.005	<0.005
Calcium (mg/L)	59	27
Chromium (mg/L)	<0.01	<0.01
Cobalt (mg/L)	--	--
Copper (mg/L)	<0.01	<0.01
Iron (mg/L)	<0.05	<0.05

Table 3-10 Groundwater Quality for Two Sampled Wells within the Project Area		
Analyte	**Well W-8**	**Well W-9**
Metals		
Lead (mg/L)	<0.01	<0.01
Lithium (mg/L)	--	--
Magnesium (mg/L)	0.74	0.85
Manganese (mg/L)	<0.01	<0.01
Mercury (mg/L)	<0.0002	<0.0002
Molybdenum (mg/L)	<0.01	<0.01
Nickel (mg/L)	<0.05	<0.05
Potassium (mg/L)	4.1	3.3
Selenium (mg/L)	<0.005	<0.005
Silica (total) (mg/L)	21	22
Silica (dissolved) (mg/L)	--	--
Silver (mg/L)	<0.01	<0.01
Sodium (mg/L)	270	225
Strontium (mg/L)	1	0.7
Thallium (mg/L)	<0.5	<0.5
Vanadium (mg/L)	--	--
Zinc (mg/L)	0.21	0.11
Other		
Alkalinity (total) (mg/L)	--	--
Alkalinity, Bicarbonate (as $CaCO_3$) (mg/L)	47.6	137
Alkalinity, Carbonate (as $CaCO_3$) (mg/L)	0	0
Alkalinity, Hydroxide (as $CaCO_3$) (mg/L)	--	--
Chloride (mg/L)	164	123
Cyanide (total) (mg/L)	<0.02	<0.02
Fluoride (mg/L)	3.7	4.4
Nitrate (NO_3) (mg/L)	5.8	12
Nitrate (NO_2) (mg/L)	--	--
pH	7.5	7.4
Phosphorus (total) (mg/L)	--	--
Phosphate (ortho) (mg/L)	--	--
Specific Conductance (at 25ºC) (µS/cm)	--	--
Specific Conductance (at 25ºC) (umhos/cm)	1,480	710

Table 3-10 Groundwater Quality for Two Sampled Wells within the Project Area		
Analyte	**Well W-8**	**Well W-9**
Metals		
Sulfate as SO_4 (mg/L)	450	250
Sulfide (mg/L)	--	--
Total Alkalinity (As $CaCO_3$ at pH 4.5) (mg/L)	--	--
Total Hardness (calc as $CaCO_3$) (mg/L)	151	71
Total Dissolved Solids (mg/L)	955	710

Notes:
1. $CaCO_3$ = calcium carbonate
2. NO_3 = nitrogen trioxide
3. <0.5 = not detected above the noted laboratory reporting limit
4. umhos/cm = micro ohms per centimeter
5. µS/cm = microsiemens per centimeter
6. ºC = Celsius
7. -- = not analyzed
8. The average of the water quality data from wells W-8 and W-9 were used for permitting and preliminary treatment and design. These data are considered representative of the groundwater quality of the Upper Aquifer underlying the Project area.

3.12.5 Jurisdictional Waters, Drainages, and Riparian Areas

The USACE regulates the "discharge of dredged or fill material" into waters of the U.S., including wetlands under Section 404 of the CWA. In accordance with 33 CFR 328.3 (a), "waters of the U.S." include tidal waters; interstate waters; all other waters such as intrastate waters that the use, degradation, or destruction of which could affect interstate or foreign commerce; and tributaries to the above, territorial seas, and wetlands adjacent to the above. A Section 404 permit is required from the USACE prior to the initiation of any regulated activities in waters of the U.S.

Before the USACE will issue a Section 404 permit, applicants must receive a Section 401 Water Quality Certification from the ADEQ. By Federal law every applicant for a Federal permit or license for an activity that may result in a discharge into a water body must request State certification that the proposed activity will not violate State and Federal water quality standards.

In accordance with the USACE Regulatory Guidance Letter Number 08-02, a preliminary jurisdictional delineation of washes that traverse the Project area was conducted April 13 to 15, 2010. The purpose of the delineation was to determine the presence, location, and magnitude of wetlands, water bodies, or washes that may be considered potential waters of the U.S.

The preliminary jurisdictional delineation identified the surface hydraulic features in the Project area are poorly developed, and consist of very shallow, narrow, and commonly vegetated, braided drainages. Washes are typically narrow (averaging 1.96 feet in width) and show little evidence of active surface water flow. The average gradient across the Project site is less than 1 percent, and soils are primarily non-cohesive sands with a high infiltration capability. Due to these physical attributes, surface flow is likely limited to either brief periods of intense, localized summer rainfall events that exceed the soil percolation rate, or extended winter rainfall events of magnitude adequate to saturate soils that result in surface flow.

3.13 CULTURAL RESOURCES

A cultural resource is generally defined as a phenomenon associated with prehistory, significant historical events or individuals, or extant cultural systems. These include archaeological sites, districts, and objects; standing historic structures, districts, and objects; locations of important historic events; and places, objects, and living or nonliving things that are important to the practice and continuity of traditional cultures. Cultural resources may involve historic properties, traditional use areas, sacred sites, and other places of traditional cultural or religious importance.

3.13.1 Applicable Plans, Policies, and Regulations

Cultural resources are nonrenewable resources that are protected by several Federal and State statutes, including the Antiquities Act of 1906 (16 USC 431–433), the NHPA of 1966 (16 USC 470x–6), EO 11593 of 1971 (directing Federal agencies to be stewards of cultural properties), the Native American Graves Protection and Repatriation Act (25 USC 3001–3013), the Archaeological Resources Protection Act of 1979 (16 USC 470aa–470mm), the American Indian Religious Freedom Act (PL 95-341; 42 USC 1996), EO 13007 (directing Federal agencies to protect access to Indian Sacred Sites), NEPA of 1970 (42 USC 4321 et seq.), the Arizona Antiquities Act of 1960 (ARS §41-841 through 844), and the Arizona State Historic Preservation Act of 1982 (ARS 41-861 through 864).

In the context of the 1966 NHPA, as amended, a historic property or resource is any historic or prehistoric district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). The definition also includes artifacts, records, and remains that are related to such a district, site, building, structure, or object. Traditional cultural properties, in terms of the NRHP, are defined as places that are prominent in cultural practices, beliefs, or values that are widely shared within the group, have been passed down through generations, and serve a role in maintaining the group’s cultural identity. Traditional cultural landscapes are similarly defined, and consist of conceptually related landforms important to a particular culture. Cultural resources also include traditional territories used historically for the collection of food and nonfood resources, habitation, ritual practices, and other activities. Sacred sites apply to traditional sites and places that Native American tribes or groups, or their members, perceive as having religious significance.

Regulations implementing NEPA stipulate that Federal agencies consider the consequences of their undertakings on historical and cultural resources (40 CFR 1502.16[g]). Section 106 of the NHPA also requires Federal agencies to consider the effects of their undertakings on properties eligible for inclusion in the NRHP. Regulations for Protection of Historic Properties (36 CFR 800) implement Section 106 by defining procedures for agencies to consult with the relevant

SHPO and other interested parties in identifying and seeking to avoid, mitigate, and resolve any adverse effects.

To be eligible for inclusion in the NRHP, a property must be at least 50 years old (unless it has exceptional significance), and possess integrity of location, design, setting, feeling, materials, workmanship, and association. In addition, a property must meet one or more of the following criteria to demonstrate its significance in American history, architecture, archaeology, engineering, or culture (36 CFR 60.4):

- Criterion A — Be associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion B — Be associated with the lives of significant persons in our past.
- Criterion C — Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D — Have yielded, or may be likely to yield, information important in prehistory or history.

The authority to formally list properties is vested with the Keeper of the NRHP, but within the framework of the Section 106 process, the lead Federal agency (in this case Western) and SHPO can make consensus decisions to determine properties as eligible or ineligible for inclusion in the NRHP. The types of cultural resources that could be affected by the alternatives being considered for the Project include archaeological sites, historic buildings, structures, and linear features, and traditional cultural resources.

3.13.2 Data Collection and Methods

Regulations for Protection of Historic Properties (36 CFR 800.16) stipulate that the Federal agency review existing information on historic properties within the area of potential effects (APE), including any data concerning possible historic properties not yet identified. To comply with this, a cultural resources records review was undertaken to identify archaeological and historical sites recorded within 1 mile of the direct impacts APE (Florie et al. 2009). The records review area consists primarily of public land managed by the BLM, but also includes some Arizona State Trust Land.

The primary data sources for the records review included the files of the BLM YFO and the AZSITE Cultural Resources Inventory, which is a GIS database of cultural resources that includes records from Arizona State Museum (ASM), Arizona State University, the Museum of Northern Arizona, and Arizona SHPO, and participating agencies such as the BLM. NRHP listings were also checked. General Land Office plats and land patent records on file at the BLM Arizona State Office were also reviewed for indications of possible unrecorded historical resources. Additional information was collected from paper records at ASM.

It is estimated that construction of the Project facilities would disturb approximately 1,675 acres (2.6 square miles) in the northeastern quadrant of the original ROW application area. Based on the preliminary engineering, an area of 3,020 acres (4.75 square miles) was identified as including the potential locations of the proposed facilities and an added buffer to allow for modifications during preparation of the final design for the Project. That area was surveyed for cultural resources by Archaeological Consulting Services (Rayle and Fangmeier 2010). Pedestrian survey was accomplished utilizing 15 meter transects between individuals from April 12 to April 30, 2010 and on July 6, 2010. Western also conducted a helicopter reconnaissance survey in the vicinity of Quartzsite on May 26, 2010. The aerial reconnaissance was primarily conducted in order to identify and photograph historic and recent linear military features, such as tank tracks associated with Cold War Era military maneuvers, and to determine the relationship of tank tracks to historic military camps outside the Project area.

3.13.2.1 **Area of Potential Effects**

Regulations for Protection of Historic Properties (36 CFR 800.16) define the APE of a Federal undertaking as the geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties. The Project could result in two types of such alterations resulting from: (1) ground disturbance associated with construction and operation of the Project (direct impacts) and (2) visual changes to the integrity of feeling or setting of historic and traditional cultural properties (indirect impacts).

The APE for direct impacts includes the Project footprint, which totals approximately 1,675 acres. The APE for indirect/visual impacts incorporates the visual zone of influence of all components of the Project. This APE was originally defined as extending 3 miles beyond the footprint of the proposed solar generation facility (and related structures and buildings) where the 653-foot-tall solar collecting tower would be built, and 1 mile beyond the proposed electrical switchyard and new 230-kV generation tie-line. As a result of consultations with tribes regarding potential impacts to traditional cultural resources, consideration of potential visual effects was expanded to distances of up to 25 miles from the Project.

Western's consultation with tribes having traditional cultural associations with the Project area identified six traditional cultural properties as warranting visual simulations to characterize the potential visual impacts of the Project (see Section 4.16 for discussions on visual impact analysis). Western conducted meetings with the tribes to share information on the visual impacts analysis to ensure that their views are taken into account in identifying and resolving any adverse effects.

3.13.3 Culture History

Nearly a century of archaeological and historical research has documented that human use of the region spans at least 12,000 years (Florie et al. 2009), and can be divided into the Paleoindian, Archaic, Ceramic, Ethnohistoric, and Historic periods. The earliest traces of human occupation in the region date to the Paleoindian period (circa 10,000 to 7500 BC), when the climate of the late Pleistocene and early Holocene periods was cooler and wetter than today. Paleoindian people hunted numerous species of game including large, now extinct animals such as mammoths, horses, camels, and giant bison. Paleoindian culture in western Arizona is known as the San Dieguito tradition and has been divided into three periods; but evidence of this ancient time is limited mostly to isolated finds, and corroborating chronological evidence of this classification is lacking.

The subsequent Archaic Period (circa 7500 BC to AD 500) is a long post-Pleistocene period that followed the retreat of continental glaciers and the extinction of the large Pleistocene game species. Like the earlier Paleoindian peoples, Archaic subsistence strategies relied on hunting and gathering, with small bands traveling through their territories with the changing seasons to hunt game and to collect and process plant foods. Grinding stones indicate that the collection and processing of seeds for food became increasingly important over time. Archaic culture in western Arizona is known as the Amargosa tradition and is divided into early, middle, and late periods based on changing styles of stemmed and notched dart points made of flaked stone. Few sites dating to the early and middle Archaic periods have been found in southwestern Arizona; sites dating to the late Archaic Period are more common and probably reflect higher population density.

The Ceramic period that followed is characterized by greater reliance on domesticated crops, more sedentary habitation, and the production and use of ceramic containers. The Ceramic period cultural tradition in southwest Arizona is known as Patayan (or alternatively, the Hakataya). The Patayan chronology is generally divided into three periods. Patayan I (circa AD 700 to 1000) represents the initial period of making and using pottery by groups living along the lower Colorado River valley. The Patayan II period (AD 1000 to 1500) was a time of population expansion and increased interaction with neighboring areas; Patayan II pottery has been found as far east as the Phoenix area. Patayan III (post-1500) is a transition period between the prehistoric period and historic occupation by various Yuman-speaking tribes. The discovery of Patayan III ceramics on the Pacific Coast and in the Salt River Valley indicates that trade networks and alliances persisted during this period.

The Project area is located within the traditional territory of the ethnohistorically documented Yavapai. The Hualapai lived to the north of the Yavapai. The Mojave, a lowland Yuman group, lived to the west along the Colorado River, as did the Chemehuevi, a band of Southern Paiute that ranged into the desert far west of the river. The Quechan and Cocopah were other lowland Yuman tribes that lived along the lower Colorado River south of the Mojave. During historic times, some indigenous people left their homelands along the lower Colorado and Gila rivers because of internecine warfare, and joined the Akimel O'odham living along the Gila River in the Phoenix Basin.

Euro-American explorers traveled north out of Mexico into what is now Arizona, in the early sixteenth century. Although Spain claimed hegemony over the area for almost three centuries, colonization in Arizona never extended north of the Tucson area. The Spanish priest Francisco Garcés led efforts to establish two missions in the vicinity of the Yuma crossing of the Colorado River in 1780, but the Quechan drove out the Spanish a year later.

After a successful revolt for independence, the Project area became part of the territory claimed by Mexico but, like Spain, Mexico made no attempt to settle the area. In 1848, Mexico ceded land north of the Gila River to the United States with the Treaty of Guadalupe-Hidalgo that concluded the war with Mexico. The U.S. Army soon built a series of forts and camps—

including Fort Yuma, Camp Lincoln (a subpost of Fort Yuma), and Fort Mojave—along the lower Colorado River, conquered native groups, and relocated them on reservations. The Project area was within the territory occupied by the Yavapai, who now reside on reservations along the lower Verde River (Fort McDowell Yavapai Nation), middle Verde River (Yavapai-Apache Nation), and at Prescott (Yavapai-Prescott Indian Tribe).

Prior to and during the 1848 California gold rush, the lower Gila River, approximately 75 miles south of the Project area, was a major travel corridor for Euro-Americans moving farther west. After the gold rush waned, many prospectors moved into Arizona (part of the New Mexico Territory until 1863) in the 1850s and 1860s. Gold mines were established in La Paz and Yuma, and along the Bill Williams River north of Parker, Arizona; silver and copper mines also were established along the lower Colorado River. Prior to construction of transcontinental railroads, steamboats navigating the Colorado River were the primary source for mining supplies, and many inland mines were unsuccessful because of high transportation costs and lack of water. Mines closer to the river, including the Best Bet and Gold Wing mines in the Lake Havasu vicinity, thrived into the early 1900s, though had significantly declined by the end of World War II.

In 1856, Charles Tyson established a privately-owned fort and stage station in the area that would later become Quartzsite. Originally known as Fort Tyson or Tyson Wells, the settlement was located along the road between the river port of Ehrenburg and Prescott. A post office was established there in 1893, but closed 2 years later when mining activity waned. A mining resurgence in 1897 led to the reestablishment of the post office under the name Quartzsite, and by 1900 the town boasted 10 saloons, a Chinese restaurant, a barber shop, and a general store. Quartzsite was incorporated as a town in 1989, and today is a popular destination for RV campers during the winter months.

Parker, located north of the Project area, was established in 1871 when a post office of the same name opened on the Native American reservation along the Colorado River. After the Atchison, Topeka & Santa Fe Railway arrived in the area in 1905, Parker was moved approximately 4 miles north of its original location to the railroad corridor, and became a railroad watering and shipping station. Town residents offered services and supplies first to nearby miners and later to farmers, as mining activity decreased. The Federal government constructed the Parker Dam in 1938 and the Headgate Rock Dam in 1941 to provide a reliable source of irrigation water to area farmers. The construction of the Headgate Rock Dam resulted in the creation of the 16-mile-long Lake Moovalya. Parker prospered as a commercial center for area farmers and as a recreational center for visitors to Lake Moovalya.

During World War II, General George Patton established the Desert Training Center along the California-Arizona border. Training exercises were designed to prepare U.S. troops for combat in the hostile desert terrain and climate of North Africa. After the Allied victory in North Africa, the Desert Training Center was renamed the California-Arizona Maneuver Area. Training was broadened to include simulated war conditions; and by late 1943, the California-Arizona Maneuver Area extended eastward from Pomona, California, to Maricopa County, Arizona, and from Yuma northward to Boulder City, Nevada. Four Division camps were operated in Area B within Arizona, which encompasses 6,251 square miles extending north from Yuma and along the Colorado River, including Camp Bouse (occupied until April 1944) northeast of the Project area. A 1943 map indicates that a low altitude gunnery range overlapped the southwestern quadrant of the Project area, west of SR 95.

During the Cold War, the Project area was also used for 2 weeks in May 1964 as part of the Desert Strike Maneuver Area to test tactical deployment of nuclear weapons, involving more than 90,000 Army troops and 10,000 Air Force personnel. It also included 780 aircraft, 1,000 tanks, and 7,000 wheeled vehicles. Various camps, staging areas, and other military facilities were constructed over the 12 million-acre Desert Strike Maneuver Area, part of which encompasses the Project area.

3.13.4 Description of Survey Results

Four cultural properties and numerous isolates were identified. Three of the cultural properties are historic era archaeological sites (AZ L:7:30 [ASM], AZ L:12:15 [ASM], and AZ R:4:30[ASM]), and the other a prehistoric archaeological site (AZ R:4:18[ASM]). In addition, surveys identified 114 isolated finds, as well as features and artifacts associated with Cold War-era military maneuvers. The three historic sites consist of a road, a transmission line, and a trash scatter; the prehistoric site is a thermal feature and associated artifact. Cultural properties within the Project area are listed in Table 3-11.

Table 3-11 Cultural Properties within the Project Area

Site No.	Site Type	Temporal Affiliation	Site Size in Project Area	Comments
AZ R:4:30 (ASM)	Trash Scatter	Late Historic (ca. 1964)	115 × 394 feet (34,186 feet^2)	Surface trash related to 1964 Desert Strike Maneuver Area
AZ L:7:30 (ASM)	Historic Road	Late Historic–Recent (1943 to present)	30 × 5,280 ft (158,400 feet^2)	SR 95
AZ L:12:15 (ASM)	Historic Transmission Line	Late Historic–Recent (1951 to present)	100 × 10,560 ft (1,056,000 feet^2)	Parker-Gila 161-kV Transmission Line
AZ R:4:18(ASM)	Roasting Pit	Unknown Prehistoric	2 x 2 m (4m^2)	50 to 60 fire cracked rocks, ashy matrix, single burned core

3.13.4.1 NRHP-Eligible Sites in the Project Area

Site AZ R:4:18(ASM) is a prehistoric roasting pit of unknown age and a single burned core (Moreno et al. 1997). It is located approximately 100 meters north of an existing utility structure of the Parker-Gila 161-kV transmission line, approximately 7.5 miles north of the Project area. The roasting pit consists of 50 to 60 fire cracked rocks and an ashy internal soil matrix. This site has been impacted by road construction and maintenance activities, but is considered potentially eligible for listing in the NRHP. It should be monitored and avoided during construction since it has the potential to yield radiocarbon dates and macrobotanical data that would contribute to the understanding of prehistoric subsistence strategies in southwestern Arizona.

Site AZ L:7:30(ASM) is historic SR 95, which is part of the Arizona State Highway System created in 1927. SR 95, which originally extended from the U.S.-Mexico border at San Luis to Bouse, wasn't designated until the mid-1930s, and was later extended and realigned in areas. The segment within the current Project area initially was an unnumbered north-south road between Quartzsite and SR 72 that appears on a 1943 topographic map of the California-Arizona Maneuver Area; the SR 95 designation was still associated with a road heading northeast from Quartzsite to Bouse. A map, circa 1942, of the Desert Training Center does not depict the north-south road (Bischoff 2008), suggesting it was built in early 1943. By 1961, SR 95 was realigned for a more direct route between Quartzsite and Parker, and the State highway designation was reassigned to the north-south road. SR 95 currently extends from I-10 in Quartzsite north to I-40, and from the Arizona-California border near Needles to its junction with SR 68 in Bullhead City (Rayle and Fangmeier 2010). The portion of road within the Project area consists of a 30-foot wide, asphalt-paved, two-lane road, most likely constructed in the early to mid-1940s. SR 95 has been determined as eligible for listing in the NRHP for its association with the historically significant Arizona State Highway System. The portion of the site within the Project area, however, has been determined non-contributing to the overall eligibility because it is not associated with SR 95's period of significance (1927-1939) for NRHP eligibility.

3.13.4.2 **NRHP-Ineligible Properties in the Project Area**

Site AZ R:4:30(ASM) is a historic trash scatter comprising primarily ration cans, beverage cans, and glass dating to the mid-1960s. This site is presumed to be related to maneuvers associated with the Desert Strike Maneuver Area. The site was interpreted as a single dumping episode with no likely subsurface deposits, and was recommended not eligible for listing in the NRHP.

Site AZ L:12:15(ASM) is the Parker-Gila 161-kV transmission line (of which the Bouse-Kofa line is a segment) that was constructed in 1951 as part of the Parker-Davis Project. The Parker-Davis Project (administered by the U.S. Bureau of Reclamation) developed and constructed a system of dams, hydroelectric power plants, and transmission lines to generate electricity along the Colorado River and distribute it to adjacent states. Western now operates the transmission lines constructed by the Bureau of Reclamation. Archaeological Consulting Services documented a 2-mile segment of this line within the Project area. The line has been determined not eligible for listing in the NRHP due to pole replacement and lack of integrity.

3.13.4.3 **Isolated Cultural Materials in the Project Area**

The survey conducted by Archaeological Consulting Services in 2010 identified 114 isolated finds in the Project area. An isolated find (or "isolate") typically consists of one to several artifacts, and, in accordance with ASM site definition criteria and BLM guidelines, does not meet the criteria necessary to be a site (or historic property). As a result, isolates are by definition not eligible for inclusion in the NRHP. SHPO and ASM guidelines specify that these be recorded, however, and that their spatial relationship with one another be discussed. Of the 114 isolated finds, 103 are historic or modern in age, and are associated primarily with military training activities. Prehistoric isolates include two broken pots, five small clusters of ceramic sherds, and four isolates containing six or fewer stone cores or flakes.

3.13.4.4 Prehistoric Isolates

Of the 114 isolates recorded during survey, 11 isolates (totaling 94 artifacts) are potentially prehistoric materials (Table 3-12). These consist primarily of prehistoric ceramic sherds, including Colorado Red sherds dating from AD 550–1000 and Colorado Beige sherds dating from AD 500–1050. Also present are a few flakes and cores and seven Parker Red sherds dating from AD 1000–AD 1900.

The types and quantities of the artifacts are suggestive of prehistoric travel across the bajada, on which the Project area is located. It is also possible that historic military-related use of the southwest portion of the surveyed area obscured surface evidence of prehistoric use. Few prehistoric sites or isolates are within this bajada region, perhaps in part due to the aridity of the setting. Prehistorically, the Project area appears to have experienced limited use, with no surface evidence for permanent habitation.

Table 3-12 Prehistoric Isolates Located in 2010

Isolate No.	No. of Artifacts	Description	Age
9	1	Chalcedony Cortical Flake	Unknown
10	2 2	Metavolcanic Cores Metavolcanic Shatter	Unknown Unknown
15	3 2 1	Metavolcanic Cortical Flakes Metavolcanic Shatter Metavolcanic Core	Unknown Unknown Unknown
30	4	Colorado Red Sherds	AD 550-1000
54	1	Colorado Red Jar Body Sherd	AD 550-1000
55	1	Red Chert Cortical Flakes	Unknown
62	7	Parker Red on Buff Jar Body Sherds	AD 1000-1900
63	37 1	Colorado Red Jar Body Sherds Colorado Red Jar Rim Sherd	AD 550-1000 AD 550-1000
64	22	Colorado Beige Jar Body Sherds	AD 500-1050
65	5	Colorado Beige Jar Body Sherds	AD 500-1050
96	5	Colorado Beige Jar Body Sherds	AD 500-1050

Source: Rayle and Fangmeier 2010

3.13.4.5 Historic Isolates

The vast majority of isolated finds are related to historic military activities in the region, in particular the World War II-era Desert Training Center and the 1964 Desert Strike Maneuver Area. These objects include .50 caliber Browning machine gun rounds, bullets, casings, and belt links; ration cans; beverage cans; and an aircraft canopy from a post-1954 F-89D/J Scorpion. The majority of the military related items are .50 caliber Browning machine gun rounds, bullets, casings, and belt links that probably came from World War II-era low altitude fighter strafing exercises conducted in the Desert Training Center. This hypothesis is supported by the fact that the majority of these isolates were located in the western half of the survey area, which is closest (less than ¼ mile) to the Desert Training Center's Low Altitude Gunnery Range. In addition, the aforementioned helicopter reconnaissance identified more than 270 individual armored vehicle track segments (left by M113 Armored Personnel Carriers and M48 Medium tanks) associated with 1964 military operations in the Desert Strike Maneuver Area, some within the Project area. An assortment of other historic isolates not associated with military activities was also located, including bottles, tires, and General Land Office survey markers.

3.13.4.6 Special Status Cultural Resources

To assist in evaluating the potential indirect impacts of the Project to cultural resources, an additional records review was conducted within 25 miles of the Project area to identify the presence of special status cultural resources. Special status cultural resources include properties such as National Historic Landmarks; National Parks; National Monuments established for cultural resources; BLM ACEC designated to protect cultural resources; National Historic Trails; sites listed or eligible for listing in the NRHP under criterion A, B, or C; and sites developed for public visitation. The review identified eight special status cultural resources, including prehistoric, historic, and commemorative properties (Table 3-13). Each of the eight special status cultural resources is located 6 or more miles from the Project area, and it is anticipated that indirect effects to these resources would be minimal. The results of visual simulations to assess impacts to resources are discussed further in the "Visual Resources" section of the document.

Table 3-13 Special Status Cultural Resources within 25 miles of the Project area

	Site Name/Number	Description	National Register Status	Distance from Project
1	Old La Paz/Laguna de La Paz	Ruins of mining town, 1850 to 1874	listed, Criteria A and D	more than 20 miles southwest
2	Old Presbyterian (Mojave Indian) Church	Church constructed in 1917	listed, Criteria A and D	more than 20 miles northwest
3	Parker Jail	Historic jail, period of significance 1900 to 1924	listed Criterion A	more than 20 miles northwest
4	Poston Memorial Monument	Site of World War II Japanese internment camp	not listed, developed for public visitation	roughly 15 miles northwest
5	Mule Tank Discontiguous Rock Art District (CA-RIV-504 and 773)	Archaeological petroglyph sites	listed, Criteria C and D	more than 19 miles west
6	Blythe Intaglios	Prehistoric geoglyph site	listed, Criterion D; but developed for public visitation	20 miles west

Table 3-13 Special Status Cultural Resources within 25 miles of the Project area				
	Site Name/Number	**Description**	**National Register Status**	**Distance from Project**
7	Archaeological Site E-21	Prehistoric archaeological site	listed, Criteria C and D	more than 20 miles northwest
8	Fisherman Intaglio	Prehistoric geoglyph site	listed, Criterion D; but developed for public visitation	6.3 miles east

3.14 SOCIAL AND ECONOMIC CONDITIONS

This section describes the existing social and economic conditions in close proximity to the Project, as well as the ROI that includes portions of La Paz, Yuma, Mohave, and Maricopa counties in Arizona and the City of Blythe, California.

The social profile functions as the baseline and existing environment setting; it focuses on the demographics, social trends, and groups, and their attitudes that comprise the host environment or ROI.

3.14.1 Applicable Plans, Policies, and Regulations

By statute, regulation, and EO, Federal agencies must utilize social science in the preparation of informed, sustainable land use planning decisions. Section 202(c)(2) of FLPMA requires the BLM to integrate physical, biological, economic, and other sciences in land use plans (43 USC 1712(c)(2)). In addition, FLPMA regulations 43 CFR 1610.4-3 and 1610.4-6 also require the BLM to analyze social, economic, and institutional information. Section 102(2)(A) of NEPA requires Federal agencies to "insure [sic] the integrated use of the natural and social sciences...in planning and decision making" (42 USC 4332(2)(A)).

3.14.2 Data Collection and Methods

The socioeconomic setting around the Project area and ROI is described in this section. This analysis includes towns, cities, and counties within the ROI that could influence or contribute to the development of the Project. The ROI was developed with an overall consideration of areas that would most likely be directly impacted by the Project, or experiencing the traffic of equipment and materials flowing onto the Project area.

The ROI is bounded by La Paz, Yuma, Mohave, and Maricopa counties, and includes the City of Blythe, California. Riverside County is not considered to be within the ROI because a large majority of its population is located in the western portion of the county. Therefore, discussing Riverside County in detail would not provide an accurate picture of Blythe's social and economic conditions. If comparable data and information were available, an effort was made to discuss Blythe along with La Paz, Yuma, Mohave, and Maricopa counties. In some cases, Riverside County is discussed when comparable Blythe data is unavailable and should be cautioned as certain data may not be representative of Blythe. This is due to the fact that the City of Blythe makes up a very small portion of Riverside County's total population.

The ROI includes the towns of Quartzsite and Parker and the unincorporated communities of Bouse and Ehrenberg. Other communities within the ROI that may provide resident workers for construction include the City of Yuma and Lake Havasu City, Arizona, and Blythe, California, which is located 26 miles to the west. Due to its distance from the Project area (approximately 80 miles), the City of Yuma is discussed within the context of Yuma County.

As mentioned previously, the primary counties within the ROI that will be addressed include La Paz (site of the Project), Yuma, Mohave, and Maricopa. These counties will be referred to individually and collectively as the multiple-county region. Table 3-14 represents a breakdown of the areas within the ROI that will be discussed in this section.

Table 3-14 Levels of Analysis and Discussion

Cities and Towns	Counties	States	Country
Quartzsite*	La Paz*	Arizona	United States
Bouse*Parker*	Mohave*	California	
Parker*	Yuma*		
Ehrenberg*	Maricopa*		
Lake Havasu City*	Riverside (CA)		
Blythe (CA)*			
*City, town, or county is within the Socioeconomic ROI			

The following sections address population, housing characteristics, wages and employment, income, affected social groups, fiscal conditions, and public services and utilities. As a means to bring further clarification to socioeconomic conditions, special attention is given to existing data for the cities and towns within the ROI. Adopted planning documents and sources such as the U.S. Census Bureau, Arizona Department of Commerce (ADC), U.S. Bureau of Labor Statistics, and personal communication provided data and background information for this section.

3.14.3 Existing Conditions

3.14.3.1 Population

The population in Quartzsite was approximately 3,466 in 2009, having grown by an estimated 3.3 percent since 2000. La Paz County's population was estimated at 20,012 in 2009, and only experienced 0.37 percent growth per year over the 9-year period. Growth rates for Quartzsite and La Paz County can be described as flat between 2000 and 2009. Parker, Arizona, located in northern La Paz County, was estimated to have a negative population growth of 20 residents (-0.6 percent) during the 9-year period. Although permanent resident populations in Quartzsite are low, the town benefits from approximately 1.5 million visitors per year (ADC 2009a). More than 50 trailer and mobile home parks in Quartzsite provide short- and long-term housing to visitors. According to the Quartzsite Chief of Police, winter populations reach approximately 100,000 (personal communication, Jeff Gilbert 2010).

Blythe, California, the second closest city to the Project area, experienced the fastest rate of overall and annual growth of any nearby city between 2000 and 2009 (75.4 percent and 8.38 percent per year, respectively). Riverside County, in which Blythe is located, grew by 37.5 percent (4.17 percent annually) between 2000 and 2009 to more than 2.1 million. Maricopa County, the most populous county within proximity of the Project, had a population estimated to be 4 million in 2009. Table 3-15 represents population estimates and growth for towns and cities, counties, and states within and near the ROI.

Table 3-15 Population Estimates and Growth

Location*	2000	2009	Percent Change (2000-2009)	Percent Annualized Growth
Towns and Cities				
Quartzsite	3,354	3,466	3.3	0.37
Bouse	615	N/A	N/A	N/A
Ehrenberg	1,357	N/A	N/A	N/A
Parker	3,140	3,120	-0.6	-0.07
Lake Havasu City	41,938	55,657	32.7	3.63
Blythe (CA)	12,155	21,322	75.4	8.38
Counties				
La Paz	19,715	20,012	1.5	0.17
Mohave	155,032	194,825	25.7	2.85
Yuma	160,026	196,972	23.1	2.57
Maricopa	3,072,149	4,023,331	31.0	3.44
Riverside (CA)	1,545,387	2,125,440	37.5	4.17
States				
Arizona	5,130,632	6,595,778	28.6	3.17
California	33,871,648	36,961,664	9.1	1.01

Source: U.S. Census Bureau 2010a

*Note: all locations are located in Arizona unless otherwise specified; CA= California

Despite slow growth between 2000 and 2009, La Paz County is expected to grow by 42.4 percent between 2009 and 2030 (ADC 2006). Surrounding Arizona counties are expected to grow at a much higher rate during this time: approximately 98 percent, 113 percent, and 102 percent in Yuma, Mohave, and Maricopa counties, respectively. These growth rates may be slightly exaggerated due to the use of 2005 baseline data; however, Arizona is predicted to continue to grow at high rates well into the future.

Between 2000 and 2009, Arizona's estimated growth was 28.6 percent, while California grew by 9.1 percent. According to the Blythe, California General Plan (City of Blythe 2007), the city is expected to expand to 38,473 residents by 2030 (55.7 percent growth from 2009). Table 3-16 depicts population projections and growth rates for the ROI.

The age of a population is an indicator of growth and potential for economic success. The younger the population, the more prepared the community will be to attract and retain economic opportunities. Quartzsite had an estimated median age of 66.5 in 2000 (U.S. Census Bureau 2000). The nearby unincorporated Town of Bouse was similar, with an estimated median age of 65.4 in 2000. Parker, a town of approximately 3,140 in 2000, had a much younger population than Quartzsite and Bouse, with a median age of 32.4. The median age estimates for 2000 in these communities brings further clarification to La Paz County's flat population growth.

Table 3-16 County Population Projections and Growth

Location	2009	2020	2030	Percentage Growth (2009 to 2030)
La Paz County*	19,715	25,487	28,074	42.4
Yuma County*	160,026	271,361	316,158	97.6
Mohave County*	155,032	281,668	330,581	113.2
Maricopa County*	3,072,149	5,276,074	6,207,980	102.1
Blythe (CA)**	21,322	28,640	38,473	55.7

Source: ADC 2006; City of Blythe 2007
*Projections based on 2005 baseline data
**Projections based on 2007 baseline data

In 2008, the estimated median age in La Paz County was 50.4 years, which is 15.5, 7.8, 16.5, and 13.7 years greater than median ages in Yuma County, Mohave County, Maricopa County, and the United States, respectively. More than 50 percent of the populations in Quartzsite and Bouse are over the age of 65. Age data for towns, cities, counties, states, and the United States for the years 2000 and 2008 are included in Table 3-17. Due to unavailable data, age data for Quartzsite, Bouse, and Parker are presented for the year 2000. All other data is present for the year 2008.

Based on 2000 and 2008 U.S. Census data, the nearest communities with a favorable working aged population are Parker, Arizona (approximately 21 miles from the Project area), and Blythe, California (approximately 26 miles from the Project area). However, given the current state of the economy, construction workers from Yuma, Mohave, and Maricopa counties and beyond could also temporarily or permanently relocate to Quartzsite to pursue work.

Table 3-17 Age Data (2008)			
Location	**Percentage 18 Years and Older**	**Percentage 65 Years and Older**	**Estimated Median Age**
Towns and Cities			
Quartzsite (2000)	94.3	54.9	66.5
Bouse (2000)	90.2	51.4	65.4
Parker (2000)	67.2	9.4	32.4
Lake Havasu City	79.2	24.1	45.9
Blythe (CA)	80.7	6.3	32.4
Counties			
La Paz	81.6	32.0	50.4
Yuma	71.5	18.4	34.9
Mohave	77.8	21.1	42.6
Maricopa	72.6	11.2	33.9
State			
Arizona	73.7	13.0	35.0
California	74.3	11.0	34.7
Country			
United States	75.5	12.6	36.7
Source: U.S. Census Bureau 2000; U.S. Census Bureau 2010b			

3.14.3.2 Housing Characteristics

The percentage of owner-occupied housing units in Quartzsite and Bouse is noticeably higher (89.1 and 88.1, respectively), compared to other counties and surrounding communities. Housing occupancy and costs of homes within the ROI are provided in Table 3-18. These high percentages of ownership are likely due to age of the population and the typical affordability of housing in rural areas. The median mortgage of an owner-occupied unit in Quartzsite and Bouse is $941 and $905, respectively. Despite a similar median mortgage rate ($922) in Parker, the percentage of owner-occupied units is much less than Quartzsite or Bouse, at approximately 66.3 percent. The median owner-occupied home value in Quartzsite, Bouse, and Parker ranged from $96,400 to $109,700 in 2000 (U.S. Census Bureau 2000). In Blythe, only half of all occupied units were estimated to be owner-occupied in 2008.

Table 3-18 Housing Occupancy and Costs (2008)					
Location	**Percentage Owner-Occupied Units**	**Median Mortgage (Owner-Occupied)**	**Percentage Renter-Occupied Units**	**Average Rent (Renter-Occupied)**	**Estimated Owner-Occupied Value**
Towns and Cities					
Quartzsite (2000*)	89.1	$941	10.9	$439	$105,700
Bouse (2000*)	88.1	$905	11.9	$425	$96,400
Parker (2000*)	66.3	$922	33.7	$629	$109,700
Lake Havasu City	71.6	$1,397	28.4	$841	$254,500
Blythe (CA)	50.3	$1,424	49.7	$652	$193,500
Counties					
La Paz	75.9	$866	24.1	$573	$95,300
Yuma	70.1	$1,156	29.9	$693	$147,400
Mohave	69	$1,191	31	$812	$191,500
Maricopa	68.1	$1,611	31.9	$911	$263,600
Source: U.S. Census Bureau 2010c ; U.S. Census Bureau 2010d *Dollar values adjusted for inflation to 2008 values using U.S. Bureau of Labor Statistics Inflation Calculator (U.S. Bureau of Labor Statistics 2010a)					

The number of vacant housing units in Quartzsite and Bouse was approximately 41.9 percent and 43.1 percent in 2000, respectively. These vacancy rates were representative of La Paz County, which was estimated to have a vacancy rate of 44.7 percent or 6,771 units in 2000. The high vacancy rates experienced in La Paz County are indicative of a tourism-based economy; La Paz County experiences a high number of visitors during the winter months. In 2000, 79.2 percent of vacant housing units in Quartzsite were for seasonal uses, meaning that only approximately 236 vacant units (or 20.2 percent) were available for year-round uses (Town of Quartzsite 2003). Parker was only estimated to have 93 vacant units (8 percent) in 2000. Parker's low vacancy rates can be attributed to a large year-round workforce, which was approximately 2.3 times the size of Quartzsite's in 2008 (ADC 2009a).

Between 2000 and 2008, Quartzsite's vacant housing units were estimated to decrease to 36.1 percent. If 72.9 percent of vacant housing units were to remain for seasonal uses (as in 2000), approximately 247 units would be available for year-round use, an increase of just 11 units from 2000. This suggests that many of these homes will be vacant during the summer and off-peak travel months and not available to those looking for housing. According to Nora Yackley (Planning and Zoning Administrator, Town of Quartzsite), a shortage of rental housing units often occurs during the peak months; however, some availability at RV and trailer parks in the area can be found during this time (personal communication, Nora Yackley 2010). Vacant housing data for the communities and counties near the Project area are included in Table 3-19.

In addition to occupancy, the type of housing stock that exists in a community is an important indicator of whether or not certain types of population growth can be accommodated. La Paz County's housing stock is made up of mostly mobile home units, estimated to be 54.3 percent in 2000. Housing units in Quartzsite and Bouse are primarily mobile home units; 56.2 percent and 59.9 percent, respectively. RVs represent the second highest number of housing units in Quartzsite, making up nearly 25 percent of all units in the Town. The high number of RVs in Quartzsite poses an interesting scenario for the allocation of Town resources because these residents have the ability to move their entire living quarters from place to place, both within the Town of Quartzsite and throughout the region.

Table 3-19 Vacant Housing

Location	2000 Number of Units	2000 Vacant Units	2000 Percent Vacant	2008 Number of Units	2008 Vacant Units	2008 Percent Vacant
Towns and Cities						
Quartzsite	3,186	1,336	41.9	3,292*	1,188*	36.1*
Bouse	562	242	43.1	N/A	N/A	N/A
Parker	1,157	93	8.0	N/A	N/A	N/A
Lake Havasu City	23,018	5,107	22.2	30,967	8,909	28.8
Blythe (CA)	4,891	788	16.1	5,520	1,267	23.0
Counties						
La Paz County	15,133	6,771	44.7	15,663	6,029	38.5
Yuma County	74,140	20,292	27.4	86,582	17,150	19.8
Mohave County	80,062	17,253	21.5	100,644	25,634	25.5
Maricopa County	1,250,231	117,345	9.4	1,536,471	198,423	12.9

Source: U.S. Census Bureau 2010e

*Note: These are 2009 projections. The population per housing units from 2000 (3,354 population/3,186 housing units= 1.05 people/housing units) were carried forward to calculate the number of housing units in Quartzsite in 2009 (assuming a 2009 population of 3,466). The 2009 percentage of vacant units was then calculated using a ratio between Quartzsite and La Paz County vacancy percentages in 2000 (41.9%/44.7%= 0.93); therefore, the percentage of vacant units was 0.93 x 38.5% or 36.1%.

The percentage of multiple family housing such as apartments (structures with 10 to 19 units and 20 or more units) were very low in Quartzsite, Bouse, and La Paz County, suggesting that those living on modest means may not be able to find the appropriate type of housing to meet their lifestyle. Higher-density living offered by apartments often equates to lower living costs and close proximity to nearby amenities such as grocery stores, medical care, and other services crucial to special needs groups. A breakdown of housing types in Arizona counties and surrounding area is represented in Table 3-20.

Table 3-20 Types of Housing (2000 and 2008)

Units within Housing Structures	Quartzsite (2000) (% of total)	Bouse (2000) (% of total)	Parker (2000) (% of total)	Lake Havasu City (2008) (% of total)	Blythe (CA) (2008) (% of total)	La Paz County (2000) (% of total)	Yuma County (2008) (% of total)	Mohave County (2008) (% of total)	Maricopa County (2008) (% of total)
1 unit, detached	551 (17.3%)	260 (33.9%)	878 (75.9%)	23,953 (77.4%)	3,077 (55.7%)	4,628 (30.6%)	40,929 (47.3%)	59,316 (58.9%)	989,314 (64.4%)
1 unit, attached	19 (0.6%)	2 (0.3%)	28 (2.4%)	1,256 (4.1%)	158 (2.9%)	145 (1.0%)	2,695 (3.1%)	2,460 (2.4%)	84,937 (5.5%)
2 units	5 (0.2%)	0 (0%)	7 (0.6%)	1,104 (3.6%)	195 (3.5%)	59 (0.4%)	1,227 (1.4%)	1,594 (1.6%)	20,564 (1.3%)
3 or 4 units	15 (0.5%)	0 (0%)	23 (2.0%)	1,298 (4.2%)	548 (9.9%)	50 (0.3%)	2,033 (2.3%)	2,851 (2.8%)	59,588 (3.9%)
5 to 9 units	0 (0%)	0 (0%)	45 (3.9%)	493 (1.6%)	384 (7.0%)	223 (1.5%)	3,190 (3.7%)	1,738 (1.7%)	84,869 (5.5%)
10 to 19 units	5 (0.2%)	0 (0%)	41 (3.5%)	850 (2.7%)	286 (5.2%)	60 (0.4%)	2,176 (2.5%)	2,036 (2.0%)	102,329 (6.7%)
20 or more units	5 (0.2%)	0 (0%)	47 (4.1%)	997 (3.2%)	171 (3.1%)	125 (0.8%)	2,506 (2.9%)	2,116 (2.1%)	108,550 (7.1%)
Mobile home	1,794 (56.2%)	460 (59.9%)	76 (6.6%)	1,016 (3.3%)	701 (12.7%)	8,210 (54.3%)	28,116 (32.5%)	27,672 (27.5%)	83,461 (5.4%)
Boat, RV, van, etc.	799 (25.0%)	46 (6%)	12 (1.0%)	0 (0%)	0 (0%)	1,633 (10.8%)	3,710 (4.3%)	861 (0.9%)	2,859 (0.2%)
Total housing units	**3,193**	**768**	**1,157**	**30,967**	**5,520**	**15,133**	**86,582**	**100,644**	**1,536,471**

Source: U.S. Census Bureau 2000; U.S. Census Bureau 2010f

The number of lodging and RV trailer parks can be useful in determining how much housing is available for temporary and permanent workers. While most of the RV and trailer parks are only seasonal, Al Johnson (Town of Quartzsite, Certified Building Official) stated that owners in Quartzsite are interested in renting their facilities to temporary construction workers year round (personal communication, Al Johnson 2010). Currently, there is only one hotel in Quartzsite, with a capacity of 22 rooms. The number of RV and trailer parks within and just outside the Town of Quartzsite total between 50 and 70. Capacities for these parks vary greatly throughout the year, with 11 parks offering more than 100 spaces and 35 parks offering less than 100 spaces.

Parker, which is approximately 21 miles from the Project area, has 30 RV parks and campsites and 532 hotel and motel rooms (ADC 2009a). Bouse has capacity for roughly 600 winter visitors in its RV and trailer parks, and has 10 hotel/motel rooms available. Blythe and Ehrenberg are also viable options for temporary housing, with 24 hotels (1,370 rooms) within approximately 26 miles of the Project area. Table 3-21 lists lodging and RV/Trailer Parks within the ROI.

Table 3-21 Lodging and RV/Trailer Parks

City or Town	Approximate Distance from Project area	Number of RV/Trailer Parks	Capacity of Trailer Parks	Number of Hotels and Motels	Number of Hotel and Motel Rooms
Quartzsite	10	50-70***	***	1	22
Bouse	11	N/A	600**	1	10
Parker*	21	10	N/A	12	532
Ehrenberg	23	3	N/A	1	120
Blythe (CA)	26	20	N/A	22	1,250

Source: ADC 2009a; Blythe Chamber of Commerce 2010; Parker Area Tourism Committee 2010; RV Toads 2010; Personal Communication, Cindy Harvard 2010

*Information for Arizona side of the state line only

** Number of people

***There are approximately 50 businesses holding licenses for RV and Trailer Parks within Town limits; 35 have fewer than 100 spaces; 11 have more than 100 spaces (data for remaining four is unavailable). The estimate of 70 includes Parks that may be just outside of Town limits.

3.14.3.3 Employment and Wages

According to the ADC (2008), Quartzsite's economy provided an estimated 601 jobs in 2004; approximately 146 jobs per 1,000 residents. The number of jobs per 1,000 residents ranked among the lowest quartile of 83 incorporated towns and cities in Arizona, which was 67 to 70 percent less than the National and State averages (*ibid*). The top employment sectors in Quartzsite included accommodation and food services, retail trade, and government, employing approximately 521 workers or 87 percent of the workforce. Dependence on accommodation and food services and retail trade industries is typical of tourism-based economies. Table 3-22 includes the number of establishments and employment numbers for the Town of Quartzsite in 2004.

Total employment in Blythe, California was approximately 5,572 in 2007 (City of Blythe Planning Department 2007). Top employment industries included public administration

(23.5 percent), education/health/social services (15.7 percent), retail trade (11.7 percent), entertainment/recreation/accommodation/food services (9.7 percent), and agriculture (8.7 percent). Retail trade and entertainment/recreation/accommodation/food employment in Blythe combined to make up approximately 21.4 percent of the city's total jobs. In Quartzsite, these sectors combined to make up nearly 66 percent of local employment (Table 3-22). These numbers indicate that Blythe's economy is more diverse than Quartzsite's, and is far less susceptible to fluctuations in the tourism industry. Employment by sector for Blythe is provided in Table 3-23.

Table 3-22 Quartzsite Employment by Sector (2004)

Sector	Number of Establishments	Number Employed	Percentage Total Employed
Agriculture	0	0	0
Mining	0	0	0
Utilities	0	0	0
Construction	2	8	1.3%
Manufacturing	1	2	0.3%
Wholesale Trade	1	7	1.2%
Retail Trade	16	183	30.4%
Transportation and Warehousing	1	2	0.3%
Information	3	21	3.5%
Finance and Insurance	0	0	0
Real Estate and Rental and Leasing	1	2	0.3%
Professional, Scientific, and Technical Services	0	0	0
Management of Companies and Enterprises	0	0	0
Administrative, Support, Waste Management, and Remediation Services	1	2	0.3%
Educational Services	0	0	0
Health Care and Social Assistance	4	30	5.0%
Arts, Entertainment, and Recreation	0	0	0
Accommodation and Food Services	17	213	35.4%
Other Services (except Public Administration)	4	7	1.2%
Total, Non-agricultural Private Sector	**51**	**477**	**79.2**%
Government	6	125	20.8%
Total	**57**	**602**	**100.0**%

Source: ADC 2008

Data based on zip codes 85346 and 85359

Table 3-23 Blythe (CA) Employment by Sector (2004)		
Sector	**Number Employed**	**Percentage Total Employed**
Agriculture	485	8.7%
Construction	237	4.3%
Manufacturing	183	3.3%
Wholesale trade	231	4.1%
Retail trade	654	11.7%
Transportation/warehousing/utilities	303	5.4%
Information	36	0.6%
Finance/insurance/real estate	151	2.7%
Professional	209	3.8%
Education/health/social services	876	15.7%
Entertainment/recreation/accommodation/food services	539	9.7%
Other services	360	6.5%
Public administration	1,308	23.5%
Total Employed	**5,572**	**100.0%**
Source: City of Blythe Planning Department 2007		

Identical to the top employment sector in Quartzsite (in 2004), La Paz County's top occupation was listed as "food preparation and serving-related." Food related services employed approximately 18 percent (980 workers) of La Paz County workers and paid an annual wage of roughly $16,642. This wage was similar to Yuma and Mohave wages for this occupation ($16,412 and $16,383, respectively) and slightly lower than Maricopa County and the State of Arizona ($17,852 and $17,140, respectively). In 2008, other top occupations in La Paz County included office and administrative support; sales and related services; and installation, maintenance, and repair work. Annual wages for these occupations were $24,742, $20,096, and $30,852, respectively. Construction and extraction (including trades such as electricians, plumbers, and pipefitters) employees made up only 3.6 percent (or 200 workers) of La Paz County's total employment in 2008, indicating that construction labor would most likely come from outside of the county. Construction and extraction employment in Yuma, Mohave, and Maricopa counties made up approximately 6.1 percent, 9.3 percent, and 7.1 percent, respectively. Farming, fishing, and forestry related occupations employ approximately 7,650 workers in La Paz, Yuma, and Mohave counties. The annual median construction wage in La Paz County, estimated at $35,227, was higher than each county in the multiple-county region and the State of Arizona. Overall, the median annual wage in La Paz County is $29,460, ranking higher than Yuma and Mohave counties ($24,720 and $27,757, respectively) and lower than Maricopa County and the State of Arizona ($31,588 and $30,940, respectively). Table 3-24 represents occupational employment estimates and wages for the multiple-county region and State of Arizona.

Table 3-24 Occupational Employment Estimates & Wages (2008)										
Occupation	**La Paz County**		**Yuma County**		**Mohave County**		**Maricopa County**		**State of Arizona**	
	Employment	**Annual Wages**	**Employment**	**Annual Wages**	**Employment**	**Annual Wages**	**Employment**	**Annual Wages**	**Employment**	**Annual Wages**
Management	240	$52,299	2,110	$63,189	2,180	$62,816	89,390	$79,709	126,450	$75,970
Business and Financial Operations	90	$33,188	1,670	$50,509	1,390	$45,143	96,980	$51,224	123,590	$50,960
Computer and Mathematical	20	$39,542	340	$53,113	250	$48,233	43,950	$64,149	57,490	$64,830
Architecture and Engineering	N/A	N/A	1,260	$47,935	370	$51,110	43,260	$63,342	59,860	$63,130
Life, Physical, and Social Science	N/A	N/A	280	$54,470	170	$49,632	10,550	$54,046	19,400	$51,470
Community and Social Services	10	$32,947	870	$38,845	530	$39,303	15,870	$38,040	28,470	$37,860
Legal	N/A	N/A	230	$61,293	180	$55,012	12,780	$62,447	17,550	$61,560
Education, Training, and Library	360	$32,679	3,370	$36,242	2,690	$35,303	85,320	$37,618	138,830	$37,000
Arts, Design, Entertainment, Sports, and Media	N/A	$26,742	540	$19,229	380	$30,700	19,310	$38,551	26,910	$37,280
Healthcare Practitioners and Technical	N/A	N/A	2,090	$57,371	2,940	$53,441	79,850	$55,421	121,710	$55,760
Healthcare Support	N/A	N/A	1,440	$24,454	N/A	$24,464	43,310	$25,038	67,400	$24,630
Protective Service	N/A	$26,002	2,650	$40,116	1,610	$34,910	41,360	$32,849	73,800	$35,260
Food Preparation and Serving Related	980	$16,642	4,890	$16,412	5,560	$16,383	155,980	$17,582	236,570	$17,140

Table 3-24 Occupational Employment Estimates & Wages (2008)										
Occupation	**La Paz County**		**Yuma County**		**Mohave County**		**Maricopa County**		**State of Arizona**	
	Employment	**Annual Wages**	**Employment**	**Annual Wages**	**Employment**	**Annual Wages**	**Employment**	**Annual Wages**	**Employment**	**Annual Wages**
Building and Grounds Cleaning and Maintenance	340	$19,165	2,430	$19,382	2,130	$19,974	67,510	$20,216	98,660	$20,150
Personal Care and Service	270	$18,530	660	$18,505	650	$19,855	50,180	$21,926	70,550	$21,480
Sales and Related	540	$20,096	6,220	$21,698	6,150	$21,914	205,260	$26,648	283,980	$24,930
Office and Administrative Support	680	$24,742	8,720	$26,272	8,920	$26,311	375,820	$28,852	511,290	$28,420
Farming, Fishing, and Forestry	250	$17,949	8,440	$17,694	N/A	N/A	2,800	$17,628	13,170	$17,770
Construction and Extraction	200	$35,227	3,720	$29,349	4,730	$32,912	130,150	$33,956	182,730	$33,930
Installation, Maintenance, and Repair	490	$30,852	2,890	$32,573	2,480	$33,211	68,950	$37,980	103,000	$37,580
Production	90	$24,473	2,460	$22,688	2,440	$28,414	91,560	$27,643	124,750	$27,840
Transportation and Material Moving	390	$19,679	4,030	$22,964	3,370	$24,490	105,600	$26,913	152,750	$26,370
Total Employment	**4,950**	**-**	**61,310**	**-**	**49,120**	**-**	**1,835,740**	**-**	**2,638,910**	
Annual Median Wage (all occupations)	**-**	**$26,002**	**-**	**$30,961**	**-**	**$33,211**	**-**	**$28,944**	**-**	**$29,945**
Source: ADC 2009b										

The tourism industry is crucial to the State of Arizona and the multiple-county region. In 2009, the travel related industry employed 157,210 workers in Arizona (Arizona Office of Tourism 2009). Travel spending across Arizona was estimated to be more than $16 billion and generated approximately $1 billion in taxes for the State. A significant source of income and employment in La Paz County came from travel related economic activities in 2009. Estimated travel spending from these activities totaled approximately $30 million and generated approximately $9.8 million for local and State tax coffers. Estimated county and State travel impacts are included in Table 3-25.

Table 3-25 Arizona County Travel Impacts (2009)

	Travel Spending ($millions)	Earnings ($millions)	Employment (jobs)	Local Taxes ($millions)	State Taxes ($millions)	Total Taxes ($millions)
La Paz County	$180	$30	1,290	$2.1	$7.7	$9.8
Yuma County	$577	$144	5,940	$14.4	$21.8	$36.2
Mohave County	$406	$104	4,780	$8.7	$16.9	$25.6
Maricopa County	$10,308	$2,996	84,200	$282.4	$336.4	$618.8
State of Arizona	$16,594	$4,654	157,210	$426.2	$574.8	$1,000.9

Source: Arizona Office of Tourism 2009

In 2009, unemployment in La Paz County averaged 9.1 percent, along with the State of Arizona. Yuma County had the highest rate in the State at 21.3 percent, while Maricopa County had the lowest rate among the counties in the multiple-county region, at 8.3 percent. Mohave County's unemployment rate averaged 10.4 percent. Arizona and its surrounding states have been among the hardest hit economies in the nation. Riverside County, California experienced a high unemployment rate of 13.6 percent in 2009. High unemployment rates within Arizona counties and California's Riverside County may encourage some workers to travel to other counties and states for work. Table 3-26 lists unemployment averages in the ROI.

Table 3-26 Unemployment Averages (2009)

	La Paz County	Yuma County	Mohave County	Maricopa County	Riverside County (CA)	State of Arizona
Unemployment Rate	9.1%	21.3%	10.4%	8.3%	13.6%	9.1%

Source: U.S. Bureau of Labor Statistics 2010b

3.14.3.4 Income

Two measures are most commonly used to gauge the relative prosperity of a population. The first, per capita income is calculated by taking total personal income from all sources for the region and dividing it by the total number of people living there. It is best used in comparing a large number of diverse areas, but its interpretation is sensitive to differences in family size, which can impact the size of the denominator of the measure. Table 3-27 reveals that the City of Blythe and La Paz, Yuma, and Mohave counties have a relatively low per capita income as compared to Arizona or the United States at large. Maricopa County is the only area included with a per capita income exceeding the national average, and most of the higher incomes are associated with Phoenix area residents. The higher incomes in Maricopa County likely reflect the availability of higher wage professions as well as single person households.

The second useful measure of income is median household income, which reflects the halfway point in incomes as they might be arranged from the lowest to the highest. The estimated median household income in La Paz County was $30,797 in 2008, much lower than the rest of the multiple-county region, City of Blythe, State of Arizona, and the United States. Median household income tends to be a more accurate reflection of the community than average household income, which can be skewed by rich individuals.

Table 3-27 Estimated Household and Per Capita Income (2008)

	La Paz County	Yuma County	Mohave County	Maricopa County	Blythe (CA)	State of Arizona	United States
2008 Estimated Average Household Income	$47,958	$51,268	$49,095	$75,339	$53,175	$65,507	$67,918
2008 Estimated Median Household Income	$30,797	$40,079	$37,745	$56,555	$37,937	$48,836	$50,170
2008 Estimated Per Capita Income	$22,912	$18,599	$20,060	$27,745	$12,637	$24,356	$25,933

Source: U.S. Census Bureau 2010g

3.14.3.5 Fiscal Conditions

This section addresses the general fiscal conditions of the Town of Quartzsite and La Paz County for the year 2010. During the 2010 fiscal year, the Town of Quartzsite depended on four types of funds for its operations: General Operations Fund, Special Revenue Funds, Capital Projects Fund, and the Enterprise Fund. Table 3-28 shows the actual total revenues for each fund at the end of the 2009-2010 fiscal year. Significant revenue sources for 2010 included local taxes (14.3 percent) (city sales tax), intergovernmental (11.1 percent) (State sales tax and vehicle licensing), highway user revenue fund (12.6 percent), sewer projects (22 percent), and other capital fund projects (17.4 percent). Total revenues (not including property tax) were approximately $9.1 million in 2010 (Town of Quartzsite 2010).

Table 3-28 Quartzsite Actual Revenues				
Revenue	**General Operations Fund**	**Special Revenue Funds**	**Capital Projects Fund**	**Enterprise Fund**
Local taxes	$1,297,961	-	-	-
Licenses and permits	$134,728	-	-	-
Intergovernmental	$1,006,404	-	-	-
Charges for services	$725	-	-	-
Fines and forfeits	$130,791	-	-	-
Interest on investments	$3,570	-	-	-
Miscellaneous	$56,980	$85,205	-	$20,449
Property Tax	N/A	-	-	-
Highway user revenue fund	-	$1,143,534	-	-
Local transportation assistance fund	-	$19,837	-	-
Public safety grants	-	$219,345	-	-
Municipal court funds	-	$11,451	-	-
Water projects funds*	-	-	$250,300	-
Sewer projects*	-	-	$2,000,000	-
Other capital projects funds	-	-	$1,576,759	-
Water sales (and related)	-	-	-	$574,871
Sewer sales (and related)	-	-	-	$538,937
Total Revenues	**$2,631,159**	**$1,479,372**	**$3,827,059**	**$1,134,257**

Source: Town of Quartzsite 2010
*Estimated 2010 revenues

The Town of Quartzsite's major expenditures in 2010 are reflected in Table 3-29. A large portion of Quartzsite's total expenditures went toward police services (18.5 percent), public works projects (13.8 percent), wastewater (14 percent), and water projects (19.2 percent). Expenditures totaled approximately $5.6 million in 2010; nearly $3.5 million less than its 2010 revenues of $9.1 million (Town of Quartzsite 2010).

Table 3-29 2010 Quartzsite Actual Expenditures				
Expenditures	**General Operations Fund**	**Special Revenue Fund**	**Capital Projects Fund**	**Enterprise Fund**
Police	$1,044,865	-	-	-
Legal	$127,350	-	-	-
Administrative	$236,624	-	-	-
Magistrate	$120,063	-	-	-
Planning and Zoning (including economic development)	$172,713	-	-	-
Library	$116,963	-	-	-
Parks and recreation	$180,300	-	-	-
Other	$213,868	$297,938	-	-
Public works	-	$775,380	-	-
Task force	-	$102,017	-	-
Transit authority	-	$67,908	-	-
Community Development Block Grant water project grant	-	-	$246,550	-
Road beautification	-	-	$2,375	-
ADOT signage grant	-	-	$54,666	-
Wastewater	-	-	-	$796,760
Water	-	-	-	$1,082,784
Total Expenditures	**$2,212,746**	**$1,243,243**	**$303,591**	**$1,879,544**
Source: Town of Quartzsite 2010				

In 2010, there were three major funding sources that contributed toward La Paz County's revenues: the General Operations Fund, Special Revenue Fund, and the Enterprise Fund (Table 3-30). Significant funding sources for these funds were taxes (8.5 percent) (excise and auto lieu tax), intergovernmental (22.1 percent) (Federal payments and sales tax), and the road fund (21.5 percent) (highway user revenue). Total revenues in 2010 were approximately $18.5 million (personal communication, Ava Alcaida 2010).

Table 3-30 2010 La Paz County Actual Revenues			
Revenue	**General Operations Fund**	**Special Revenue Fund**	**Enterprise Fund**
Taxes	$1,582,743	-	-
Licenses and permits	$183,692	-	-
Intergovernmental	$4,088,118	-	-
Charges for services	$430,746	-	-
Fines and forfeits	$1,335,549	-	-
Investments	$1,183	-	-
Rent, royalties, and commissions	$5,500	-	-
Miscellaneous	$135,997	-	-
Property Tax*	N/A	-	-
Road fund	-	$3,982,029	-
Health services fund	-	$196,061	-
Other special revenue funds	-	$4,885,937	-
La Paz County Golf Course	-	-	$1,692,683
Total revenues	**$7,763,528**	**$9,064,027**	**$1,692,683**
Source: personal communication, Ava Alcaida 2010 *Note: Property tax revenue was not available, this is a significant source funding			

The primary expenditures in La Paz County during the 2009-2010 fiscal year (Table 3-31) were general government (20 percent), public safety (13.6 percent), judicial and legal (12.0 percent), health and welfare (8.8 percent), and public works (14.3 percent). In all, total expenditures were approximately $24.3 million (Alcaida 2010).

Table 3-31 2010 La Paz County Actual Expenditures			
Expense	**General Operations Fund**	**Special Revenue Fund**	**Enterprise Fund**
General government	$4,927,594	-	-
Education	$126,349	-	-
Judicial and legal	$2,906,017	-	-
Health and welfare	$1,389,834	$739,475	-
Public safety	$3,285,063	-	-
Public works	-	$3,458,373	-
La Paz Park	-	$721,865	-
Other special revenue expenditures	-	$5,356,624*	-
La Paz County Golf Course	-	-	$1,341,421
Total Expenditures	**$12,634,857**	**$10,276,337**	**$1,341,421**
*Includes expenditures from approximately 90 different funds/departments, some of these funds may fit under other expense categories Source: personal communication, Ava Alcaida 2010.			

3.14.3.6 Public Services and Utilities

Emergency Services

Depending on the type and severity of an emergency, fire and medical emergency services for the Project area could come from three different organizations; the Town of Parker Volunteer Fire District, Town of Quartzsite Fire District, or River Medical Incorporated (a for-profit medical company with ambulance service located in Parker and Quartzsite) (personal communication, Justin Hess 2010). The Project area is roughly located between mileposts 119 and 122, east of SR 95. The Town of Quartzsite Fire District serves the area along SR 95 as far north as milepost 113 (approximately 6 miles south of the Project area), and is the closest fire district to the Project area. The Parker Volunteer Fire District serves the Town of Parker and 5 miles outside of the Town limits, which is approximately 15 miles north of the Project area (personal communication, John Rather 2010). The Project area does not fall within the jurisdiction of either fire district; therefore, service contracts (or individual fees) would need to be established to provide fire protection.

River Medical Incorporated covers all of La Paz County and would send ambulances from its Parker or Quartzsite locations, depending on availability (personal communication, Jason Butler 2010). The nearest hospital to the Project area is La Paz County Regional Hospital, located approximately 23 miles away in Parker.

Table 3-32 summarizes the equipment and personnel that each emergency and fire response organization has access to.

Table 3-32 Emergency Services

Service	Location	Distance from Project area	Equipment and Capabilities Summary (2010)
Parker Volunteer Fire District	1101 W. Arizona Avenue Parker, AZ 85344	23 miles north	1 emergency medical technician (EMT), 32 firefighters (Hazmat, 1st and 2nd responders), 2 fire engines (750 gallons each), 2 water tenders (2,800 and 3,000 gallons each), and a 75-foot ladder truck
Quartzsite Fire District	70 E. Tyson Street Quartzsite, AZ 85346	10 miles south	17 EMTs (including 4 advanced certified EMTs and 3 more in training), 20 firefighters (17 EMTs are also firefighters), 2 fire engines (1,000 gallons each, one with aspirated foam), 2 water tenders (2,000 gallons each, one with air foam), quick attack engine (500 gallons)
River Medical Incorporated	1001 S. Ocotillo Avenue Parker, AZ 85344	24 miles north	Parker: 4 EMTs and 4 medics typically on duty at any given time, with access to 4 ambulances
River Medical Incorporated	60 E. Noname Street Quartzsite, AZ 85346	11 miles south	Quartzsite: 2 EMTs and 2 medics typically on duty at any given time, with access to 2 ambulances on site

Source: Personal Communications, Justin Hess, Jeff Gilbert, John Rather, Jason Butler, and Lenard Thomas 2010

Law enforcement services for the Project area fall within the jurisdiction of the La Paz County Sheriff Department. Sheriff Department patrol officers for the area are based out of the Ehrenberg Substation, with one deputy and one sergeant typically patrolling the area (personal communication, Richard Epps 2010). Quartzsite police patrol up to milepost 118 which is 1 mile south of the Project area. The Quartzsite Police Department has 13 police officers on staff (11 patrol officers) based out of one substation located within Quartzsite town limits (personal communication, Jeff Gilbert 2010).

Electricity and Natural Gas

The current electricity supplier to Quartzsite and its surrounding towns is Arizona Public Service. Arizona Public Service serves more than one million customers in 11 of the State's 15 counties; this includes the towns of Bouse, Parker, and Ehrenberg. Southwest Gas Corporation provides natural gas service to Ehrenberg and Parker. In addition, numerous propane dealers and distributors are scattered throughout towns near the Project area, including Quartzsite (ADC 2009a).

Water and Wastewater

Water service comes primarily from two different sources; individual wells and the Town of Quartzsite Utility Department. Many individual wells still provide water to most of Quartzsite's residents, which means that there is no confirmation that the drinking water meets safe drinking water standards. As the Town continues to expand its Utility Department services, the assurance of cleaner water will increase.

Quartzsite currently operates two town wells with an output of approximately 400,000 to 600,000 gallons per day, serving a total of 837 water users (personal communication, Cindy Harvard 2010). The Town's water storage tank has a capacity of 1.8 million gallons. Due to its remote location, water to the Project area would come from individual onsite wells.

The Town of Quartzsite operates one wastewater treatment facility located a few miles north of the center of Town along SR 95. Currently, the Town services only 633 sewer users (personal communication, Cindy Harvard 2010). Private and collective septic tanks provide service for remaining residents. Wastewater service for the Project area would take place onsite.

Solid Waste

Solid waste disposal in the Project area, Quartzsite (and the majority of La Paz County), Blythe, and unincorporated parts of Riverside County is provided by Palo Verde Disposal Services. The nearest landfill is located approximately 8 miles north of the Project area off of SR 95, 18 miles north of Quartzsite. Disposal fees are $25.50/per ton and do not include the cost of delivery and pickup of the large trash receptacles. The delivery fee per receptacle (22 feet x 6 feet x 8 feet) is $53, and the pickup and drop off of a new receptacle is $235. If a receptacle is not picked up after 14 days, a $5 per day rental fee is charged.

Schools

There are four school districts and one public charter school located within proximity to the Project area. From an overall perspective, schools within the Quartzsite, Parker, Bouse, and Palo Verde Unified school districts are well below their estimated enrollment capacities (based on personal communication and district websites). All grade levels (kindergarten through 12) are served within a reasonable distance (approximately 35 miles) of the Project area. Table 3-33 lists basic information for each of the school districts. The current enrollment numbers and estimated capacities show that schools near the Project area have ample room to accommodate growth in the future.

Table 3-33 School Districts

District	School	Grades	Current Enrollment (2010)	Capacity	Notes
Quartzsite School District (Quartzsite, AZ)	Ehrenberg Elementary School (located in Ehrenberg, AZ)	K-8	132	N/A	Ehrenberg Elementary's enrollment is nearly at capacity in grades 3 and 4, and 5 and 6 (combined classes).
	Quartzsite Elementary School	K-8	107	N/A	Quartzsite Elementary's enrollment has been decreasing for some time, and is not expected to reach full capacity in the near future.
Public Charter School (Quartzsite, AZ)	The Scholar's Academy	7-12	112	160	Capacity of Scholar's Academy can expand beyond 160, with approval.
Bouse Elementary School District (Bouse, AZ)	Bouse Elementary	K-8	49	125	
Parker School District (Parker, AZ)	Blake Primary School	Pre-3	525	525	School is nearly at full capacity; however, students can shift to other schools if necessary.
	Le Pera Elementary School	K-8	279	400	Located 19 miles south of Parker; well under capacity.
	Parker High School	9-12	538	700	
	Wallace Elementary School	4-6	318	400	
	Wallace Junior High School	7-8	228	300	
Palo Verde Unified School District (Blythe, CA)	Head Start/Child Development Center	Preschool	153	187	
	Felix J. Appleby Elementary	K-6	559	853	
	Margaret White Elementary	K-6	742	757	
	Ruth Brown Elementary	K-5	704	725	
	Blythe Middle School	7-8	528	750	The school no longer serves grade 6, and therefore has adequate room to grow.

Table 3-33 School Districts					
District	**School**	**Grades**	**Current Enrollment (2010)**	**Capacity**	**Notes**
	Palo Verde Valley High School	9-12	944	1020	School is nearing its capacity and does not have much room to grow.
	Twin Palms High School	9-12	67	80	School has had as many as 100 students, and therefore has room to grow.
Sources: Personal Communications, Carol Fibrow, Tracy George, Betty Looper, Virginia Barber, Mary Hernandez, Rebecca Mendoza, Kevin Uden, Sharon Barnes 2010					

3.15 ENVIRONMENTAL JUSTICE

This section describes the environmental conditions in close proximity to the Project, as well as the ROI that includes all of La Paz County. The environmental justice section functions as the baseline and existing environment setting; it focuses on the locations of minority and low-income populations that comprise the ROI.

3.15.1 Applicable Plans, Policies, and Regulations

Presidential EO 12898 (1998) requires that Federal agencies address high and disproportionate environmental impacts on minority and low-income populations ("environmental justice" impacts). Environmental justice impacts would result if potentially significant and adverse environmental impacts attributable to the Project would fall disproportionately on minority or low-income populations. The first step of an environmental justice analysis involves screening the Project area to determine if potential environmental justice populations exist, and to assess the degree to which those populations might be expanding within the area. The second step is to determine whether the Project impacts would be significant, and if they would disproportionately affect any environmental justice populations.

3.15.2 Data Collection and Methods

For the purposes of accurately evaluating existing conditions relating to environmental justice, the ROI focuses on the population within La Paz County. Reference data from the 2009 U.S. Census American Community Survey is provided for each census tract within La Paz County. These data include estimates of minority and low-income populations, based on data collected between 2005 and 2009, and represent the most accurate estimates available for small populations between the 2000 and 2010 decennial censuses (U.S. Census Bureau 2010h).

3.15.3 Existing Conditions

Minority populations are described by the U.S. Census as those that are not classified as "white alone" in the 2000 Census. People of Hispanic or Latino heritage can be considered any race and therefore are not part of the total population. Table 3-34 allows for a detailed assessment of the resident population by census tract across the ROI. La Paz County is made up of approximately 25 percent minority populations. Hispanic or Latino populations made up approximately 24 percent of the County's population in 2009.

While large proportions of minority populations exist in various locations within the ROI, census tract 205 (spanning approximately 65 miles), which contains the Project area, does not represent any minority or low-income populations. In 2009, the population within this census tract was estimated to be approximately 94 percent white alone, 0.5 percent African American, 1.0 percent American Indian, 0.11 percent Asian, and 4.6 percent characterized as some other race or more than two races (U.S. Census Bureau 2010i). Approximately 3.7 percent of the population in census tract 205 considered themselves to be of Hispanic or Latino heritage. Outside of census tract 205, tracts 9402 and 9403 contained high concentrations of Hispanic or Latino (42.1 percent and 47.0 percent, respectively) and American Indian (22.4 percent and 36.2 percent, respectively) populations in 2009. The communities of Parker and Poston (approximately 21 and 40 miles from the Project area, respectively) are located in tracts 9402 and 9403, respectively. Census tract 201, which includes the communities of Salome, Wenden, and Bouse, was approximately 34.8 percent Hispanic or Latino in 2009. Figure 3-9 displays the boundaries of each census tract within La Paz County.

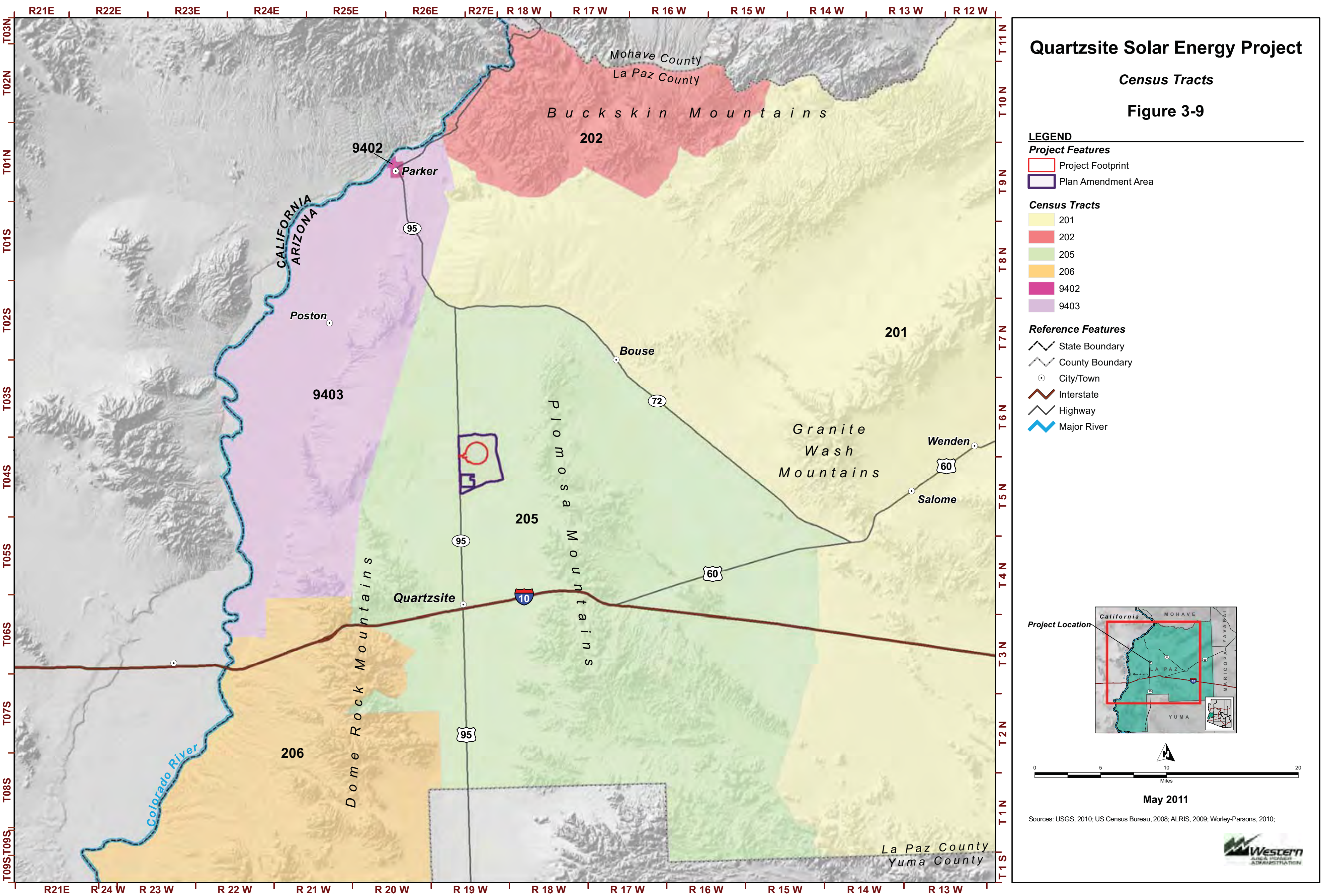
Table 3-34 Estimated 2008 Resident Population by Race

Race or Ethnicity	Census Tract 201	Census Tract 202	Census Tract 205	Census Tract 206	Census Tract 9402	Census Tract 9403	La Paz County*
White	91.34%	94.08%	93.81%	82.28%	62.61%	33.93%	**74.52%**
Black or African American	0.00%	0.27%	0.49%	0.00%	2.99%	0.37%	**0.72%**
American Indian and Alaska Native	1.80%	3.02%	0.99%	1.89%	22.42%	36.22%	**12.66%**
Asian	0.38%	0.48%	0.11%	0.00%	0.76%	0.44%	**0.38%**
Native Hawaiian and Other Pacific Islander	0.00%	0.00%	0.00%	0.00%	0.38%	0.09%	**0.08%**
Some other race	4.01%	1.60%	3.59%	11.07%	6.69%	25.47%	**9.19%**
Two or more races	2.48%	0.54%	1.01%	4.76%	4.14%	3.47%	**2.46%**
Hispanic or Latino**	34.83%	5.93%	3.70%	18.07%	42.05%	46.95%	**23.91%**

Source: U.S. Census 2010i

*Data for La Paz County is for the entire county. All other data columns are for census tracts located within La Paz County.

** Hispanic and Latino populations were considered an ethnicity and not a race category in these data. Any race can consider itself to be Hispanic or Latino; therefore, the numbers presented in each column do not total 100 percent.


Quartzsite Solar Energy Project
Census Tracts
Figure 3-9
LEGEND
Project Features
Project Footprint
Plan Amendment Area
Census Tracts
201
202
205
206
9402
9403
Reference Features
State Boundary
County Boundary
City/Town
Interstate
Highway
Major River
Project Location
California
MOHAVE
LA PAZ
YUMA
0
5
10
20
Miles
May 2011
Sources: USGS, 2010; US Census Bureau, 2008; ALRIS, 2009; Worley-Parsons, 2010;
Western
R21E
R22E
R23E
R24E
R25E
R26E
R27E
R 18 W
R 17 W
R 16 W
R 15 W
R 14 W
R 13 W
R 12 W
R21E
R 24 W
R 23 W
R 22 W
R 21 W
R 20 W
R 19 W
R 18 W
R 17 W
R 16 W
R 15 W
R 14 W
R 13 W
T03N
T02N
T01N
T01S
T02S
T03S
T04S
T05S
T06S
T07S
T08S
T09S
T09S
T 11 N
T 10 N
T 9 N
T 8 N
T 7 N
T 6 N
T 5 N
T 4 N
T 3 N
T 2 N
T 1 N
T 1 S
Mohave County
La Paz County
Buckskin Mountains
202
9402
Parker
CALIFORNIA
ARIZONA
95
Poston
Bouse
201
9403
72
Granite
Wash
Mountains
Wenden
60
Salome
Plomosa Mountains
205
95
60
Quartzsite
10
Dome Rock Mountains
95
206
Colorado River
La Paz County
Yuma County

A common measure of the absence of income is whether a population meets the Federal definitions for poverty. La Paz County had an estimated 19.7 percent of the population living below the poverty level in 2009. The greatest percentage of low-income individuals were found in census tracts 201 and 9403 (25.8 percent and 35.8 percent, respectively), encompassing the small communities of Poston, Salome, Wenden, and Bouse (Table 3-35). The distances of these communities from the Project area are approximately 21, 40, 45, and 11 miles, respectively. However, despite a high percentage of low-income families across La Paz County, the census tract encompassing the Project area (census tract 205) had the second lowest percentage of low-income individuals in the County, estimated to be 11.34 percent of the population in 2009 (U.S. Census Bureau 2010i).

Table 3-35 Estimated Population Below the Poverty Level

Census Tract 201	**Census Tract 202**	**Census Tract 205**	**Census Tract 206**	**Census Tract 9402**	**Census Tract 9403**	**La Paz County***
25.76%	15.74%	11.34%	10.33%	12.80%	35.77%	**19.71%**

Source: U.S. Census Bureau 2010i

*Data for La Paz County is for the entire county. All other data columns are for census tracts located within La Paz County.

3.16 VISUAL RESOURCES

This section focuses on the inventory of existing visual resources potentially affected by the construction, operation, and maintenance of the Project.

3.16.1 Regional Setting

The Project area is located within the Sonoran Desert section of the Basin and Range Province. The Basin and Range Province is distinguished by isolated, roughly parallel mountain ranges separated by closed desert basins (Fennemen 1931). Mountain ranges trend north to south, with distinctive alluvial areas at their bases (also known as *bajadas*). The Project area is located on sandy soils that are due to eolian processes. The vegetation community that is associated with the Project area is the Lower Colorado River Valley, as characterized by dominant stands of low-growing desertscrub (primarily creosote bush) and occurrences of Ocotillo in the plains, and cholla and saguaros found sporadically on the rocky hills and mountains (Brown and Lowe 1994). In addition to creosote and ocotillo, the sandy soils of the Project area have a dense covering of the invasive Asian mustard.

The Project area is located in the La Posa Plain (elevation approximately 930 feet), which is loosely surrounded by the Dome Rock Mountains (elevation approximately 3,000 feet) to the southeast, the Plomosa Mountains (elevation approximately 2,225 feet) and associated gently-sloping alluvial fans approximately 5 miles to the east and southeast, the Buckskin Mountains (elevation approximately 1,500 feet) to the north, and Mesquite Mountain (elevation approximately 1,800 feet) to the northwest. The La Posa Plain slopes gradually to the Parker Valley (elevation approximately 280 feet) and to the Colorado River beyond. The Big Maria Mountains (elevation approximately 3,300 feet) and Riverside Mountains (elevation approximately 2,100 feet) are west of the Colorado River and help further define the valley. The Parker Valley is approximately 12 miles to the west and heavily developed for agriculture. The

La Posa Plain is typical of a panoramic landscape in that the views are wide and sweeping, with distant views to mountains from most viewing angles.

The localized Project area is currently undeveloped; however, due to evidence of OHV use resulting in two-track roads dissecting the northern portion of the Project area, the site shows evidence of disturbance.

3.16.2 Applicable Plans, Policies, and Regulations

In keeping with the FLPMA, the BLM is required to consider scenic values of public land as a resource that merits management and preservation where appropriate—including electric power-related projects—as determined through the land use planning process. Consistent with methods based on the BLM's VRM System (Manual H-8410-1) and in consultation with YFO VRM staff, the Visual Resource Inventory (VRI) for the Project includes scenic quality, landscape sensitivity level analysis, and delineation of distance zones. Based on these three factors, VRI classes are established and become a component of the RMP, ultimately establishing the agency visual management objectives. Therefore, the VRI components of distance zones, scenic quality, and sensitivity level rating units (SLRU) and subsequent VRI classes are addressed below.

3.16.2.1 **Visual Resource Management System**

As a response to the FLPMA, the BLM devised a standard visual assessment methodology (the VRM system), with the primary objective of managing public land in a manner that will protect the quality of the scenic (visual) values of these lands (Information Bulletin No. 98-135). In this regard, the VRM system (BLM Handbook H-8410-1) provides guidance relating to the VRI methodology that the BLM implements to inventory scenic values, as well as assess potential effects based on the analysis of visual contrast. Furthermore, IM 167-2009 states that Field Offices with renewable energy projects are to have up-to-date VRI and VRM class designations.

3.16.2.2 **Visual Resources Inventory**

As mentioned above, the following resources are inventoried to establish the VRI, including scenic quality, distance zones, and visual sensitivity as described below.

Scenic Quality – Scenic quality is defined by the BLM as the measure of the visual appeal of a tract of land. Scenic quality rating units (SQRU) are delineated based on common physiographic characteristics, including visual patterns, textures, colors, variety, etc. Once the SQRUs are delineated, an evaluation occurs and each SQRU is ranked A, B, or C, based on; landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications. Cultural modifications within the landscape contribute to the overall visual character associated with a particular landscape. Cultural modifications can range from natural to completely modified based on the visual influence of transmission lines, transportation routes, and other man-made features.

Distance Zones – Distance zones represent the relative visibility of the landscape from a particular viewing location. The term *sensitive viewer* refers to sensitive viewing locations. Residences, travel routes, or recreation areas are examples of sensitive viewers that are typically affected by visual modifications to the landscape. Inventory Observation Points are thus established to represent typical viewing distances and conditions associated with sensitive viewers. Three zones have been identified by the BLM, which include foreground/middleground (0 to 5 miles), background (5 to 15 miles), and seldom-seen (areas that are not visible within the foreground-middleground and background distance zones). A viewshed analysis is performed and combined with this information to finalize the inventory of distance zones.

Visual Sensitivity – Visual sensitivity represents the measure of public concern for scenic quality of land and is associated with: type of user, amount of use, public interest, adjacent land uses, special areas (such as Wilderness Areas, ACECs, etc.), and other factors. Landscape sensitivity can range from high to moderate to low, and largely is associated with SQRUs. It is important to note that although related, the sensitivity of the landscape does not equate to sensitivity of viewers or viewing locations within that landscape. Visual sensitivity is mapped in the form of SLRUs and was provided by the BLM for the purposes of this analysis.

3.16.2.3 Visual Resource Inventory Classes

The three VRI components (scenic quality, distance zones, and visual sensitivity) were mapped individually and combined to determine VRI classes as depicted on Figure 3-10. VRI classes are categories ranging from Class I to Class IV, and are assigned to BLM lands in order to portray the relative value of visual resources and to serve as a management tool for VRM. Class I is assigned to land in which the existing landscape is to be maintained. The designations of Classes II, III, and IV are assigned to landscapes based on scenic quality, distance zones, and visual sensitivity, and are informational in nature. VRI classes do not establish management guidelines, but rather provides a basis for considering visual values in establishing the RMP.

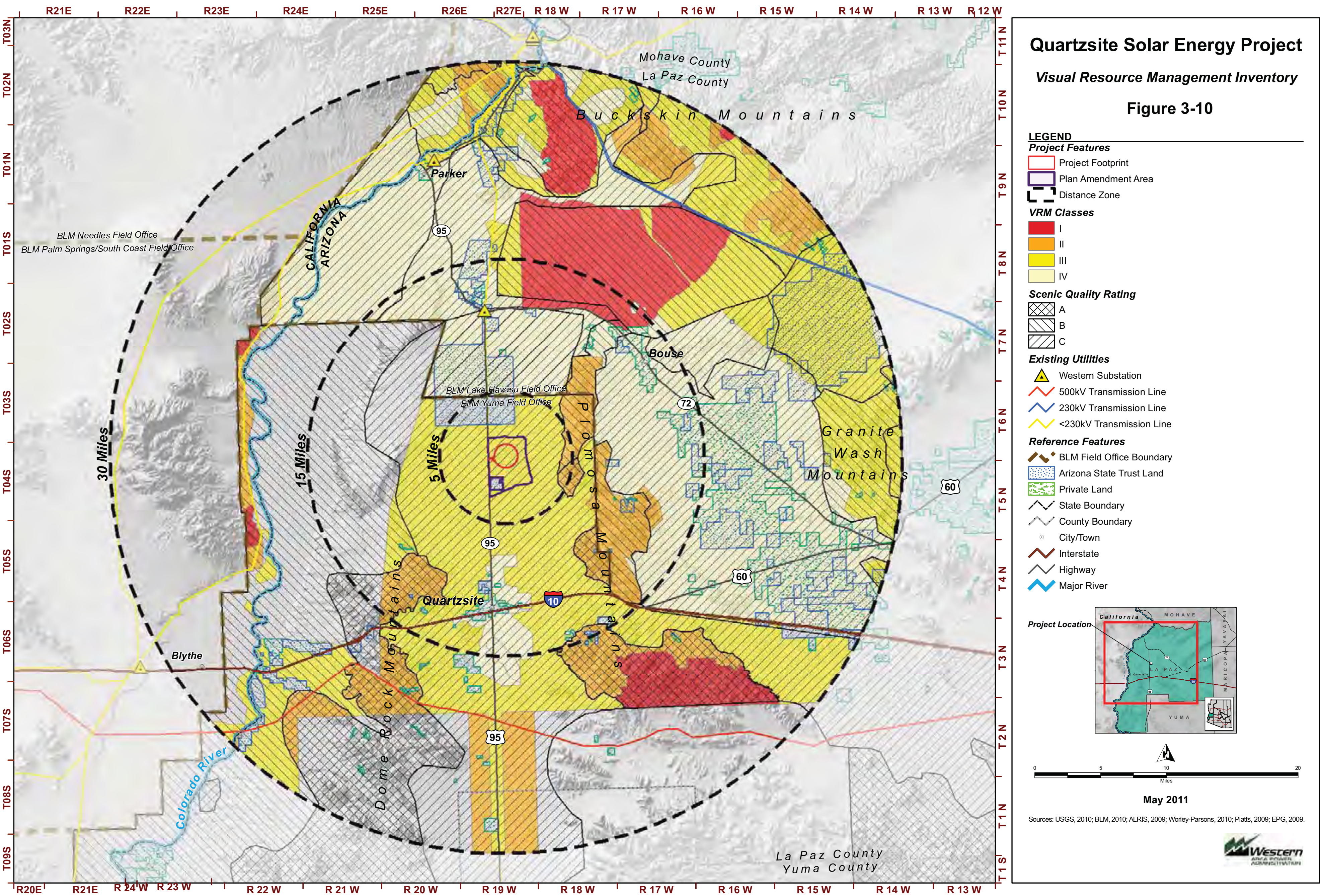
3.16.3 Visual Resource Management Classes

The VRI classes are reviewed by the BLM in context with other resource plans and objectives and considered accordingly in determining VRM classes (depicted on Figure 3-10), which range from Class I (the most restrictive) to Class IV (the least restrictive). Following are the management objectives associated with VRM Classes I-IV:

- Class I – To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. Class I designation is reserved for special areas that require maintaining a natural environment unaltered by man, such as designated Wilderness Areas, WSAs, etc

- Class II – To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements found in the predominant natural features of the characteristic landscape

- Class III – To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes must repeat the basic elements found in the predominant natural features of the characteristic landscape.



Quartzsite Solar Energy Project
Visual Resource Management Inventory
Figure 3-10
LEGEND
Project Features
Project Footprint
Plan Amendment Area
Distance Zone
VRM Classes
I
II
III
IV
Scenic Quality Rating
A
B
C
Existing Utilities
Western Substation
500kV Transmission Line
230kV Transmission Line
<230kV Transmission Line
Reference Features
BLM Field Office Boundary
Arizona State Trust Land
Private Land
State Boundary
County Boundary
City/Town
Interstate
Highway
Major River
Project Location
California
MOHAVE
LA PAZ
YUMA
MARICOPA
YAVAPAI
0
5
10
20
Miles
May 2011
Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.
Western Area Power Administration
R21E
R22E
R23E
R24E
R25E
R26E
R27E
R 18 W
R 17 W
R 16 W
R 15 W
R 14 W
R 13 W
R 12 W
T03N
T02N
T01N
T01S
T02S
T03S
T04S
T05S
T06S
T07S
T08S
T09S
T 11 N
T 10 N
T 9 N
T 8 N
T 7 N
T 6 N
T 5 N
T 4 N
T 3 N
T 2 N
T 1 N
T 1 S
R20E
R21E
R 24 W
R 23 W
R 22 W
R 21 W
R 20 W
R 19 W
R 18 W
R 17 W
R 16 W
R 15 W
R 14 W
R 13 W
Mohave County
La Paz County
Buckskin Mountains
Parker
CALIFORNIA
ARIZONA
BLM Needles Field Office
BLM Palm Springs/South Coast Field Office
Bouse
BLM Lake Havasu Field Office
BLM Yuma Field Office
Plomosa Mountains
Granite Wash Mountains
30 Miles
15 Miles
5 Miles
Quartzsite
Blythe
Dome Rock Mountains
Colorado River
La Paz County
Yuma County
95
72
60
10

- Class IV – To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

The Project area is located in a VRM Class III area.

3.16.3.1 **Methodology**

Figure 3-12 illustrates the methodology associated with the VRI and subsequent impact assessment for the Project. The inventory methods discussed below are consistent with, and adhere to, BLM Manual H-8410-1 – Visual Resource Inventory.

A viewshed analysis was conducted using GIS to assess where the Project could be visible within a 30-mile radius of the Project area. Based on consultation with BLM visual resource personnel, this 30-mile radius was determined to be the ROI and defines the visual study area as inventoried for the Project.

The GIS parameters for the viewshed analysis assumed the viewer to be 5.8 feet in height and the solar collecting tower to be 653 feet in height. This method revealed the potential viewpoints that have the highest potential to see the tallest Project feature (i.e., the solar collecting tower). Data collected within the ROI were based on reviews of aerial photographs, topographic maps, planning documents, consultation with the BLM and affected communities, and field investigations. The visibility mapping was overlaid with mapping of any potential moderate or high sensitive viewers (including residences, travel routes, recreation, and tribal viewers, as described below) to assist in determining potential Key Observation Points (KOP).

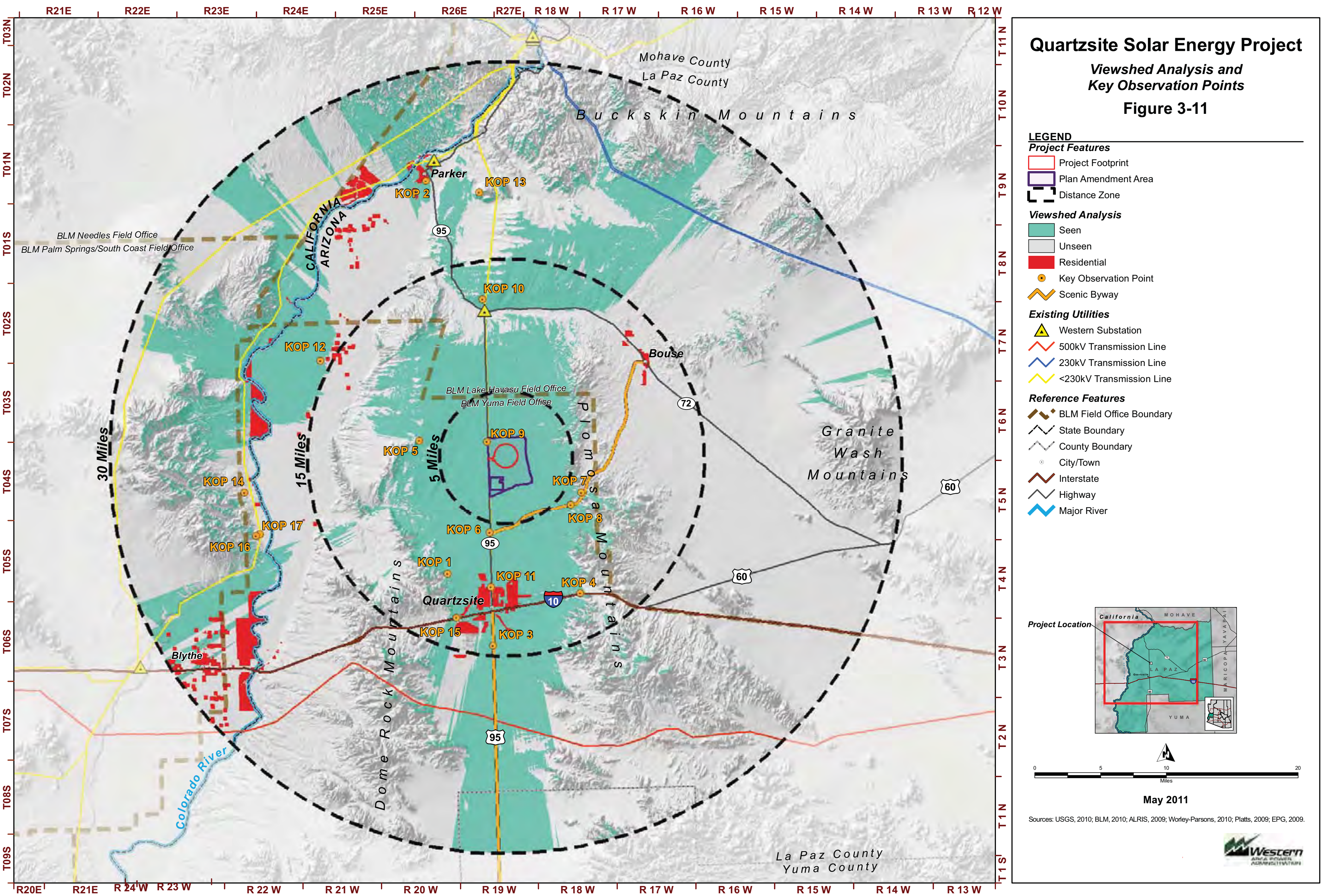
From the list of preliminary KOPs, Western and BLM representatives selected the final KOPs for the visual resource analysis. KOPs represent critical viewpoints or typical viewing conditions associated with sensitive viewers. Based on the results of the viewshed analysis, field inventory, and with direction from the BLM, 18 KOPs were selected for the visual analysis (see Table 3-36 and Figure 3-11).

Sensitive viewers within the 15-mile and 30-mile ROI were initially identified as potential KOPs. Sensitive viewers that were visually separated (screened) by topography and/or vegetation from the Project were determined to have no effect and were documented as such. A field reconnaissance was necessary to determine the degree of visibility (e.g., partial screening due to topography, etc.). Sensitive viewers were anticipated to include:

- Residences – single-family, detached structures, and permanent mobile homes or mobile home parks

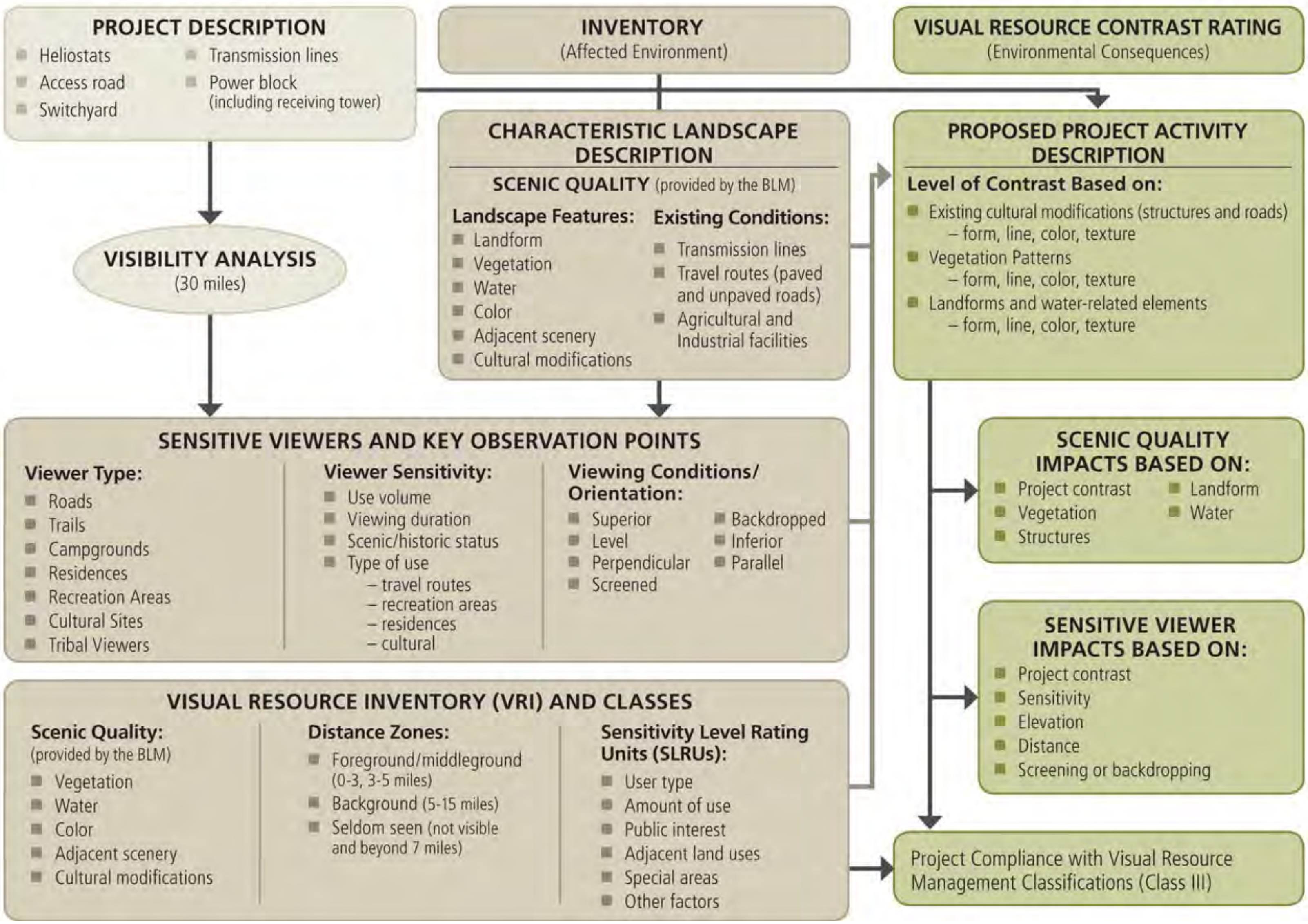
- Tribal viewers – cultural sites and landmarks important to local Native American tribes

- Travel routes – highways and roads used by origin/destination travelers, designated scenic or historic byways, and recreation destination roads (i.e., roads that provide recreation access)



Quartzsite Solar Energy Project
Viewshed Analysis and Key Observation Points
Figure 3-11
LEGEND
Project Features
Project Footprint
Plan Amendment Area
Distance Zone
Viewshed Analysis
Seen
Unseen
Residential
Key Observation Point
Scenic Byway
Existing Utilities
Western Substation
500kV Transmission Line
230kV Transmission Line
<230kV Transmission Line
Reference Features
BLM Field Office Boundary
State Boundary
County Boundary
City/Town
Interstate
Highway
Major River
Project Location
May 2011
Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.
Mohave County
La Paz County
Yuma County
Buckskin Mountains
Granite Wash Mountains
Plomosa Mountains
Dome Rock Mountains
Parker
Bouse
Quartzsite
Blythe
CALIFORNIA
ARIZONA
Colorado River
BLM Needles Field Office
BLM Palm Springs/South Coast Field Office
BLM Lake Havasu Field Office
BLM Yuma Field Office
30 Miles
15 Miles
5 Miles
KOP 1
KOP 2
KOP 3
KOP 4
KOP 5
KOP 6
KOP 7
KOP 8
KOP 9
KOP 10
KOP 11
KOP 12
KOP 13
KOP 14
KOP 15
KOP 16
KOP 17

Figure 3-12 | VISUAL RESOURCE ASSESSMENT METHODOLOGY | Quartzsite Solar Energy Project



- Recreation areas – existing recreation sites used for picnicking, camping, hiking, scenic overlooks, rest areas, or other recreational activities

For the purpose of this visual study, viewer sensitivity is defined as the degree of concern for changes to the landscape that, in the context of the Project, may range from high to moderate to low. The sensitivity rating is based on the following five criteria: (1) type of use, (2) volume of use, (3) viewing duration, (4) concern for aesthetics, and (5) scenic or historic status. Scenic or historic status may increase the amount of use and viewing duration for viewers. Note that viewer sensitivity is explicit to sensitive viewers and although related, differs from the sensitivity levels associated with the BLM's specific VRI (see Section 3.16.3 for specifics). Table 3-37 provides a list of inventoried sensitive viewers.

Table 3-36 Key Observation Points

KOP #	Description	Sensitive Viewer
KOP #1	View facing northeast from Dome Rock Mountain	Tribal
KOP #2	View facing southeast from Parker	Residential
KOP #3	View facing north from LTVA	Recreation/Other
KOP #4	View facing northwest from I-10 westbound	Travel Route
KOP #5	View facing east from Copper Peak	Tribal
KOP #6	View facing north from Plomosa Campground	Recreation/Other
KOP #7	View facing northwest from Fisherman Intaglio	Tribal
KOP #8	View facing northwest from Plomosa Back Country Byway	Travel Route
KOP #9	View facing southeast from SR 95	Travel Route
KOP #10	View facing south from SR 95/72 intersection	Recreation/Other
KOP #11	View facing north from Quartzsite	Residential
KOP #12	View facing southeast from La Pera Elementary School	Recreation/Other
KOP #13	View facing south from Black Peak	Tribal
KOP #14	View facing east from Blythe Intaglios	Recreation/Tribal
KOP #15	View facing northeast from I-10 eastbound	Travel Route
KOP #16	View facing east from Black Point	Recreation/Tribal
KOP #17	View facing east from Big Maria Mountains	Recreation/Tribal
KOP #18	La Paz County Regional Hospital / Parker Residential	Community Facility / Residential

Table 3-37 Sensitive Viewers										
	Sensitivity					**Visibility**				
Sensitive Viewer	**Use Duration**	**Use Volume**	**Aesthetic Concern**	**Scenic/ Historic**	**Overall Sensitivity**	**KOP**	**Sim**	**Distance Zone**	**Seen**	**Screening**
Residents/Communities										
Quartzsite	High	High	High		High	KOP 11	Y	Background	Yes	Partial (topography, vegetation)
Parker	High	High	High		High	KOP 2	Y	Background	Yes	Partial (topography, vegetation)
Bouse	High	High	High		no views	N	N	Background	No	Complete
Tribal Viewers										
Black Point	Moderate	Moderate	High		High	KOP 16	Y	Background	No	Complete
Copper Peak	Moderate	Low	High		High	KOP 5	Y	Background	Yes	Unobstructed
Black Peak	Moderate	Moderate	High		High	KOP 13	Y	Background	Yes	Unobstructed
Dome Rock Mountains	Moderate	Low	High		High	KOP 1	Y	Background	Yes	Unobstructed
Fisherman Intaglio	Moderate	Moderate	High		High	KOP 7	Y	Background	Yes	Partial (topography)
Big Maria Mountains	Moderate	Moderate	Moderate		Moderate	KOP 17	Y	Background	Yes	Mostly complete
Blythe Intaglios	Moderate	Low	Moderate		High	KOP 14	N	Background	No	Complete

Table 3-37 Sensitive Viewers

Sensitive Viewer	Sensitivity					Visibility				
	Use Duration	Use Volume	Aesthetic Concern	Scenic/ Historic	Overall Sensitivity	KOP	Sim	Distance Zone	Seen	Screening
Travel Routes										
Plomosa Back Country Byway	Moderate	Moderate	High	Scenic	High	VP 8	N	MG/BG	Yes	Partial (topography, vegetation)
I-10 – westbound	Short	High	Moderate		Moderate	KOP 4	Y	Background	Yes	Partial (topography, vegetation)
I-10 – eastbound	Short	High	Moderate		Moderate	KOP 15	N	Background	Yes	Partial (topography, vegetation)
SR 95	Short	Moderate	Moderate		Moderate	KOP 9	Y	Foreground	Yes	Unobstructed
US 95 – south of I-10	Short	Moderate	High	Scenic	High	KOP 3	N	Background	Yes	Partial (topography, vegetation)
SR 95/72 (east of Parker)	Short	Moderate	Moderate		Moderate	KOP 10	N	Background	Yes	Partial (topography, vegetation)
US 95 (California, paralleling the Colorado River)	Short	Moderate	Moderate		Moderate	N	N	Background	Yes	Partial (topography, vegetation)
Recreation Areas										
Plomosa Camp	Moderate	Moderate	Moderate		Moderate	KOP 6	Y	Background	Yes	Partial (topography, vegetation)
Buckskin Mountain State park	Moderate	Moderate	Moderate		Moderate	N	N	Background	No	Complete
Bluewater Marina – Parker	Moderate	Moderate	Moderate		Moderate	N	N	Background	No	Complete
Lost Lake Resort	Moderate	Moderate	Moderate		Moderate	N	N	Background	No	Complete
Veterans Memorial Freedom Garden (nearest park in Quartzsite)	Moderate	Moderate	Moderate		Moderate	N	N	Background	Yes	Partial (topography, vegetation)

Table 3-37 Sensitive Viewers										
	Sensitivity					**Visibility**				
Sensitive Viewer	**Use Duration**	**Use Volume**	**Aesthetic Concern**	**Scenic/ Historic**	**Overall Sensitivity**	**KOP**	**Sim**	**Distance Zone**	**Seen**	**Screening**
City Park (nearest park in Parker)	Moderate	Moderate	Moderate		Moderate	N	N	Background	Yes	Partial (topography, vegetation, development)
LTVA South	Long	High	Moderate		Moderate	KOP 3	N	Background	Yes	Partial (topography, vegetation, development)
Poston Japanese Internment Camp Memorial	Moderate	Moderate	Moderate		Moderate	N	N	Background	Yes	Partial (topography, vegetation)
Cactus Plain WSA	Long	Low	High		High	N	N	Background	Yes	Partial (topography)
Gibraltar Mountain Wilderness	Long	Low	High		High	N	N	Background	Yes	Partial (topography)
New Water Mountains Wilderness	Long	Low	High		High	N	N	Background	Yes	Partial (topography)
Kofa Wilderness	Long	Moderate	High		High	N	N	Background	Yes	Partial (topography)
Community Facilities										
Churches (First Assembly Church of God, Quartzsite, is closest)	Moderate	Moderate	Moderate		Moderate	N	N	Background	Yes	Partial (topography, vegetation, development)
Parker Unified School (and sports fields)	Moderate	High	Moderate		Moderate	N	N	Background	Yes	Partial (topography, vegetation, development)
Parker Cemetery	Low	Moderate	High		High	N	N	Background	Yes	Partial (topography, vegetation, development)
Quartzsite Cemetery (buildings screen Project)	Low	Moderate	High		High	N	N	Background	Yes	Partial (topography, vegetation, development)
La Pera Elementary School	High	High	Moderate		Moderate	KOP 12	N	Background	Yes	Partial (topography, vegetation, development)

3.16.3.2 **Inventory Results**

The VRI mapping and supplemental documents were provided by the BLM YFO for inclusion in this EIS. Included in this VRI were scenic quality, distance zones, and SLRUs. Scenic Quality Field Inventory forms, as recorded by the BLM YFO, were completed in June 2005 for several locations in close proximity to the Project area, providing context for this study.

Scenic Quality – The Project area is sited on terrain characterized as flat plains with minimal vegetative diversity typically associated with creosote flats. Based on the scenic quality inventory data provided by the BLM, the Project setting is designated as Class C scenery, with 'flat' and 'coarse' as primary characterizations. The local setting has been modified by cultural additions such as SR 95 and an H-frame 161-kV transmission line paralleling SR 95 on the east side of the highway. The majority of the visual ROI is also associated with Class C scenery extending east to west from the Plomosa Mountains to the agricultural lands associated with the Colorado River, and north to south from SR 72 to I-10. There are several Class B landscapes in the region, including the Plomosa Mountains to the east and the Dome Rock Mountains to the southwest (BLM 2010a).

Cultural modifications to scenic quality are based on the intensity of use caused by non-natural disturbance within the landscape that contributes to the overall visual character associated with a given area. Conditions can range from natural to completely modified based on the visual influence of transmission lines, residences, transportation routes, and other community facilities or structural features.

Distance Zones – The Project boundary is located 0.5 mile east of SR 95, approximately 10 miles north of the Town of Quartzsite and 10 miles south of SR 72. Based on distance zone data provided by the BLM, the Project area is characterized as being in the foreground distance zone.

Visual Sensitivity –The Project area has been determined by the BLM YFO to be a high sensitivity level due to the seasonal visitors camping in the Plomosa Road 14-day camping area, the Plomosa Back Country Byway approximately 5 miles to the south, and the close proximity to SR 95. Tribal viewers from a variety of viewpoints in the region are considered high sensitivity. The BLM, with input from local Native American tribes, provided input into the selection of KOPs.

As described in Section 3.16.2.2, VRI classes represent the scenic value of BLM-administered land and are based on scenic quality (Class C), distance zones (foreground), and sensitivity levels (High). The Project area is located within a designated VRI Class III landscape. The BLM YFO-supplied VRI data is for this specific site.

Residential

Each grouping of residences listed below are anticipated to have a high sensitivity based on a long viewing duration and heightened concern for aesthetics or changes in the landscape.

- **Quartzsite** (KOP 11). Residents along the northern edge of town would have level, unobstructed views of the Project area in the background distance zone (approximately 10 miles). This KOP represents residential views from the north end of the Town of Quartzsite.

- **Parker** (KOP 18). Residents along the southern edge of town would have inferior, partially obstructed views of the Project area in the background distance zone (approximately 19 miles). From this vantage point, topographic changes such as the edge of the La Posa Plain is visible in the foreground, as well as cultural modifications such as ranching/agricultural structures, increasing the likelihood that views to the Project area would be seen in the context of existing man-made features. This KOP represents high-sensitive residential viewers from the southern end of the Town of Parker.

Tribal Viewpoints

Tribal viewers typically have a high sensitivity to landscape change, based on their historical connection to the site and long viewing durations.

- **Black Point** (KOP 16). Black Point is a traditional cultural property adjacent to the Big Maria Mountains, located west of Quartzsite along the Colorado River. From this level viewing position relative to the Project area, there are open panoramic views across the Colorado River Valley, with agriculture fields and the Colorado River in the foreground and the La Posa Plain in the middleground to background toward the Plomosa Mountains. Views of the Project area would be in the background distance zone (approximately 19 miles) and would be partially to fully screened by topography of the Moon Mountain range (approximately 7 miles to the east). This KOP represents views from a traditional cultural property adjacent to Black Point.

- **Copper Peak** (KOP 5). Copper Peak is located between Parker and Quartzsite. From this relatively flat vantage point there are open panoramic views across the valley to the east toward the Plomosa Mountains in the background. Cultural modifications in the foreground include the adjacent mining operations that are subordinate in the landscape. Visitors to Copper Peak would have level, unobstructed views of the Project area in the middleground to background (approximately 5 to 6 miles to the west). Visitors are anticipated to have moderate to long viewing durations and a high concern for aesthetics. This KOP represents tribal viewers from Copper Peak.

- **Black Peak** (KOP 13). This viewing location, from the top of Black Peak, is located east of Parker and approximately 18 miles north of the Project area. From this superior viewing position, viewers would have panoramic views across the valley toward the Plomosa Mountains and Copper Peak, with unobstructed views of the Project area as seen in the background distance zone. Cultural modifications as seen from this KOP are the Town of Parker in the foreground/middleground (to the west of the viewer) and SR 95 as seen in the background distance zone. This KOP represents high sensitivity tribal viewers from the top of Black Peak.

- **Dome Rock Mountains** (KOP 1). Visitors to the Dome Rock Mountains would have slightly superior, unobstructed views from the foothills of the Dome Rock Mountains to the Project area approximately 10 miles to the northeast. Viewers are anticipated to have moderate to long viewing durations and a high sensitivity due to concern for tribal values. In addition to high-sensitive tribal viewers, moderately sensitive dispersed recreation users (e.g., camping and rockhounding) could be located at the base of the mountains and would have unobstructed, long-duration views of the Project area from a level viewing position.

- **Fisherman Intaglio** (KOP 7). Visitors to the Fisherman Intaglio site at the western edge of the Plomosa Mountains are approximately 6 miles southeast of the Project area. From this slightly-superior viewing position, there are panoramic views in the foreground with longer, framed views across the valley to the Dome Rock Mountains in the background. The landscape appears intact, with only minimal cultural modifications due to the fencing related to protecting the intaglio site. Visitors hike a short trail from the trailhead approximately 0.25 mile east of the site to the intaglio. Due to a high concern for landscape aesthetics with the intaglio seen in the context of the natural surroundings, viewer sensitivity would be high. Sensitive viewers would have views in the middleground-to-background distance zone, but views would be partially screened due to changes in topography. This KOP represents tribal viewers and recreational hikers visiting the intaglio site.

- **Big Maria Mountains** (KOP 17). Big Maria Mountains includes cultural values as well as dispersed camping and informal hiking trails and is adjacent to the Black Point tribal site (KOP 16), although at a higher elevation. Moderately sensitive viewers from this location would have open, panoramic views of an agricultural landscape associated with the Parker Valley in the foreground, with potential views to the Project area in the background distance zone. Topography associated with the Moon Mountain range (approximately 7 miles away) would partially to fully screen views to the Project area.

- **Blythe Intaglios** (KOP 14). The intaglio is slightly inferior (below) relative to the Project area with panoramic views of the Parker Valley, but views to the Project area would be screened due to the topography of the Moon Mountain range. This KOP represents highly sensitive, tribally significant sites and is accessible for recreational hikers from a nearby trailhead.

Travel Routes

Travelers on U.S. Highways typically have moderate sensitivity and are typically focused on commuting to a destination with moderate concern for aesthetics. As travelers' speeds increase, their cone of vision (i.e., the angle needed to quickly fixate on an object) decreases, thus lowering perceptions of visual change in their peripheral vision.

- **Plomosa Back Country Byway** (KOP 8). High sensitivity viewers along the Plomosa Back Country Byway would have views of the Project area that range from unobstructed in the foreground distance zone to completely screened in the background distance zone. Travelers along the byway are typically viewing the natural desert plains in the western portion of the byway and desert mountain landscapes in the eastern portion of the byway. In addition to connecting travelers to the Town of Bouse and SR 95, the primary access to Fisherman Intaglio and other hiking/recreational opportunities are from this travel route. Travelers using the Plomosa Back Country Byway are moving at a slow to moderate rate of speed and have a high concern for landscape aesthetics. This KOP represents travelers along the designated scenic byway and potential visitors to hiking areas and the intaglio site.

- **Interstate 10** (KOP 4, KOP 15). Potential viewers along the highway would be traveling at a high rate of speed and would see the Project area to the north in the background distance zone for a short duration of time. Viewing position would range from superior to the east (KOP 4), to level to the west (KOP 15). Travelers would have panoramic views of the La Posa Plain with views of the Dome Rock Mountains for travelers headed west and the Plomosa Mountains for travelers headed east. Travelers in either direction would have views of the Project area with the Town of Quartzsite as seen in the context of the La Posa Plain. KOP 4 represents views of westbound travelers on I-10 looking toward Quartzsite.

- **SR 95** (KOP 9). From this viewing position there are open panoramic views across the valley toward the Plomosa Mountains to the east and the Dome Rock Mountains to the west. Travelers along SR 95 travel at a moderate rate of speed; they are typically visitors traveling to the designated camping areas or are travelers connecting to the local communities of Quartzsite or Parker. Travelers would see the Project area in the foreground distance zone with level, unobstructed views of the Project area. Any views of the Project area would be seen in the context of an existing H-frame transmission line and wood pole distribution line as well as SR 95. This KOP represents viewers of southbound travelers along SR 95.

Recreation Areas

Recreational viewers are typically highly sensitive to landscape change based on their expectation for high quality landscapes and long viewing durations. For some recreation viewers, however, aesthetics are secondary to the actual recreation activity and the sensitivity level would typically be moderate; an example of this could be OHV activity.

- **Plomosa Campground** (KOP 6). From this level viewing position, views of the Project area would be partially screened based on changes to topography and vegetative screening along the perimeter of the camping area. Existing cultural modifications include SR 95 and a high-voltage transmission line evident in the foreground distance zone. This KOP represents moderate sensitive viewers that are associated with camping at the Plomosa 14-Day Camping Area.

- **Long-term Visitor Area** (KOP 3). The LTVA entrance is approximately 15 miles south of the Project area, with level views of the Project area. High sensitive viewers would have long-duration views as most recreational visitors to the LTVA are camping for longer than 14 days. Sensitive viewers would have partially screened views due to the gently undulating nature of the topography and medium-height vegetation screening scattered throughout the camping site. Cultural modifications within the viewers' foreground include structures associated with the Town of Quartzsite, I-10, and an H-frame transmission line paralleling US 95.

- **SR 95/SR 72** (KOP 10). This viewpoint, approximately 0.75 mile north of the SR 95/SR 72 junction, represents the entrance to Cactus Plain WSA, East Cactus Plain Wilderness, Gibraltar Mountain Wilderness, and the Snake Intaglio. These high sensitive viewers would have views of the Project area in the background distance zone from a level viewing position.

Community Facilities

- **La Paz County Regional Hospital, Parker** (KOP 18). Views of the Project area from the La Paz County Regional Hospital, located towards the southern edge of the Town of Parker, are partially obstructed by interviewing subtle topography in the background distance zone (approximately 19 miles). From this vantage point, cultural modifications such as ranching/agricultural structures and infrastructure are visible. This KOP also represents residential viewing conditions from the southern end of the Town of Parker.

- **La Pera Elementary School** (KOP 12). This moderately sensitive viewpoint 15 miles northwest of the Project area would have partially screened views due to topography, as the viewpoint is inferior relative to the Project area in the background distance zone.

3.17 NOISE

This section describes the existing ambient sound environment within the Project area. The analysis considers the potential for noise attenuation during construction and operation within a 10 mile radius, which encompasses the Town of Quartzsite, the nearest residential area, and the Plomosa Road 14-day camping area located along the Plomosa Back Country Byway, approximately 5 miles south of the Project area.

3.17.1 Applicable Plans, Policies, and Regulations

The following section describes Federal, State, and local laws and regulations that are applicable to defining potential noise effects from the Project and give perspective as to what needs to be evaluated with respect to the existing noise conditions of the affected environment.

3.17.1.1 **Federal**

There are no Federal laws or regulations directly regulating offsite noise. The Project area is subject to the management guidance included in the YFO RMP, which does not contain noise regulations or standards, although the RMP includes management objectives that address recreational user's experiences, which include opportunities "…to hear, see, and smell the natural resources" of an area (BLM 2010a).

Guidelines at the Federal level that direct the consideration of a broad range of noise and vibration issues include:

- Noise Control Act of 1972 (42 USC 4910)

- U.S. Department of Housing and Urban Development Noise Guidelines 24 CFR § 51 subpart B

The EPA has not promulgated standards or regulations for environmental noise generated by power plants; however, the EPA has published a guideline that specifically addresses issues of community noise (EPA 1974). This guideline, commonly referred to as the "levels document," contains goals for noise levels affecting residential land use of Day-Night Average Sound Level

(L_{dn}) <55 A-weighted sound level (dBA) for exterior levels and L_{dn} <45 dBA for interior levels. The U.S. Department of Housing and Urban Development Noise Guidebook Chapter 2 (24 CFR §51.101(a)(8)) also recommends that exterior areas of frequent human use follow the EPA guideline of 55 dBA L_{dn}. However, the same Section 51.101(a)(8) indicates that a noise level of up to 65 dBA L_{dn} could be considered acceptable.

Occupational exposure to noise is regulated by Title 29 CFR Part 1910.95, which describes that protection against the effects of noise exposure shall be provided when the sound levels exceed an average of 90 dBA for an 8-hour period. When employees are subjected to sound exceeding this limit, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within 90 dBA, personal protective equipment shall be provided and used to reduce sound levels within the limits. The employer shall administer a continuing, effective hearing conservation program whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA (measured via slow response). For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with 29 CFR 1910.95 Appendix A (noise exposure computation), without regard to any attenuation provided by the use of personal protective equipment.

3.17.1.2 State

For power plant projects, the Arizona Corporation Commission is typically delegated authority to act as the lead agency for purposes of environmental noise compliance. As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

> *"Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities."*

Chapter 4 of this EIS details anticipated Project construction and operation noise emission levels that could—if applicable—satisfy this Arizona Corporation Commission requirement.

3.17.1.3 Local (La Paz County)

The Project and environs are unincorporated areas within and governed by La Paz County, Arizona. La Paz County does not have an ordinance that regulates noise from power plants or other stationary noise sources.

3.17.2 Data Collection and Methods

3.17.2.1 Fundamentals of Acoustics

To describe environmental noise at the regional and local levels, and to assess impacts on areas sensitive to community noise, an understanding of acoustic fundamentals is necessary. Acoustics is the study of sound, and noise is defined as sound. Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual.

Noise standards and sound measurement equipment have been designed to account for the sensitivity of human hearing to different frequencies. This is accomplished by applying "A-weighted" correction factors. This correction factor is widely applied in the industry and is known to de-emphasize the very low and very high frequencies of sound in a manner similar to the response of the human ear. The primary assumption is that the dBA is a good correlation to a human's subjective reaction to noise.

Noise is measured in decibel units on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The dBA scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans, is measured in dBA. A noise level change of 3-dBA is barely perceptible to average human hearing. A 5-dBA change in noise level, however, is clearly noticeable. A 10-dBA change in noise level is perceived as doubling or halving of noise loudness, while a 20-dBA change is considered a dramatic change in loudness. Table 3-38 (see below) provides typical instantaneous noise levels of common activities in dBA.

3.17.2.2 **Data Collection**

To confirm and document the current ambient noise conditions in the Project area, environmental noise monitors were used to capture the rise and fall of ambient noise conditions in the area. The field survey was conducted April 12 and 13, 2010. The sound level measurements for the field survey were conducted with Larson-Davis sound level meters, rated by the American National Standards Institute as either Type 1 (Larson-Davis Model 820) or Type 2 (Larson-Davis 720). The sound level meter windscreened microphones were positioned roughly 4 to 5 feet above grade to simulate the average height of the human ear above ground level and at least 10 feet from any acoustically reflecting surfaces. All sound level meters used in the field survey were laboratory calibrated less than a year prior to the field survey.

A Skymaster SM-28 handheld anemometer was used to measure average wind speed, temperature, relative humidity, and barometric pressure at the beginning of each sound level measurement period.

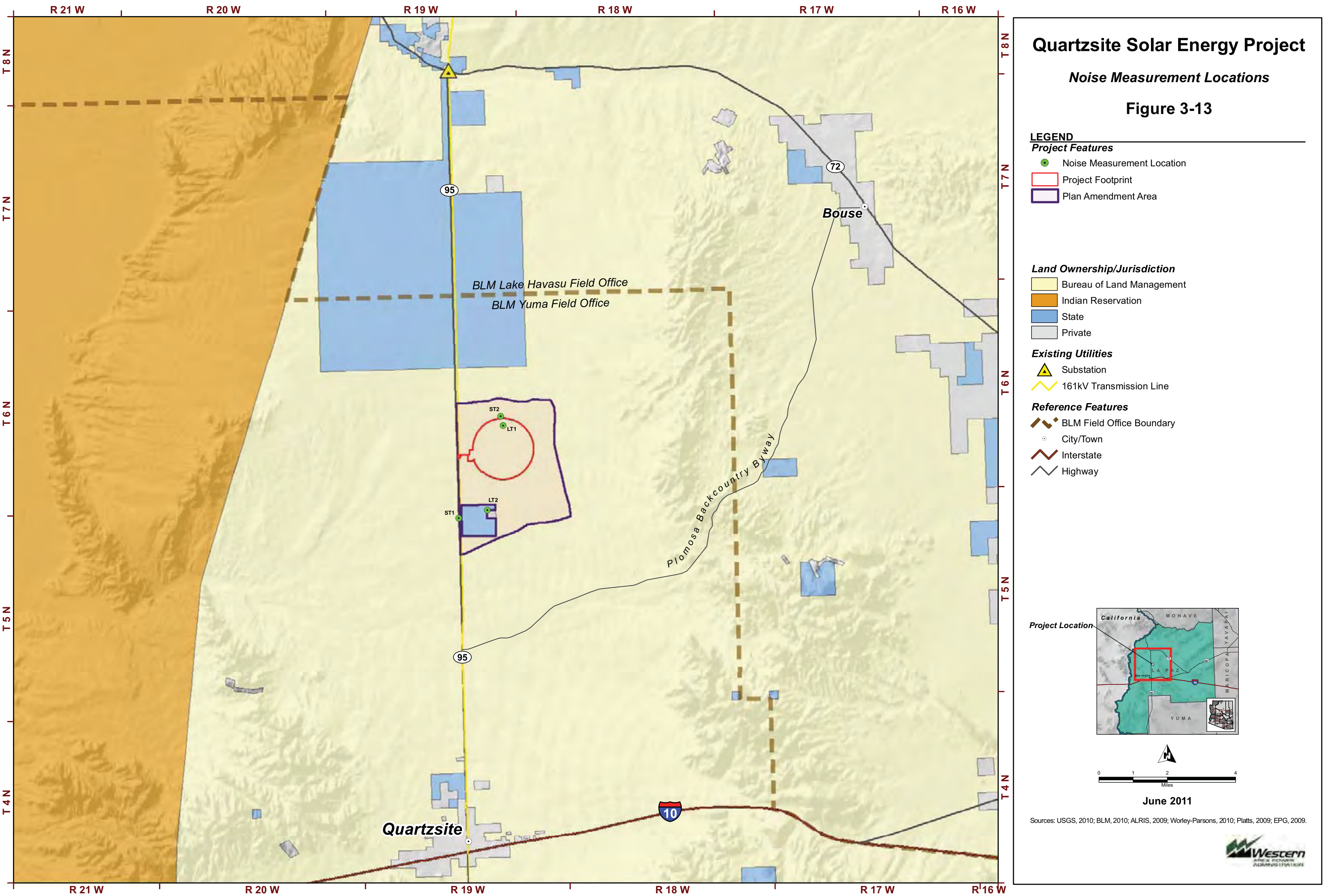
Procedures

All sound level meters used during the field survey were equipped with standard-sized (3.5-inch diameter) windscreens and set for slow time-response and usage of the A-weighting scale. The instruments were field calibrated before and after each measurement period with acoustic calibrators. Sound level measurements performed for this field survey were conducted in accordance with applicable portions of International Organization for Standardization (1996a, b, and c) standards. Weather conditions were also measured at the beginning of each measurement with the aforementioned handheld anemometer.

Table 3-38 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	**A-Weighted Sound Level in Decibels (dBA)**	**Noise Environment**	**Subjective Impression**
Civil Defense Siren (100 feet)	140-130		Pain Threshold
Jet Takeoff (200 feet)	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Drive (50 feet)	100		
Ambulance Siren (100 feet)	90	Boiler Room	
Freight Cars (50 feet)	85		
Pneumatic Drill (50 feet)	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100 feet)	70		Moderately Loud
Vacuum Cleaner (100 feet)	60	Data Processing Center Department Store / Office	
Light Traffic (100 feet)	50	Private Business Office	
Large Transformer (100 feet)	40		Quiet
Soft Whisper (5 feet)	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
Source: Handbook of Noise Measurement, Peterson 1980			

Field Survey Measurement Locations

Prior to the field survey, candidate or prospective measurement locations of existing ambient sound level were pre-selected based on the proposed site configuration (in particular, the expected layout of the solar field and power block), appearance of potentially habitable structures, and presence of access roads. During the survey, and as determined by the field team, two locations for long-term (24-hour) measurements (LT1, LT2) and two locations for short-term (20-minute) measurements (ST1, ST2) were deemed suitable. These measurement locations are shown on Figure 3-13. The audible noise sources perceived during the long-term monitor setup and disassembly procedures, as well as the short-term measurements, generally included aircraft overflights, rustling vegetation, occasional wind gusts, and highway traffic—depending on proximity to SR 95.


Quartzsite Solar Energy Project
Noise Measurement Locations
Figure 3-13
LEGEND
Project Features
Noise Measurement Location
Project Footprint
Plan Amendment Area
Land Ownership/Jurisdiction
Bureau of Land Management
Indian Reservation
State
Private
Existing Utilities
Substation
161kV Transmission Line
Reference Features
BLM Field Office Boundary
City/Town
Interstate
Highway
Project Location
California
MOHAVE
LA PAZ
YUMA
MARICOPA
YAVAPAI
0 1 2 4
Miles
June 2011
Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.
Western Area Power Administration
R 21 W
R 20 W
R 19 W
R 18 W
R 17 W
R 16 W
T 8 N
T 7 N
T 6 N
T 5 N
T 4 N
BLM Lake Havasu Field Office
BLM Yuma Field Office
Bouse
Quartzsite
Plomosa Backcountry Byway
95
72
10
ST1
ST2
LT1
LT2

3.17.3 Existing Conditions

The Project area is located within La Paz County, Arizona, approximately 10 miles north of Quartzsite, Arizona, approximately 20 miles east of the Colorado River, and approximately 22 miles south-southeast of Parker, Arizona. The existing ambient noise environment in the vicinity of the Project site is primarily made up of natural sounds, vehicle noise from SR 95, which is approximately 1 mile to the west of the Project area center, and overflight aircraft traffic associated with the Military Operating Area. On the basis of population density, the day-night average noise level (L_{dn}) is estimated to be 28 dBA Ldn for La Paz, below the range of 33 to 47 dBA L_{dn} typical of a rural area (DOE 2010).

Table 3-39 presents a summary of what are considered representative long-term noise measurement results, with validity largely depending on the observed ambient wind speed. In general, collected sound data during all measurement periods were considered valid. Table 3-40 presents a summary of the short-term noise measurement results.

Table 3-39 Long-Term Noise Measurement Data Summary (dBA)

Site ID	Start Time	Stop Time	L_{max}	L_{min}	L_{10}	L_{50}	L_{90}	L_{dn}	Temp	RH	Wind Speed Range and Direction
LT1	11:00 a.m.	11:00 p.m.	81	35	46	42	38	53	77 °F	29%	8-12 mph from the north
LT2	12:00 p.m.	12:00 a.m.	84	38	53	49	45	62	77 °F	29%	8-12 mph from the north

LT = Long-term, RH = Relative Humidity, Indicated Temperature, RH, and Wind Speed values were measured at the Start Time

Noise measurements collected on April 12-13, 2010. L_{max} is the single highest sampled level of sound; L_{min} is the lowest single sampled level of sound. L_{10}, L_{50}, and L_{90} refer to the level of sound exceeded for no more than 10, 50, and 90 % respectively, of the monitoring period. Ldn is the day-night average noise level.

Table 3-40 Short-Term Noise Measurement Data Summary (dBA)

Site ID	Start Time	Stop Time	L_{eq}	L_{max}	L_{min}	L_{10}	L_{50}	L_{90}	L_{dn}	Temp	RH	Wind Speed Range and Direction
ST1	3:55 p.m.	4:15 p.m.	55	72	35	58	48	42	60	78 °F	32%	8-10 mph from the north
	10:35 p.m.	10:55 p.m.	53	70	35	53	47	43		63 °F	38%	8-10 mph from the east
ST2	4:40 p.m.	5:10 p.m.	56	74	33	56	49	43	55	77 °F	32%	8-12 mph from the north
	11:15 p.m.	11:35 p.m.	40	49	28	44	39	34		63 °F	39%	6-8 mph from the east

Noise measurements collected on April 12, 2010. L_{eq} is the time-averaged sound level (or equivalent sound level) over the 20-minute measurement period.

With an annual average daily traffic volume of 2,454 reported for the 2008 year (ADOT 2008), and using the Federal Highway Administration Traffic Noise Model Lookup Tables (Federal Highway Administration 2004), traffic noise from SR 95 is estimated to be approximately 59 dBA L_{eq} at ST1 (90 feet distant from SR 95), which is reasonably close to the 55 dBA L_{eq} representative daytime measurement. At distances greater than 400 feet from SR 95, the Traffic Noise Model Lookup Table predicted highway traffic noise would diminish to levels lower than 46 dBA L_{eq}. However, other acoustic sources, belonging to the overall ambient outdoor sound environment, appear to have correspondingly greater contribution to the measured level. Depending on the listener location in the vicinity of the Project, these contributors to the measured and/or observed existing ambient sound level are likely to include the following:

- Distant passenger vehicle, bus, and truck traffic on SR 95
- Commercial, civilian, and military aircraft overflights, including both fixed-wing and rotary-wing vehicles
- Wind-generated turbulence, resulting from wind interaction with vegetative ground cover and exposed rocky surfaces
- Occasional OHV traffic, as permitted on BLM land, associated with recreational activities that use unimproved roads or trails in the vicinity

3.18 PUBLIC HEALTH AND SAFETY

3.18.1 Applicable Plans, Policies, and Regulations

The BLM YFO planning area encompasses more than 1.3 million acres, extending northward along the lower Colorado River from the United States-Mexico International Boundary at San Luis, Arizona, to north of Blythe, California, and Ehrenberg, Arizona. The planning area also includes a narrow strip of land in Imperial and Riverside counties, California, and a portion of La Paz County, Arizona (BLM 2010a). Within this planning area, the BLM YFO RMP identifies four factors as having the potential to impact public health and safety. These factors are abandoned mines, unexploded ordnance, International Boundary issues, and hazardous materials. A primary concern with regard to abandoned mines is the risk of falling into an open shaft or pit. Unexploded ordnances, including military materials such as bombs, mortars, artillery shells, rockets, submunitions, and landmines, are a concern within the YFO planning area due to the military maneuvers associated with the USAG–YMP located within the planning area boundaries. Hazardous materials concerns within the YFO planning area include issues related to the chemicals and materials associated with abandoned mines, mining mill sites, landfills, illegal dumping, leaking fuel tanks, illegal drug manufacturing sites, abandoned building, formerly used defense sites, and military aircraft crashes (BLM 2010a). Hazardous materials are addressed in more detail in Section 3.19.

3.18.2 Data Collection and Methods

To assess the health and safety issues currently existing at the Project area, a limited site reconnaissance was conducted. Observations of the site were made from the perimeter of the Project area by car and on the actual Project area on foot.

3.18.3 Existing Conditions

The terrain of the Project area consists of natural desert crossed by ephemeral washes. Vegetation in the area consists of cactus, grassland, and low-lying bushes. The climate in the area is generally hot and dry, reaching temperatures well over 100°F in the summer, and annual rainfall is generally only about 4 inches (Town of Quartzsite 2003). Weather extremes, lack of water, and the lack of nearby populated areas can bring about heat stress for humans stranded in the area.

Military tank maneuvers associated with the 1964 Desert Strike Maneuver Area are known to have occurred within the vicinity of the Project area. No physical presence of military materials was observed during the site reconnaissance; however, during the cultural surveys, which are a more in depth and structured survey of the site, Browning machine gun rounds were observed.

The Project area is located approximately 100 miles north of the International Boundary. Due to its relative distant location from the International Boundary, issues associated with criminal incidents related to the United States/Mexico border are of less concern than in regions closer to the border. No known occurrences of International Boundary incidents have occurred within the Project area.

The evidence of OHV use observed during the site reconnaissance suggests that the Project area has been used for recreational purposes. The use of off-road vehicles can be dangerous, particularly if risky behaviors are exhibited. Exposure to snakes, insects, poisonous plants, and other biological hazards also is a safety concern in the Project area.

No evidence of solid waste dumping was observed on the Project area during the site reconnaissance, although not every portion of the study area was visually observed. If solid waste dumping has occurred in locations that were not visually observed, the presence of chemicals or contaminants could present a safety issue.

3.18.3.1 **Fuels and Fire Management**

The Project area is located on federally managed land within the Lower Colorado River North Fire Management Unit (BLM 2004). Humans are the predominate cause of unplanned wildfires in the Fire Management Unit. Between 1984 and 2003 the average number of fires per year was 7.47, with 376 acres burned. The Fire Management Unit supports two major fuel complexes: grass with shrubs and riparian (*ibid*).

Wildland fire protection on all BLM public land within the Fire Management Unit is provided by the BLM YFO. Structural fire protection on private land within this Fire Management Unit is provided by the Quartzsite Fire District.

3.19 HAZARDOUS MATERIALS

Hazardous materials are defined as materials that, because of their quantity, concentration, or physical or chemical characteristics, may pose a real hazard to human health or the environment. Hazardous materials include flammable or combustible material, toxic material, poisonous and infectious materials, corrosive material, oxidizers, aerosols, biohazards, and compressed gasses.

3.19.1 Applicable Plans, Policies, and Regulations

The BLM Hazardous Materials Program, developed in 1998, has the responsibility for compliance with Federal, State, interstate, and local management requirements. All non-DOI groups whose activities are on BLM-managed land and facilities (such as claimants, concessionaires, contractors, permittees, and lessees) are responsible for meeting the same requirements. The Hazardous Materials Program is also responsible for aggressively pursuing potentially responsible parties to correct their contamination of BLM land and to facilitate or recover cleanup costs (BLM 2010e).

As outlined in the BLM Hazardous Materials Program, hazardous materials management involves the prevention, investigation, and remediation of illegal hazardous materials actions on public land; the proper authorization, permitting, and regulation of the uses of hazardous materials; and the timely, efficient, and safe responses to hazardous material incidents. Educating the public, law enforcement involvement, and oversight of permitted operations are steps taken to ensure hazardous materials are safely managed to protect human health and welfare and for environmental protection. Although the BLM issues authorizations that could result in the direct storage, and potential use, of hazardous materials on public land, the unexpected release or disposal of these materials is proactively addressed through standard operating procedures, stipulations, and terms and conditions that are included in authorization documents.

Use, storage, and disposal of hazardous materials are regulated by numerous local, State, and Federal laws. The following regulations for the storage, use, and disposal of hazardous materials may be applicable to the Project.

- *Comprehensive Environmental Response, Compensation, and Liability Act or Superfund, as amended by the Superfund Amendments and Reauthorization Act of 1986: 42 USC § 9601 et seq. Title 40 CFR Part 302.* Requires notification to various agencies when there is a release of hazardous substances from a facility.

- *Emergency Planning and Community Right to Know Act of 1986, commonly known as Superfund Amendments and Reauthorization Act Title III: 42 USC § 11001 et seq.; Title 40 CFR Parts 350, 355 370, and 372.* Requires inventory reporting, planning, and reporting for storage and release of hazardous and acutely hazardous materials.

- *Emergency Planning and Community Right to Know Act, § 302 (PL 99–499), 42 USC 11022.* Requires agency notification if extremely hazardous substances are stored in excess of Threshold Planning Quantities.

- *Emergency Planning and Community Right to Know Act, § 311, (PL 99–499, 42 USC 11021).* Requires that either material data safety sheets for all hazardous materials or a list of all hazardous materials be submitted to Nevada Emergency Response Commission and local fire department.

- *Emergency Planning and Community Right to Know Act, § 313, (PL 99–499, 42 USC 11023).* Requires annual reporting of releases of hazardous materials.

- *OSHA 29 USC §651 et seq., Title 29 CFR Part 1910 Safety and Health Regulations for Construction: Title 29 CFR Part 1926.* Specifies standards for hazardous materials storage, handling, and worker protection in emergencies.

- *Oil Pollution Prevention: Title 40 CFR Part 112.* Requires the preparation of a SPCC Plan if storage capacity exceeds certain volumes, and should there be a reasonable possibility that the tank(s) may discharge oil into navigable waters of the United States.

- *Hazardous Materials Transportation 49 CFR 171-172.* Requires transporters of hazardous materials to properly label, manifest, package, and ship hazardous materials.

- *Chemical Accident Prevention Provisions, Title 40 CFR Part 68.* Requires the preparation of a Risk Management Plan if certain listed toxic or flammable substances are used in excess of the listed threshold quantity.

- *Chemical Facility Antiterrorism Standard, 6 CFR Part 27.* Requires facilities that possess any "chemicals of interest" above threshold quantities must register and provide specified information to the Department of Homeland Security.

- *Hazard Communication Program 29 CFR § 1910.1200 Safety and Health for Construction 29 CFR § 1926.1 et seq.* Requires employers to implement Hazard Communication Standard that gives workers the right to know the hazards and identities of chemicals in their workplaces (29 CFR 1910.1200) Requires written procedures and personnel protective equipment for employees working with hazardous materials.

3.19.2 Data Collection and Methods

The ROI for consideration of hazardous materials and solid waste is the Project area. In order to assess the potential for offsite conditions to impact the Project area, Federal and State environmental regulatory record searches were conducted within a 1-mile radius from the Project area boundary.

A limited site reconnaissance was conducted on April 12, 2010. Observations of the site were made from the perimeter of the Project area by car and on the actual Project area on foot. Photographic documentation was collected for both the Project area and adjacent areas.

Possible sources of hazardous materials activity include incidents of illegal dumping (solid waste makes up the bulk of the illegal dumping activities on public lands); land actions that involve ROW leases and permits (e.g., gasoline and natural gas pipelines, telecommunication sites, military sites, and transportation facilities); weed and insect control (i.e., herbicides and pesticides); and the minerals program. All lands and minerals actions are reviewed both by the BLM and ADEQ, if appropriate, for compliance with Federal and State regulations during the application process. Special stipulations are also developed as part of the permit or lease to safeguard human health, environmental damage, and BLM liability.

A hazardous wastes and materials database search was conducted to identify potential environmental issues located within the Project area and at locations within a 1-mile radius from the Project boundary. A list of the applicable Federal and State agencies and the associated regulatory databases was compiled as specified by the American Society for Testing and Materials, E 2247-08 Standard: *Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property* (American Society for Testing and Materials 2008). The purpose of this standard is to define good commercial and customary practice in the United States for conducting an environmental site assessment of a property measuring 120 acres or greater and described as forestland or rural property.

The most current available information was gathered through readily available public sources from Federal (EPA) and State (Arizona) environmental databases and included: (a) known or potential hazardous waste sites or landfills; (b) sites currently under investigation for environmental violations; (c) sites that manufacture, generate, use, store, and/or dispose of hazardous substances or hazardous wastes; and (d) sites with recorded violations of regulations concerning underground storage tanks and hazardous substances or petroleum products. The databases were queried for sites within the Project area or within a 1-mile radius of the Project area.

3.19.3 Existing Conditions

The Copperstone Underground Mine/Mill Project is located approximately 4.6 miles northwest of the Project area and may store hazardous materials. It is owned by American Bonanza Gold Corp and is currently not in production. According to the Mine Plan of Operations there are hazardous materials expected to be utilized onsite, as well as hazardous wastes generated (Fayram 2008). The mine is subject to all of the applicable rules and regulations regarding hazardous materials and wastes and is responsible for cleanup of any spills associated with its operations.

As discussed in Section 3.13 (Cultural Resources), much of the region was utilized for training in the Desert Strike Maneuver Area. Numerous signs have been found in the Project area indicating its use during this time. Although .50-caliber Browning machine gun rounds, bullets, and casings have been found, no unexploded ordnance has been identified on or near the Project area.

No evidence of solid waste dumping was observed on the Project area during the site reconnaissance. It should be noted that due to the large size of the site (1,675 acres), not every portion was visually observed.

ADEQ and EPA online hazardous materials databases were queried for the Project area and within 1-mile of the Project area. The results of the database search are provided in Table 3-41.

Table 3-41 Hazardous Materials Database Findings		
Environmental Database	**Description of Database**	**Number of Sites***
Water Quality Assurance Revolving Fund	The Water Quality Assurance Revolving Fund area, which is also referred to as a State Superfund area, is a region designated by the ADEQ for further investigation regarding environmental concerns. This designation typically is based on known areas of groundwater contamination, or past or present land uses that have been known to use and discharge chemicals that can contaminate groundwater.	0
Resource Conservation and Recovery Act Treatment, Storage, and Disposal Facilities	The EPA's Resource Conservation and Recovery Information System identifies and tracks hazardous waste from the point of generation to the point of disposal. The Resource Conservation and Recovery Information System Treatment, Storage, Disposal Facilities List is a compilation by the EPA of reporting facilities that generate, transport, store, treat, or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act, but are not undergoing any "corrective action."	0
Resource Conservation and Recovery Act Generators	Resource Conservation and Recovery Act-regulated hazardous waste generator notifiers list; both Large and Small Quantity Generators are included in this list.	0
Solid Waste Disposal and Landfill	State inventory of solid waste disposal and landfill sites.	0
Leaking Underground Storage Tanks	List of information pertaining to all reported leaking underground storage tanks.	0
Underground Storage Tanks	State underground storage tank sites listing. The State of Arizona requires that owners of most underground storage tanks register them with the ADEQ.	0
Declaration of Use Restriction	A Declaration of Use Restriction, previously known as Voluntary Environmental Mitigation Use Restriction, is a restrictive use covenant that accompanies the title to the land. It is required by ADEQ when a property owner elects to (1) remediate contamination found on the property to a non-residential use level, or when (2) an institutional or engineering control remains as a means to meet remediation goals.	0
Arizona Unified Repository for Informational Tracking of the Environment	A database that provides core data to all of ADEQ's programs (including licensing and permitting).	0
*Number of sites identified by ADEQ within the boundaries of the Project area. Source: ADEQ 2010b		

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CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter provides a description of the effects on the environment that could occur from the construction, operation, and ultimate decommissioning of the Applicant's Proposed Project and amending the YFO RMP. The Applicant's Proposed Project and alternatives are described in Chapter 2 and the proposed YFO RMP amendment and alternatives are presented in Appendix A. Information about the existing condition of the environment provided in Chapter 3 was used as a baseline from which to measure and identify potential impacts resulting from the Project and the proposed YFO RMP amendment. As explained in Section 3.1, the direct, indirect, and cumulative effects of the Applicant's Proposed Project and plan amendment area the same.

This chapter begins with a summary of the terms and methods used for the impact assessment and general mitigation. Subsequent sections for each resource describe the impacts that could result from each alternative.

The **No Action Alternative** is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the Applicant's Proposed Project and the alternatives. Under the No Action Alternative, Western would deny the interconnection request and the BLM would not grant a right-of-way or amend the YFO RMP. The impacts of the Project would not occur.

The **Applicant's Proposed Project** would consist of the construction and operation of the Project, as proposed. The proposed Project would have a 30-year lifespan at which point the Project would be decommissioned, unless the Project remains economically viable. The Applicant's Proposed Project would use dry-cooling for power plant cooling.

Alternative 1 – Hybrid Cooled. Under Alternative 1, the Project would be constructed and operated using a hybrid-cooled technology, rather than the dry-cooling technology considered under the Applicant's Proposed Project.

If Western chooses to interconnect QSE's proposed solar facility, under either the dry- or hybrid cooled alternative, Western would construct and operate a new 161/230-kV switchyard to interconnect the solar facility to Western's existing Bouse-Kofa 161-kV transmission line. In addition, Western would upgrade their communication system to provide dual and redundant communications to deliver signals to operate the switchyard equipment from control centers and other remote locations and to report metering. Impacts associated with construction and operation of Western's proposed switchyard and telecommunication system were analyzed as part of the Applicant's Proposed Project and alternatives. The issuance of a ROW grant for either, the Applicant's Proposed Project or Alternative 1, requires the concurrent amendment of the YFO RMP as outlined in Appendix A.

4.1.1 Types of Impacts to be Addressed

Impacts are defined as modifications to the existing environment brought about by implementing an alternative. Impacts can be beneficial or adverse, result from the action directly or indirectly, and can be long-term, short-term, temporary, or cumulative in nature. The analysis in this chapter provides a quantitative or qualitative comparison (dependent on available data and nature of the impact) between alternative impacts and establishes the severity of those impacts in the context of the existing environment. The discussion of each resource includes sections for specifically required disclosures under NEPA, including the disclosure of residual impacts, irreversible and irretrievable commitment of resources, and the impact of the Project's short-term resource use on the long-term productivity of the Project area. These required disclosures are explained in the section below.

Direct impacts are attributable to implementation of an alternative that affects a specific resource, and generally occur at the same time and place.

Indirect impacts can result from one resource affecting another (e.g., soil erosion and sedimentation affecting water quality) or can occur later in time or removed in location, but can be reasonably expected to occur.

Long-term impacts are those that would remain for the life of the Project. For the analysis contained in this EIS, long-term impacts are those lasting beyond 5 years after the implementation of the alternative.

Short-term impacts result in changes to the environment that are stabilized or mitigated rapidly and without long-term effects. For the analysis contained in this EIS, short-term impacts are those occurring within the first 5 years of alternative implementation.

Cumulative impacts are those which result "from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

NEPA regulations, 40 CFR 1502.16, require a discussion of ***irreversible or irretrievable commitments of resources*** which would be involved with the Project. A resource commitment is considered irreversible when impacts from its use would limit future use options and the change cannot be reversed, reclaimed, or repaired. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for use by future generations until reclamation is successfully applied.

4.1.2 Mitigation and Residual Impacts

The mitigation measures identified in Chapter 4 consist of potential additional mitigation not included as applicant-committed measures under any of the alternatives (including measures outside the jurisdiction of the lead or cooperating agency) that could be implemented to address impacts that would result from Project implementation. The residual impacts section addresses impacts that cannot be avoided by the application of mitigation measures. This section, therefore, discloses the effectiveness of proposed mitigation measures for each resource, and helps the decision maker identify those mitigation measures to be included in the ROD.

4.1.3 Cumulative Impacts

The CEQ (40 CFR § 1508.7) defines "cumulative impact" as: "...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

Cumulative impacts result when the effects of an action are added to, or interact with, other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that is the focus of the cumulative impact analysis. While impacts can be differentiated as direct, indirect, and cumulative, the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time. Thus, the cumulative impacts of an action can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource no matter what entity (Federal, non-Federal, or private) is taking the actions.

4.1.3.1 Cumulative Impacts Analysis Methodology

The cumulative impacts on the resources, ecosystem, and human community were considered by first identifying the geographic scope of the cumulative analysis area. The cumulative analysis area varies depending on the resource. For example, the analysis area for geology may be restricted to a geological unit, while the analysis area for the socioeconomic analysis may encompass multiple counties, cities, and jurisdictions. After determining the analysis area, a comprehensive list of past, present, and reasonably foreseeable actions within the analysis area was compiled and utilized to determine the cumulative impacts of the Project and the additional projects identified. Figure 4-1 and Table 4-1 lists existing (past and present), and reasonably foreseeable projects within the cumulative effects ROI.

Information about past, present, and reasonably foreseeable future activities in the cumulative effects ROI were gathered from the BLM, La Paz County, and other agencies; adopted plans; environmental documents; and personal communications with public agencies.

The approach to cumulative impacts of the proposed Project considers "past" or "existing" projects to be those that currently exist or have completed construction and are in operation. As explained in Chapter 3 and above, the impacts of past or existing actions are already reflected in the baseline conditions identified in Chapter 3. "Present" projects include those that are currently under construction or have been fully permitted such that they are likely to be part of the existing environment when the proposed Project would begin construction. "Reasonably foreseeable" future projects are those for which a formal permit application has been filed. For Western, if an interconnection request has been submitted, then it is considered a "reasonable foreseeable" action. For the BLM, a reasonably foreseeable action is one for which a ROW application has been submitted. However, the identification of reasonably foreseeable project does not end there, it also considers the status of such projects, the availability of data for such projects, and whether or not the impacts of such projects are too speculative to be considered “reasonably foreseeable” based on the available information. As explained, in Table 4-1 below, for some of the projects where applications have been submitted, the impacts of those projects have been determined to not be reasonably foreseeable, because inactivity on those applications, or lack of data, makes the status of such projects speculative.

4.1.4 Relationship of Short-Term Uses to Long-Term Productivity

This section describes how the short-term Project use would affect the long-term productivity of a given resource.

4.1.5 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources (in other words, irreversible and irretrievable impacts) are disclosed in this chapter for each resource. Irreversible impacts are those that would result in changes to the environment that cannot be reversed, reclaimed, or repaired. An example of an irreversible impact would be the removal of groundwater from a poorly recharged aquifer. Once groundwater reserves are removed, they cannot be replaced or reclaimed. Irretrievable impacts are those that result in the temporary loss or degradation of the resource value until reclamation is successfully completed.

It is important to note, if approved, the ROW authorization for the proposed Project would include a required Performance and Reclamation bond to ensure compliance with the terms and conditions of the BLM ROW authorization, consistent with the requirements of 43 CFR 2805.12(g). The “Performance and Reclamation” bond would consist of three components. The first component would be hazardous materials; the second component would be the decommissioning and removal of improvements and facilities; and the third component would address reclamation, revegetation, restoration, and soil stabilization.

Prior to issuance of the BLM ROW authorization, the Applicant must submit a Decommissioning and Site Reclamation Plan that defines the reclamation, revegetation, restoration, and soil stabilization requirements for the Project area as a component of their Plan of Development (43 CFR 2804.25(b)). The Decommissioning and Site Reclamation Plan requires expeditious reclamation of construction areas and the revegetation of disturbed areas to reduce invasive weed infestation and erosion and must be approved by the BLM authorized officer prior to the issuance of the ROW grant. The approved Decommissioning and Site Reclamation Plan will be used as the basis for determining the standard for reclamation, revegetation, restoration, and soil stabilization of the Project area.

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions

Project Name	Project Description	Project Type	Project Status	Affected Resources
Multiple Grazing Allotments on BLM-managed Lands	Nine Mile Allotment (109,239 acres BLM land; 640 other; 468 AUMs); Weisser Ephemeral Allotment (64,674 acres BLM land; 0 AUMs); Martinez Allotment (64,044 acres BLM land; 0 AUMs)	Land Use	Past and Present	Land Use, Livestock Grazing
Grazing Allotments on Arizona State Trust Lands	Byers Allotment (005-094375). Located on Arizona State Land, totaling approximately 24,000 acres. Land lease expires in April 2012. *Not shown on Figure 4-1.	Land Use	Past and Present	Land Use, Livestock Grazing
Dunes WHA	The Project area is located in the Dunes WHA.	Land Use	Past and Present	Biological Resources, Land Use, Recreation
Plomosa 14-Day Camping Area	BLM campground located 4.5 miles south of Project area on east side of SR 95.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Hi Jolly 14-Day Camping Area	BLM campground located 7.5 miles south of Project area on east side of SR 95.	Land Use	Past and Present	Recreation, Socioeconomic Resources
La Posa LTVA	BLM camping area located south of I-10 east and west of US 95. This area accommodates an estimated 250,000 visitors a year.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Road Runner 14-Day Area Site	BLM campground located southwest of La Posa LTVA west of US 95.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Scadden Wash 14-Day Area Site	BLM campground located southeast of I-10 and US 95 just north of La Posa LTVA.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Plomosa SRMA	BLM recreation area on 102,053 acres of BLM land and located 3 miles northeast of the Project area.	Land Use	Past and Present	Recreation, Socioeconomic Resources
La Posa SRMA	Recreation area located 2 miles south of the Project area.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Arizona Public Service (BLM ROW AZA 010121 and AZA 032504, and Arizona State Land Department ROW 18-47038)	Arizona Public Service ROW for maintenance and operation of 69-kV transmission line along SR 95 between I-10 and SR 72. Located on BLM and Arizona State Land, totaling approximately 116 acres.	Electric Utility Line	Past and Present	Visual Resources

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions

Project Name	Project Description	Project Type	Project Status	Affected Resources
Western Area Power Administration (AZ-PHX 0080583)	Western ROW for maintenance and operation of 161-kV transmission line along the west side of the Little Harquahala Mountains. Located on BLM land, totaling 245 acres.	Electric Utility Line	Past and Present	Visual Resources
Western Area Power Administration (Bureau of Reclamation Parker-Gila Project; AZ PHX 072-0086406)	Western (formerly Bureau of Reclamation) ROW for 161-kV transmission line located on BLM-managed land on the east side of SR 95 running north to Parker (totals 993 acres). Western, formerly Bureau of Reclamation, ROW located on Arizona State Land Department managed land, totaling 164 acres.	Electric Utility Line	Past and Present	Visual Resources
Southwestern Telephone Company (BLM ROW AZA 34991; Arizona State Land Department ROW 18-104576)	Southwestern Telephone Company ROW for telephone line along the east side of SR 95. Located on BLM and Arizona State Land, totaling approximately 16 acres.	Telephone Line	Past and Present	Visual Resources
ADOT (Arizona State Land Department ROW 072-083964)	ADOT ROW for State Route 95.	Highway	Past and Present	Transportation
La Paz County Board of Supervisors (BLM ROW AZA 028920)	First stage of Project ROW would be used as a truck haul road. Long-range plan is to construct 4.9 miles of roadway for a railroad drill track.	Road	Past and Present	Transportation
Patch Living Trust (BLM ROW [road] AZA 032505; AZA 032506 [water])	AZA 32505 issued to Cyprus Copperstone. Right-of-way width/length – 27,984 feet by 75 feet wide. AZA 32506 includes a water line and three well pump stations.	Road and Water	Past and Present	None
Oldham Family Trust (BLM ROW AZA 032825; Arizona State Land Department 016-108178 [road])	Development of a dirt road to access private property located east of SR 95. Right-of-way is 66 feet wide by 590 feet long.	Road	Past and Present	None
Arizona State Highway (AZAR 0009717)	Right-of-way for a material site. BLM land, totaling approximately 57 acres.	Material Site	Past and Present	None
Town of Quartzsite – BLM Recreation and Public Purpose Lease (AZA 032171)	Town of Quartzsite Recreation and Public Purpose Lease for the Town's park. Park is approximately 80 acres in size.	Recreation Lease	Past and Present	Recreation, Socioeconomic Resources

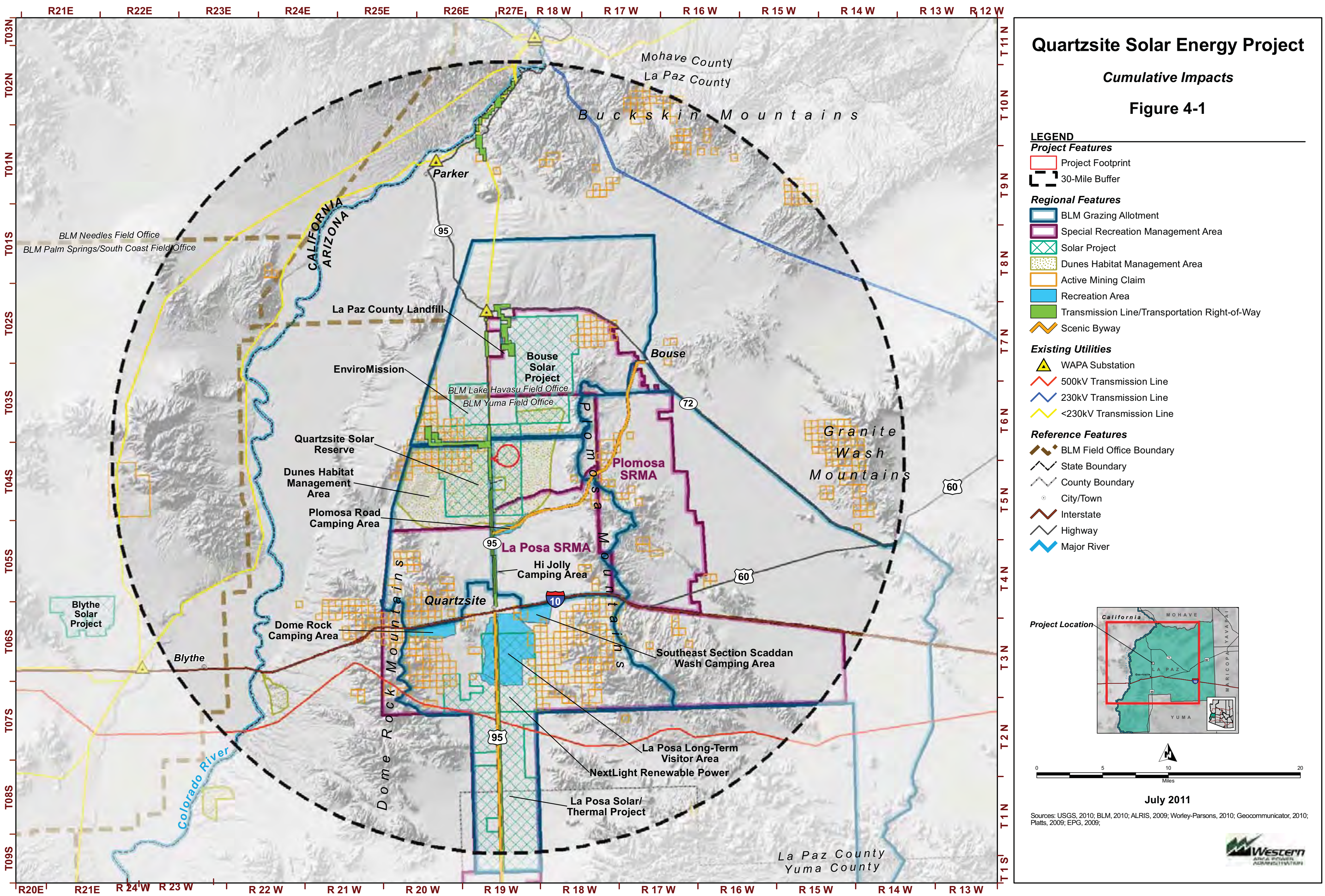
Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions

Project Name	Project Description	Project Type	Project Status	Affected Resources
Arizona Western College – BLM Recreation and Public Purpose Lease (AZA 03264401)	Public Purpose Lease for Arizona Western College Quartzsite Learning Facility. Disturbed ground (including building) is approximately 6 acres. Lease is for 60 acres.	Public Purpose Lease	Past and Present	Socioeconomic Resources
Quartzsite Fire Department – BLM Recreation and Public Purpose Lease (AZA 03344501)	Quartzsite Fire Station. Located on Tyson Street just west of SR 95 on 5 acres of BLM Land.	Public Purpose Lease	Past and Present	Public Safety
Multiple mining claims and leases on BLM and Arizona State Land Department lands	More than 100 active mining claims within the La Posa Plain. Most claims consist of lode and placer claims. Larger authorized leases include Cyprus Bagdad (AZA 023307 – 900 acres; gold lode), American Bonanza Gold Mining Corporation (AZA 033604 – 3,790 acres, gold lode; AZA 032676 – 4,900 acres; 008-113911 and 08-113912 Arizona State Land Department Mineral Exploration Permits, varying acreage), Copperstone claims (multiple leases, varying acreage).	Mining	Past and Present	Mineral Resources
EnviroMission (USA) Inc. (003-11362899)	Request for 5,700 acres of Arizona State Land to construct and operate two solar collecting towers, each 2,400 feet high, to generate up to 400-MW of solar energy. Applicant issued a press release on November 10, 2010, stating they have filed an application for a Certificate of Environmental Compatibility with the Arizona Power Plant and Transmission Line Siting Committee (Line Siting Committee of the Arizona Corporation Commission) to begin the State permitting process. According to the press release, EnviroMission plans to sell electricity from the first of two planned 200-MW Solar Tower power stations to the Southern California Public Power Authority under the terms of a Power Purchase Agreement approved by the Southern California Public Power Authority on October 26, 2010.	Solar Energy Project	Future/Pending (see Project Description regarding status)	Land Use, Recreation, Special Management Areas, Biological Resources, Water Resources, Socioeconomic Resources, Visual Resources, Public Health and Safety, Air Quality

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions

Project Name	Project Description	Project Type	Project Status	Affected Resources
SolarReserve (03-113630-99)	Request for 5,120 acres of Arizona State Trust Land to construct and operate a 100 to 200-MW CSP Project. ROW application filed on January 15, 2009. Parcel was part of SolarReserve initial siting investigation, but was eliminated from further consideration (see Section 2.2.1)	Solar Energy Project	Not Active	None
Bouse Solar Project, Boulevard Associated LLC (AZA 034335)	BLM ROW request for 24,220 acres to construct and operate two 250-MW CSP projects. Right-of-way application filed with the BLM YFO on June 8, 2007.	Solar Energy Project	Future/Pending No activity since 2007	Given the inactivity since the submission of the ROW application in 2007, there is no data to assess the potential impacts that would result from this project's construction, operation, maintenance, and decommissioning, as a result the status of this project is speculative, and therefore those impacts are not reasonably foreseeable for purposes of this analysis.
NextLight Renewable Power, LLC (AZA 034554)	BLM ROW request for 20,700 acres to construct and operate a 500-MW CSP project. Right-of-way application filed with the BLM YFO on March 26, 2008.	Solar Energy Project	Future/Pending No activity since 2008	Given the inactivity since the submission of the ROW application in 2008, there is no data to assess the potential impacts that would result from this project's construction, operation, maintenance, and decommissioning, as a result the status of this project is speculative, and therefore those impacts are not reasonably foreseeable for purposes of this analysis.

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions				
Project Name	**Project Description**	**Project Type**	**Project Status**	**Affected Resources**
La Posa Solar Thermal Project, Pacific Solar Investment Company (AZA 034427)	Right-of-way request for 38,211 acres of BLM land to construct and operate a 2,000-MW CSP project. Right-of-way application filed on September 6, 2007.	Solar Energy Project	Future/Pending No activity since 2008	Given the inactivity since the submission of the ROW application in 2008, there is no data to assess the potential impacts that would result from this project's construction, operation, maintenance, and decommissioning, as a result the status of this project is speculative, and therefore those impacts are not reasonably foreseeable for purposes of this analysis.
Blythe Solar Project (CACA 48811) (Solar Millennium, LLC)	Request for 9,400 acres of BLM land to construct and operate 1,000-MW commercial dry-cooling solar thermal parabolic trough generating station. The site is 8 miles west of Blythe, 3 miles north of I-10 (approximately 30 miles west of the Project area).	Solar Energy Project	Under construction	Socioeconomic Resources (Construction began in June 2011. Project to be constructed in multiple phases over a 60-month timeframe))
ADOT	Installation of a new traffic signal at the interchange of SR 95 and SR 72.	Roadwork	Future/Pending	Transportation
Quartzsite Golf Course (AZA 03446701)	Proposed golf course on 321 acres of BLM managed land.	Recreation	Future/Pending	Recreation
American Bonanza Gold Mining Corporation (AZA 035202)	The BLM YFO issued a Finding of No Significant Impact on October 20, 2010 to allow the mine to reopen as an underground gold mining and flotation mill operation. The project proposes to mine and mill approximately 450 tons of ore per day and produce between 35,000 to 55,000 ounces of gold per year for 7 to 10 years. Waste rock from underground operations will be disposed of within the open pit left by previous mining.	Mining	Present/future (use of an existing open pit mine)	Land Use, Transportation, Air Quality, Geology and Mineral Resources, Water Resources, Social and Economic Resources, Noise, Hazardous Materials



Quartzsite Solar Energy Project

Cumulative Impacts

Figure 4-1

July 2011

Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Geocommunicator, 2010; Platts, 2009; EPG, 2009;

Western Area Power Administration

4.2 LAND USE

This section discusses the effects on land use that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives.

4.2.1 Methodology for Analysis

The BLM Legacy Rehost and National Integrated Land System GeoCommunicator were reviewed to obtain information related to pending and authorized land uses and grazing allotments on BLM land potentially affected by the Project.

The impact assessment is based on known impacts relative to construction, operation, maintenance, and decommissioning of rights-of-way and land use permits of all types on BLM-administered land. The land use impact analysis is based on review of the existing conditions (Section 3.2) and focuses on the indicators listed below in Section 4.2.2.

4.2.2 Indicators

An impact on land use and/or livestock grazing may result if any of the following were to occur from construction or operation of the Project:

- Conflict with applicable land use plans, policies, goals or regulations
- Unresolved conflict with existing utility rights-of-way
- Nuisance impacts attributable to incompatible land uses
- Loss of forage such that it would adversely affect livestock operations and reduce the number of AUMs available
- Disrupt livestock movement between use areas
- Increase human disturbance/harassment to livestock
- Conflict with the use of existing livestock grazing areas

4.2.3 Direct and Indirect Effects by Alternatives

4.2.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to be managed within the BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policies, and land use plans. As a result, none of the impacts to land use, including livestock grazing, mining, or other uses would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.2.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Construction of the QSE's solar facility and associated Project components (e.g. access road, Western's switchyard, etc.) would remove approximately 1,675 acres of land from potential public use or disposal for the duration of the lease. The proposed land use is compatible with the BLM YFO RMP and the BLM mission of multiple uses of public land.

The Applicant's Proposed Project has no direct effects to the authorized and pending rights-of-way identified in Chapter 3, does not conflict with applicable land use plans, policies, goals or regulations, and does not result in unresolved conflict with existing utility rights-of-way.

The Project footprint is located within the 64,674-acre Weisser Ephemeral Allotment (see Figure 3-1), which currently is not active for grazing. Implementation of the Applicant's Proposed Project would result in an approximate 2.6 percent reduction in available rangeland within the Weisser Ephemeral Allotment and an approximate 0.04 percent reduction in available rangeland within the entire YFO (approximate reduction from 428,300 to 426,625 acres).

Given the small size of the Project footprint relative to the Weisser Ephemeral Allotment, if the Allotment were to become active, implementation of the Applicant's Proposed Project would not result in a loss of forage. Therefore, the Applicant's Proposed Project is not anticipated to adversely affect livestock operations or reduce the number of AUMs available, would not disrupt livestock movement, would not increase human disturbance/harassment to livestock, and would not conflict with the use of existing livestock grazing areas.

Closure and Decommissioning

Permanent closure would presumably occur 30 years after the start of operation unless the Project remains economically viable. The industrial use currently proposed would then be considered an existing use in an area that would probably continue to be bounded by public recreation and natural resource lands. Given the limited infrastructure and distance from any major urban area, significant residential or commercial development over the next 30 years is unlikely.

Prior to issuance of the BLM ROW authorization, the Applicant must submit a Decommissioning and Site Reclamation Plan that defines the reclamation, revegetation, restoration, and soil stabilization requirements for the Project area as a component of their Plan of Development (43 CFR 2804.25(b)). The Decommissioning and Site Reclamation Plan requires expeditious reclamation of construction areas and the revegetation of disturbed areas to reduce invasive weed infestation and erosion and must be approved by the BLM authorized officer prior to the issuance of the ROW grant. The approved Decommissioning and Site Reclamation Plan will be used as the basis for determining the standard for reclamation, revegetation, restoration, and soil stabilization of the project area.

Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint, conditions that would have been maintained for the life of the Project. Appropriate rehabilitation of the site would need to be revisited to determine consistency with land uses existing at the time of closure. A return to the drainages and topography that existed at the time of construction may not be appropriate and could, in fact, result in unacceptable impacts to surrounding properties. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. However, the Applicant's Decommissioning Plan would include a provision for rehabilitation of the site to be consistent with land uses existing at the time of closure. This would reduce any land use consistency issues to a minimum and would not disrupt land uses in the surrounding area.

4.2.3.3 **Alternative 1 – Hybrid-Cooled**

The hybrid alternative would result in effects to land use and livestock grazing similar to those described under the Applicant's Proposed Project.

4.2.3.4 **Western's Switchyard and Telecommunication System**

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. The switchyard facilities would be constructed, owned, and operated by Western through a land use agreement with the BLM. Land use impacts associated with construction and operation of Western's switchyard are described in section 4.2.3.2.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

No impacts to existing or planned residential, commercial, or industrial uses would be expected to occur. Because stringing of cable would occur within the existing Bouse-Kofa 161-kV transmission line corridor, there would be no long-term impacts to land use. Direct impacts to land use as a result of construction activity along roadway ROW would be temporary and minimal. Creation of new access road, if required, and the use of existing roads are not expected to change the use of the access roads or increase accessibility of areas for other users. The use and management of existing roads would remain unchanged. No indirect or permanent impacts to land use are expected as a result of fiber-optic cable installation.

Microwave Alternative

The area that may be affected by the installation of a new microwave dish at the Bouse Substation, or communication sites at Metal Mountain or Cunningham Peak, would be limited to the fenced area within the existing facility. Under this option, the microwave dish would be installed on an existing structure or new monopole within the facility ROW.

4.2.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.2.5 Residual Effects

The Project is not expected to have any residual effects to land use and livestock grazing, based on the criteria outlined in this section.

4.2.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on land use with other past, present, or reasonably foreseeable future actions. Due to the rural, undeveloped setting of the Project area, and to better illustrate potential effects associated with other pending projects, the cumulative effects land-use ROI considers a 5-mile buffered area centered along SR 95 between the Town of Quartzsite and the intersection of SR 95 and SR 72, a distance of approximately 20 miles.

There are three pending projects within the land use ROI. They include the EnviroMission Solar Energy Project, the expansion/reopening of the American Bonanza Copperstone Gold Mine, and the Bouse Solar Project. The proposed EnviroMission project is the only project that is anticipated to result in a cumulative impact to land use. The proposed expansion/reopening of the Copperstone Gold Mine would occur on previously disturbed lands. The potential impacts that would result from the construction, operation, maintenance, and decommissioning of the Bouse Solar Project are too speculative based on the inactivity on that ROW application since it was filed. Therefore those impacts are not reasonably foreseeable for purposes of this analysis.

EnviroMission is proposing to build a 200-MW solar project on 5,700 acres of land managed by the Arizona State Land Department. The proposed project, which is approximately 2 miles northwest of the Applicant's Proposed Project, would use two 2,400 foot "solar towers" and hot air to power the plant. According to their company website (www.enviromission.com.au), the project would use no water, and they are expecting to begin construction in 2014, following completion of additional engineering and environmental studies. In October 2010, EnviroMission announced they had secured a Power Purchase Agreement with the Southern California Public Power Authority to purchase power from the EnviroMission project (EnviroMission 2011). Details about their proposed transmission interconnection options are unknown. EnviroMission would be required to obtain appropriate Federal, State, and local permits and approvals prior to construction.

The construction and operation of the Applicant's Proposed Project, when combined with the construction and operation of the proposed EnviroMission solar project, would modify the land use setting in the northern portion of the BLM Yuma District along SR 95. The amount of land to be ultimately disturbed by the EnviroMission project is unknown. For this analysis, it is assumed that up to 5,700 acres would be disturbed by construction and operation of that project. Since the proposed EnviroMission project would be located on land managed by the Arizona State Land Department, it would not be subject to BLM land use guidelines. If EnviroMission plans to interconnect to a Western transmission line, they would be required to submit an interconnection request and Western would analyze and disclose impacts of the EnviroMission interconnection to Western's system through the Bouse-Kofa 161-kV transmission line in a separate EIS.

The Applicant's Proposed Project is located within the 64,674-acre Weisser Ephemeral Allotment, which currently is not active for grazing. The EnviroMission project is located on lands managed by the Arizona State Land Department, but surrounded by lands managed by the BLM YFO and Lake Havasu Field Office within the Nine Mile Allotment. Considering the BLM Yuma District contains 428,300 acres of rangeland, the additive effect of construction and operation of the Applicant's Proposed Project and the EnviroMission solar project, would not result in a significant loss of available forage; would not disrupt livestock movement; would not increase human disturbance or harassment to livestock; and would not conflict with the use of existing livestock grazing areas.

4.2.7 Short-Term Uses versus Long-Term Productivity

Under the action alternatives, lands within the Project area would be converted from their existing land uses to renewable energy production. The land within the Project area would be unavailable for other land uses as long as the Project is in operation. Although the land within the Project area would be unavailable for other land uses, the new industrial land use would produce renewable energy.

Land within the Project area is not currently used for grazing. However, construction and operation of the Project as a result of implementation of the action alternatives (the short-term use) would affect the long-term vegetation productivity of the Project area via vegetation removal. During construction of the Project, some vegetation removal would occur to facilitate placement of Project facilities on the landscape. At Project decommissioning, the Project area could be reclaimed. The loss of the vegetation communities and forage productivity that occurred during Project operations would persist for a time until vegetation is reestablished and again available for forage.

4.2.8 Irreversible and Irretrievable Commitments of Resources

There would be an irretrievable loss of availability for other land uses as a result of the action alternatives because the Project area would be graded and fenced and other uses would be precluded, but only for the life of the Project and for a time following Project decommissioning. Long-term surface-disturbing activities and removal of forage associated with construction and operation of the Project would result in irretrievable commitments of potential livestock grazing resources, as they would persist only for the life of the Project and for a time following Project decommissioning. There would be no irreversible commitments of resources because the area could be reclaimed after termination of the Project and other uses could then be established.

4.3 SPECIAL MANAGEMENT AREAS

This section discusses the effects on SMAs that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives. As described in Section 3.3, the SMA ROI includes lands within a 30 miles radius of the Project area. Although the Project would not directly impact SMAs in the ROI, the larger geographic area was selected based on potential visual effects to SMAs from the solar towers associated with the Applicant's Proposed Project.Methodology for Analysis

The impact assessment is based on impacts to known SMAs relative to construction, operation, maintenance, and decommissioning of the Project. The SMA impact analysis is based on review of the existing conditions (Section 3.3) and focuses on the indicators listed below.

4.3.1 Indicators

An impact to SMAs may result if any of the following were to occur from construction or operation of the Project:

- Conflict with State or federally established, designated, or reasonably foreseeable planned special use areas (e.g., recreation, wildlife management area, game management areas, waterfowl production areas, scientific and natural areas, Wilderness Areas, etc.)
- Results in nuisance impacts attributable to incompatible land uses.

4.3.2 Direct and Indirect Effects by Alternatives

4.3.2.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to be managed within the BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policies, and land use plans. As a result, impacts to SMAs would not occur. Although the proposed Project would not be constructed, the lands on which it is proposed would still be available for future development, including uses similar to the proposed Project.

4.3.2.2 **Applicant's Proposed Project Alternative – Dry-Cooled**

There would be no change to the recreational setting in any of the SMAs; however, as described in more detail in Section 4.4.3, the views of the Project would impact the desired, primitive experience that visitors seek when visiting the Wilderness Areas, WSA, Back Country Byway, and Scenic Byway in the vicinity of the Project. These views would be most apparent from locations closer to the Project and from peaks with expansive vistas. According to the visual analysis (Section 4.16), Project facilities would be visible from portions of the Gibraltar Mountain Wilderness, East Cactus Plain Wilderness, Riverside Mountain Wilderness, Big Maria Mountains Wilderness, the Cactus Plain WSA, the Plomosa Back Country Byway, and the Highway 95 Scenic Byway. Topography and distance would diminish or eliminate (block) these effects in portions of the nearby Wilderness Areas, WSA, and Scenic Byway. Visitors to the Plomosa Back Country Byway would have unobstructed views of the solar collecting tower, but topography would screen views of the remaining Project facilities.

Closure and Decommissioning

Permanent closure would presumably occur 30 years after the start of operation, unless the Project remains economically viable. The industrial use currently proposed would then be considered an existing use in an area that will probably continue to be bounded by public recreation and natural resource lands, including SMAs.

4.3.2.3 **Alternative 1 – Hybrid-Cooled**

The hybrid alternative would result in effects to SMAs similar to those described under the Applicant's Proposed Project.

4.3.2.4 **Western's Switchyard and Telecommunication System**

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. The proposed switchyard site is not located within or near a SMA. Therefore, construction and operation of the proposed switchyard would not impact any SMAs.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The existing Bouse-Kofa 161-kV transmission line does not cross any SMAs. Because stringing of cable would occur within an existing transmission line corridor, there would be no impacts to SMAs.

Microwave Alternative

The Bouse Substation and communication sites at Metal Mountain and Cunningham Peak are located outside of existing SMAs. As such, the installation of a microwave dish on an existing structure or monopole at these facilities would not impact SMAs. All construction activities would occur within the facility ROW, in previously disturbed areas.

4.3.3 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.3.4 Residual Effects

The Project is not expected to have any residual effects on SMAs based on the criteria outlined in this section.

4.3.5 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant’s Proposed Project could result in a cumulative impact on SMAs with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for SMAs includes lands within a 30 miles radius of the Project area. The ROI was selected based on potential visual effects to SMAs from the solar towers associated with the Applicant’s Proposed Project and the proposed EnviroMission solar project.

As described in Sections 4.3 (Special Management Areas) and 4.4 (Recreation), there would be no change to the recreation setting in any of the SMAs; however, views of the Applicant’s Proposed Project would impact the desired, primitive experience that visitors seek when visiting the adjacent Wilderness Areas, WSA, and Back Country and Scenic Byways. These views would be most apparent from locations closer to the Project and from peaks with expansive views.

The EnviroMission project, as currently proposed, would include two 2,400 foot solar towers, both of which would be 1,747 feet higher than the QSEP solar tower. According to the visual analysis conducted for this Draft EIS (see Section 4.16), the QSEP solar tower would be visible from portions of the Gibraltar Mountains Wilderness, East Cactus Plain Wilderness, Riverside Mountain Wilderness, Big Maria Wilderness, the Cactus Plain WSA, the Plomosa Back Country Byway, and the Highway 95 Scenic Byway (south of Quartzsite). Topography and distance would diminish or block the visual effects of the QSEP solar tower in portions of the nearby Wilderness Areas, WSAs, and Scenic Byway. At a height of 2,400 feet, there would be a higher probability that the EnviroMission solar towers could be seen, not only from the aforementioned areas, but in other areas beyond the cumulative effects ROI. Visitors to the Plomosa Back Country Byway would have unobstructed views of both the QSEP solar collecting tower and two 2,400 foot EnviroMission towers, and it is anticipated that the EnviroMission towers would be the more dominant feature given their height relative to the QSEP tower.

4.3.6 Short-Term Uses versus Long-Term Productivity

Implementation of the Project would create short-term and long-term changes to the landscape. This could have an indirect impact on the human uses in SMAs because views of the solar facilities could alter the recreational setting and experience in SMA's with expansive views of the Project area.

4.3.7 Irreversible and Irretrievable Commitments of Resources

If the Project area were to be reclaimed at the termination of the Project, there would be no irreversible impacts on SMAs associated with the Applicant's Proposed Project or other alternatives. However, the Project footprint could visibly persist from SMAs for some period of time beyond the Project completion. Even after reclamation efforts are complete, the composition of vegetation species and surface geomorphology in the recovery area could be different than the pre-Project setting, and additional time would then be needed for the native surface composition to reestablish. Ultimately, the native surface composition would be reestablished and would once again provide habitat and forage for wildlife. Thus, the operation of the Project would have an irretrievable impact on SMAs within the Project vicinity.

4.4 RECREATION

This section discusses the effects on recreation that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives. As described in Section 3.4, the recreation ROI includes lands within a 30 miles radius of the Project area. The larger geographic area was selected based on potential visual effects to recreational users within the ROI from the solar towers associated with the Applicant's Proposed Project.

4.4.1 Methodology for Analysis

The impact assessment is based on impacts to known recreational uses relative to construction, operation, maintenance, and decommissioning of the Project. The recreation impact analysis is based on review of the existing conditions (Section 0) and focuses on the indicators listed below in Section 4.4.2.

4.4.2 Indicators

An impact on recreation may result if any of the following were to occur from construction or operation of the Project:

- Conflict with existing Federal, State, and local recreation management plans and policies.
- Prevention of access to existing recreation areas or sites.
- Change in levels of use for existing recreation areas or sites.
- Creation of overcrowding to other recreation areas caused by “spill over.”

4.4.3 Direct and Indirect Effects by Alternatives

4.4.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant’s ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to be managed within the BLM’s framework of a program of multiple use, including recreation, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policies, and land use plans. Although the proposed Project would not be constructed, the lands on which it is proposed would still be available for future development, including uses similar to the proposed Project.

4.4.3.2 Applicant’s Proposed Project Alternative – Dry-Cooled

The Project area is within an Extensive Recreation Management Area not managed specifically to maintain recreational values, meaning that BLM management actions within this area are limited to custodial actions and do not require any implementation level planning. The Applicant’s Proposed Project would not be in conflict with the Extensive Recreation Management Area management, or any other existing Federal, State, or local recreation management plans or policies.

The Applicant’s Proposed Project would not directly impact an area with high recreational resource values, elevated public concern, or significant amounts of recreational activity. As discussed in Section 3.4.3, there are no commonly-used rockhounding sites within the Project area. No OHV routes are present within the Project area. The Applicant’s Proposed Project would not impact use of existing routes within the ROI, and would not prevent access to existing designated recreation areas or sites.

Indirect effects of the Applicant's Proposed Project include the potential for visitors in the Quartzsite area to congregate near the Project area for recreational viewing of the solar facilities. As is described in Section 4.16, depending on one's location, the Project facilities could be a dominant feature within the immediate landscape of the area, and could therefore become a draw for those interested in observing the Project structures. This potential increase in visitorship to the Project area could cause an increased recreational use of the areas immediately surrounding the Project area, thereby changing the level of recreational use.

An existing recreational feature that may be indirectly affected by implementation of the Applicant's Proposed Project is the Plomosa Back Country Byway. Located approximately 4 miles south of the Project area, the byway is the most immediate paved, public roadway to the south, and is likely to receive an increase in travelers wishing to obtain an elevated view of the Project. The byway is managed by the BLM to "expose visitors to local recreation opportunities and various multiple-use management programs, and interpret natural, cultural, geological, and scenic features" (BLM 2010a). Increased use of the Plomosa Back Country Byway as an indirect result of the Project could further expose visitors to these opportunities and features, thereby potentially broadening visitors' understanding of the area and its resources.

Potential visual impacts to recreational users within the Wilderness Areas, WSA, Back Country Byway, and Scenic Byway in the vicinity of the Project are described in more detail in sections 4.16.3 (Visual Resources) and 4.3.2 (Special Management Areas).

Closure and Decommissioning

Once constructed and in operation, the proposed Project has an estimated life of at least 30 years. The industrial use currently proposed would then be considered an existing use in an area that will probably continue to be bounded by public recreation and natural resource lands. Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint; conditions that would have been maintained for the life of the Project. Appropriate rehabilitation of the site would need to be revisited to determine consistency with land uses existing at the time of closure. A return to the drainages and topography that existed at the time of construction may not be appropriate and could, in fact, result in unacceptable impacts to surrounding properties. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. However, the Applicant's Decommissioning Plan would include a provision for rehabilitation of the site to be consistent with land uses existing at the time of closure. This would reduce any land use consistency issues to a minimum and would not disrupt recreational uses in the surrounding area.

Impacts associated with closure and decommissioning would likely benefit recreational values, since additional acres would be reclaimed; thereby, made available for active or passive recreational use.

4.4.3.3 **Alternative 1 – Hybrid-Cooled**

Implementation of the hybrid alternative would result in effects to recreation similar to those described under the Applicant's Proposed Project.

4.4.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. The proposed switchyard site is not located within an area that experiences significant amounts of recreational activity. As such, construction and operation of the switchyard would not affect existing or future recreational uses of lands on or near the proposed switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

No impacts to existing recreational uses would be expected to occur. Because stringing of cable would occur within the existing Bouse-Kofa 161-kV transmission line corridor, there would be no long-term impacts to recreation. The temporary nature of construction would limit impacts to recreation. Creation of new access road, if required, and the use of existing roads are not expected to change the use of the access roads or increase accessibility of areas for other users. The use and management of existing roads would remain unchanged. Affected BLM land would remain available for dispersed recreation activities. No indirect or permanent impacts to recreation are expected as a result of fiber-optic cable installation. Access to adjacent recreation areas from users is not expected to change because the condition of the roads is expected to remain relatively unchanged.

Microwave Alternative

The area that may be affected by the installation of a new microwave dish at the Bouse Substation, or communication sites at Metal Mountain or Cunningham Peak, would be limited to the fenced area within the existing facility. Under this option, the microwave dish would be installed on an existing structure or new monopole within the facility ROW. As such, there would be no impacts to recreation.

4.4.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.4.5 Residual Effects

The Project is not expected to have any residual effects to recreation, based on the criteria outlined in this section.

4.4.6 Cumulative Impacts

The geographic scope of the cumulative effects analysis for recreation includes lands within a 30 mile radius of the Project area, with an emphasis on specially-designated recreation areas (including LTVAs and other camping areas).

As described in Section 3.4.3, during winter months, lands within the recreation ROI experiences a tremendous influx of temporary residents. Estimated at more than 100,000 people, many visitors camp throughout the region (La Paz County 2005). During the peak period of winter, visitation recreational resources receive a high level of use. Within the Project vicinity, visitors utilize the five BLM-designated 14-day camping areas for shorter stays, and the La Posa LTVA for longer-term stays. If construction of the Project occurs during peak winter visitation, the presence of the expected 400- to 500-person peak workforce coupled with the high number of winter visitors has the potential to lead to an overcrowding of LTVA facilities in the region. Because of the estimated duration of construction, some workers are likely to temporarily reside within the La Posa LTVA. Depending on the number of workers utilizing the LTVA, use could impact the social setting or the physical infrastructure. However, this potential construction-associated impact would be limited to the projected 30-month construction period, and only during times of peak winter visitation.

As of July 2011, the only project under construction in the recreation cumulative effects ROI is the Blythe Solar Energy Project, approximately 30 miles west of the Project area. It is unlikely the proposed Project would be constructed during the same period as the Blythe Solar Energy Project or other pending projects listed in Table 4.1, and therefore the Applicant's Proposed Project and the Blythe Solar Energy Project, are unlikely to have a cumulative impact on recreation resources. Workforce numbers for the proposed EnviroMission project are not available, based on the current status of that project. Therefore, it is too speculative to forecast the potential impact the Applicant's Proposed Project would have when combined with the EnviroMission would have on the visitation or use of the regional LTVA and other camping areas within the ROI.

4.4.7 Short-Term Uses versus Long-Term Productivity

Implementation of the Project would restrict recreational access and activities within the 1,675 acre Project footprint for the life of the Project (up to 30 years). However, it would not restrict access to existing recreation areas or sites, nor would it restrict recreational activities such as OHV use on adjacent lands. Implementation of the Project would create long-term disruptions of the visual quality of the recreational experience because of soil and vegetation disturbances and changes to land use to an industrial setting.

4.4.8 Irreversible and Irretrievable Commitments of Resources

After termination of the Project, the Project area could be reclaimed; therefore, there would be no irreversible loss of recreation opportunities associated with the Applicant's Proposed Project or other alternatives. However, the Project footprint could visibly persist for some period of time beyond the Project completion. Even after reclamation efforts are complete, the composition of vegetation species and surface geomorphology in the recovery area could be different than the pre-Project setting, and additional time would then be needed for the native surface composition to be reestablished. This would not be an irreversible change to the recreation setting, but could result in displacement of recreation users or alteration of their experiences or activities.

Construction and operation of the Project would alter the adjacent scenery to a more industrial setting, as viewed from within nearby recreation areas; but, as described above, the existing landscape setting would be restored upon reclamation.

4.5 TRANSPORTATION AND TRAFFIC

This section discusses the effects on traffic and transportation that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives.

4.5.1 Methodology for Analysis

The area of analysis for transportation and traffic consists of the Project area and the access routes that would be used for Project construction and operation, as discussed in Chapter 3, Section 3.5.

The impacts analysis for transportation and traffic in the Project area and the adjacent traffic interchanges discusses changes to the LOS that would result from the Applicant's Proposed Project and alternatives. LOS is a qualitative measure of the traffic operations at an intersection or on a roadway segment. At signalized intersections, LOS is calculated for each movement. At unsignalized intersections, LOS is calculated for those movements that must either stop for or yield to oncoming traffic.

LOS is ranked from LOS A, which signifies little or no congestion and is the highest rank, to LOS F, which signifies congestion and jam conditions. LOS C or better is typically considered adequate operation at signalized and un-signalized intersections in rural areas. The impacts analysis also discusses (1) changes that would occur to the total miles of routes in the existing transportation system and the resulting impacts to transportation and traffic, and (2) changes in access to the existing transportation and traffic network.

Due to high seasonal fluctuations in traffic in the area during the winter months, the traffic counts are based on potential January peak traffic volume levels in this area, using established ADOT factors to account for seasonal variations.

4.5.2 Indicators

Based on ADOT guidelines, future peak hour factors (PHF) for the Project were used, as found in the ADOT Traffic Engineering Policies Guidelines and Procedures Section 240 Traffic Impact Analyses (ADOT 2000). Future peak hour represents how many vehicles per hour (vph) are predicted to travel through a given area. The PHF utilized are as follows:

- PHF = 0.80 for < 75 vph per lane
- PHF = 0.85 for 73–300 vph per lane
- PHF = 0.90 for > 300 vph per lane

To assess the impacts of the Project on future traffic operations, traffic predictions were made for 2012 and 2014 (SWTE 2010). Construction would most likely take place between 2012 and 2014. A construction peak year of 2012 was assumed.

Due to a lack of detailed historic traffic data in the Project area, a growth rate could not be calculated. In light of this, a 5 percent growth rate was used to estimate traffic growth in the Project area.

4.5.3 Direct and Indirect Effects by Alternatives

4.5.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, impacts from increased construction and operation traffic would not occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

It should be noted that ADOT has indicated that a traffic signal will be constructed and activated at the intersection of SR 95 and SR 72 in 2011 (SWTE 2010).

Under the No Action alternative, the following ongoing transportation and traffic actions and activities are assumed to continue:

- Limited dispersed recreation across the Project area would continue. Motorized vehicle use would be limited to existing routes in the area.

- The existing routes in the Project area (SR 95) would remain open to motorized travel.

- All intersections would continue with the existing vehicular traffic volumes as reported in Chapter 3.

Level of Service

LOS was calculated for each intersection in the area of analysis for 2012 and 2014 under the No Action alternative. The predicted LOS for eight intersections were analyzed by comparing the predicted LOS with the existing LOS, as outlined in Table 4-2 and Table 4-3, and displayed the predicted LOS for the following intersections:

- SR 95/Main Street
- SR 72/SR 95
- I-10 Westbound Ramps/Quartzsite Boulevard
- I-10 Eastbound Ramps/Quartzsite Boulevard
- I-10 Westbound Ramps/Riggles Avenue
- I-10 Eastbound Ramps/Riggles Avenue
- Quartzsite Boulevard/Main Street
- Riggles Avenue/Main Street
- SR 95/Access Road

Table 4-2 Peak Hour Levels of Service During Construction (2012)

Intersection	No Action Alternative				Proposed Alternative[1]			
	Morning Peak		Afternoon Peak		Morning Peak		Afternoon Peak	
	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]
Signalized Intersections								
SR 95/Main Street								
Eastbound Approach	C	25.9	B	19.0	C	26.9	B	19.0
Westbound Approach	C	26.6	B	19.7	C	27.2	B	19.7
Northbound Approach	B	16.1	B	18.7	B	16.9	C	19.3
Southbound Approach	B	17.1	B	19.9	B	17.6	C	22.7
SR 72/SR 95								
Eastbound Approach	B	13.0	B	13.3	B	15.2	B	16.4
Westbound Approach	B	11.7	B	11.5	B	11.7	B	14.2
Northbound Approach	C	23.5	C	23.5	C	23.5	C	27.0
Southbound Approach	B	16.8	B	16.9	B	16.8	B	14.0
Un-signalized Intersections								
I-10 Westbound Ramps/Quartzsite Boulevard								
Northbound Left/Through	A	8.0	A	8.6	A	8.0	A	8.9
Westbound Left/Through/Right	B	11.8	B	14.5	B	12.8	C	15.0
I-10 Eastbound Ramps/Quartzsite Boulevard								
Southbound Left/Through	A	8.0	A	8.3	A	8.0	A	8.3
Eastbound Left/Through	B	12.4	C	17.5	B	13.8	C	17.5
Eastbound Right	A	9.2	A	9.9	A	9.2	A	9.9
I-10 Westbound Ramps/Riggles Avenue								
Northbound Left	A	7.9	A	8.3	A	7.9	A	8.4
Westbound Left	B	10.3	B	10.9	B	10.3	B	11.0

Table 4-2 Peak Hour Levels of Service During Construction (2012)								
Intersection	**No Action Alternative**				**Proposed Alternative[1]**			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**
Westbound Through	B	11.6	B	12.9	B	11.6	B	13.2
Westbound Right	A	9.2	A	9.6	A	9.4	A	9.6
I-10 Eastbound Ramps/Riggles Avenue								
Southbound Left	A	7.9	A	8.1	A	7.9	A	8.1
Eastbound Left	B	12.3	B	15.0	B	12.3	C	16.1
Eastbound Through	B	13.3	C	16.1	B	13.3	C	17.3
Eastbound Right	A	8.7	A	8.8	A	8.7	A	8.8
Quartzsite Boulevard/Main Street								
Eastbound Left/Through/Right	A	9.0	A	9.6	A	9.2	A	9.9
Westbound Left	B	11.3	C	18.3	B	11.8	D	25.2
Westbound Through/Right	A	8.5	A	9.2	A	8.7	A	9.2
Northbound Left/Through	A	9.2	A	9.8	A	9.3	B	10.0
Northbound Right	A	9.9	B	12.7	B	11.3	B	13.4
Southbound Left/Through/Right	A	9.0	A	9.7	A	9.1	B	10.0
Riggles Avenue/Main Street								
Eastbound Left	B	12.0	C	15.0	B	12.8	C	15.0
Eastbound Right	A	9.5	B	10.3	A	9.5	B	10.5
Northbound Left	A	7.8	A	8.0	A	7.8	A	8.0
SR 95/Access Road								
Southbound Left	N/A	N/A	N/A	N/A	A	9.7	A	7.9
Westbound Left/Right	N/A	N/A	N/A	N/A	A	0.0	D	32.8

[1]Data for the Applicant's Proposed Project is identical to Alternative 1.
[2]Delay is reported in seconds.
Source: SWTE 2010

Table 4-3 Peak Hour Levels of Service During Operation (2014)								
Intersection	**No Action Alternative**				**Proposed Alternative[1]**			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**
Signalized Intersections								
SR 95/Main Street								
Eastbound Approach	C	26.4	B	16.4	C	26.5	B	16.5

Table 4-3 Peak Hour Levels of Service During Operation (2014)								
Intersection	**No Action Alternative**				**Proposed Alternative[1]**			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**
Westbound Approach	C	27.2	B	17.0	C	27.3	B	17.0
Northbound Approach	B	16.7	C	22.4	B	16.8	C	22.5
Southbound Approach	B	18.3	C	24.4	B	18.4	C	24.6
SR 72/SR 95								
Eastbound Approach	B	13.3	B	13.5	B	13.4	B	13.6
Westbound Approach	B	11.7	B	11.5	B	11.7	B	11.5
Northbound Approach	C	24.6	C	24.6	C	25.3	C	25.3
Southbound Approach	B	16.8	B	16.9	B	16.8	B	16.9
Un-signalized Intersections								
I-10 Westbound Ramps/Quartzsite Boulevard								
Northbound Left/Through	A	8.1	A	8.8	A	8.1	A	8.8
Westbound Left/Through/Right	B	12.5	C	16.3	B	12.6	C	16.2
I-10 Eastbound Ramps/Quartzsite Boulevard								
Southbound Left/Through	A	8.1	A	8.5	A	8.1	A	8.5
Eastbound Left/Through	B	13.2	C	20.1	B	13.3	C	20.5
Eastbound Right	A	9.2	B	10.1	A	9.2	B	10.1
I-10 Westbound Ramps/Riggles Avenue								
Northbound Left	A	8.0	A	8.4	A	8.0	A	8.4
Westbound Left	B	10.5	B	11.1	B	10.5	B	11.2
Westbound Through	B	12.0	B	13.5	B	12.0	B	13.5
Westbound Right	A	9.3	A	9.8	A	9.3	A	9.8
I-10 Eastbound Ramps/Riggles Avenue								
Southbound Left	A	8.0	A	8.1	A	8.0	A	8.1
Eastbound Left	B	12.9	C	16.1	B	12.9	C	16.2
Eastbound Through	B	13.8	C	17.2	B	13.9	C	17.3
Eastbound Right	A	8.7	A	8.8	A	8.7	A	8.8
Quartzsite Boulevard/Main Street								
Eastbound Left/Through/Right	A	9.2	A	10.1	A	9.2	A	10.1
Westbound Left	B	11.9	C	21.8	B	12.1	C	22.8
Westbound Through/Right	A	8.6	A	9.4	A	8.7	A	9.5
Northbound Left/Through	A	9.4	A	10.0	A	9.4	B	10.1
Northbound Right	B	10.5	B	14.2	B	10.6	B	14.5

Table 4-3 Peak Hour Levels of Service During Operation (2014)								
Intersection	**No Action Alternative**				**Proposed Alternative**[1]			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay**[2]	**LOS**	**Delay**[2]	**LOS**	**Delay**[2]	**LOS**	**Delay**[2]
Southbound Left/Through/Right	A	9.1	A	10.0	A	9.2	B	10.1
Riggles Avenue/Main Street								
Eastbound Left	B	12.6	C	16.5	B	12.6	C	16.6
Eastbound Right	A	9.6	B	10.6	A	9.6	B	10.6
Northbound Left	A	7.8	A	8.1	A	7.8	A	8.1
SR 95/Access Road								
Southbound Left	N/A	N/A	N/A	N/A	A	8.0	A	8.0
Westbound Left/Right	N/A	N/A	N/A	N/A	B	12.1	B	12.2

[1]Data for the Applicant's Proposed Project is identical to Alternative 1.
[2]Delay is reported in seconds.
Source: SWTE 2010

Under the No Action alternative, the Project area intersections would continue to operate at a LOS C or better in 2012 and 2014.

A traffic signal would be installed at the intersection of SR 72/SR 95 regardless of the alternative selected. Existing LOS at this intersection are LOS A and B. Following installation of the traffic signal, LOS will decrease to LOS B and C. For all other intersections, when compared to the existing conditions, the predicted LOS ratings would be similar in the mornings, with slight decreases in LOS in the evenings as a result of predicted growth in the area.

The No Action Alternative would have no impact to the LOS for transportation and traffic.

Transportation Routes

Transportation routes would not be impacted under the No Action Alternative, as there would be no Project-related increases in traffic or vehicle use.

Changes in Access and Infrastructure

Access and transportation infrastructure would not be impacted under the No Action Alternative, as there would be no new roads, upgrades to existing roads, or closures of existing roads.

4.5.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Levels of Service

The Applicant's Proposed Project would change the existing traffic conditions due to the increase in heavy truck traffic and frequent daily trips, resulting in slightly lower LOS during construction (Year 2012).

At the expected construction peak, 450 workers would be needed. In order to analyze the worst case scenario, i.e. peak construction, it was determined that 450 vehicles carrying construction workers would be driving to and from the Project area each day during the typical morning and afternoon peak hours. With construction complete, the operation of the Project would require 45 permanent employees (Table 4-4).

Table 4-4 Weekday Project Generated Trips

Time Period	Construction Peak (2012)	Operation (2014)
Morning Peak Hour, Inbound (vph)	450	35
Morning Peak Hour, Outbound (vph)	0	10
Total Morning Peak	**450**	**45**
Afternoon Peak Hour, Inbound (vph)	0	10
Afternoon Peak Hour, Outbound (vph)	450	35
Total Afternoon Peak	**450**	**45**
Source: SWTE 2010		

As shown in Table 4-4, the intersection of SR 95/Access Road is predicted to operate at a LOS D in the afternoon peak hour for the westbound left/right turn movement. This is due to the high number of vehicles turning left out of the Project area, delaying vehicles making a right turn (SWTE 2010).

Westbound left-turning traffic at the Quartzsite Boulevard/Main Street intersection is also predicted to operate at a LOS D in the weekday afternoon peak hour during Project construction in 2012 (SWTE 2010). This is due to the overall high number of westbound left-turning vehicles and the limited capacity of an all-way stop controlled intersection.

Per ADOT guidelines, a LOS C or better is typically considered adequate operation at signalized and un-signalized intersections in rural areas. In the case of the intersection at Quartzsite Boulevard/Main Street, for approximately 4 months out of the year when the Town of Quartzsite hosts numerous gem and mineral shows, swap meets, and winter visitors, the Town reflects an urban character with much higher traffic volumes. The LOS D would occur during this time and is considered adequate for such conditions. As a temporary condition caused by both the construction of the Project and high winter traffic volumes, further mitigation measures are not recommended at this intersection.

The predicted construction traffic at the SR 95/Access Road intersection would greatly increase (approximately 450 Project-generated vph during the morning and afternoon peaks) under the Applicant's Proposed Project when compared to the No Action Alternative. As part of the Project design described in Chapter 2, a left turn lane would be added to southbound SR 95 to prevent a decrease in LOS for through-traffic. Under current ADOT regulations (ADOT Policies, Guides, and Procedures 245), a northbound right turn lane is not warranted as fewer than 200 vph are projected as through-traffic at this intersection during peak 2012 construction (SWTE 2010).

The additional operations traffic that would be generated by the Project following peak construction and full build-out (2014) has a limited effect on the LOS at the existing Project intersections when compared to the No Action alternative. The limited effect can be characterized as such due to the expected delay increases not being substantial enough to warrant a change in the LOS. Project area intersections are predicted to continue operating at LOS C or better during the weekday peak hours with full Project build-out in 2014 (SWTE 2010).

With construction complete, travel times would return to their existing level after full build-out is complete (2014). During Project operation, delays resulting from the increased left-turning during construction would return to near pre-construction levels. Therefore, there would not be any long-term impacts to LOS at any of the Project area intersections under the Applicant's Proposed Project.

Transportation Routes

The Applicant's Proposed Project would result in new paved and gravel roads within the Project area. Most of these routes would occur within the perimeter fencing and would be closed to unauthorized use. These routes would serve as internal roads used to access the solar field, power block, staff buildings, and other facilities within the Project's footprint and would only be authorized for Project staff and authorized guests.

A paved access road would be constructed from SR 95 to the Project area, a distance of approximately 0.5 mile. Other paved and unpaved roads would be developed within the Project area to provide access to the power block and other ancillary facilities. Deceleration and/or acceleration lanes would be constructed, as required, to meet the ADOT and La Paz County requirements where the Project access road would connect to SR 95. The Project access road would be a two-lane road, constructed for two directions of travel, with a minimum width of 24 feet and 2-foot-wide shoulders on each side of the road. Additionally, paved roads meeting this same general description may be constructed from the power block to the east and south edges of the solar field. Alternate surfacing for these road segments would be rock. A perimeter road would be constructed around the perimeter of the solar field and would be surfaced with rock. Permanent access roads as discussed above are anticipated to occupy approximately 2.3 acres.

Changes in Access

Under the Applicant's Proposed Project, approximately 1,675 acres would be occupied by Project components and would be fenced for safety and security purposes. There are no authorized OHV routes or other roads present within the Project area; therefore, there would be no changes in access within the Project area.

Closure and Decommissioning

Permanent closure would presumably occur 30 years after the start of operation, unless the Project remains economically viable. It is assumed that the number and type of workers required for closure and decommissioning activities would be similar to that described for construction of the Project. Also, it is assumed decommissioning activities would utilize the same regional and local roadways that currently serve the Project site. It is speculative to assume what the capacity or LOS of these roadways would be at the time of decommissioning activities because future conditions are unknown. However, as closure and decommissioning activities would be temporary in duration, resulting in similar or fewer vehicle trips to that presented for Project construction, no significant traffic or transportation impacts to area roadways or transportation-related facilities are expected to result from closure and decommissioning activities. Therefore, closure and decommissioning of the Project would not result in any direct permanent effects to local and regional roadway capacities serving the site, or alternative transportation facilities.

4.5.3.3 **Alternative 1 – Hybrid Cooled**

Under Alternative 1, the Project would be constructed using hybrid-cooling technology rather than dry-cooling, as under the Applicant's Proposed Project. Impacts to transportation and traffic as a result of the implementation of Alternative 1 would be the same as under the Applicant's Proposed Project.

4.5.3.4 **Western's Switchyard and Telecommunication System**

Western's Switchyard

Since construction of Western's switchyard would occur at the same time as the solar facility, impacts on transportation from construction and operation of Western's switchyard are analyzed in section 4.5.3.2.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Cable installation would occur within the existing Bouse-Kofa 161-kV transmission line ROW and would not affect local roadways. Existing roadways would be used during installation. Some short-term impacts to traffic and transportation could occur along SR 95, due to construction equipment using SR 95 to access the dirt road that parallels the transmission line. Western would be required to coordinate this activity with La Paz County and ADOT, if needed. Construction vehicles would comply with all local, State, and Federal laws and regulations.

Microwave Alternative

Transportation impacts are not expected from the installation of a new microwave dish at the Bouse Substation, or communication sites at Metal Mountain or Cunningham Peak. Under this option, the microwave dish would be installed on an existing structure or new monopole within the facility ROW. Existing roadways would be used to access Bouse Substation, Metal Mountain, or Cunningham Peak.

4.5.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.5.5 Residual Effects

Under the Applicant's Proposed Project and Alternative 1, there would be short-term and long-term increases in traffic volume that could not be eliminated completely through mitigation. Short-term increases would be large and would affect the LOS of roads in the vicinity, particularly during peak traffic times and especially within the Town of Quartzsite. Long-term increases would be very small and would not be likely to affect the LOS at any intersection in the area.

4.5.6 Cumulative Impacts

The ROI for transportation is limited to the La Posa Plain area within 15 miles of the Project area. The primary transportation corridors consist of I-10, SR 95, and SR 72. Additional roadways that are used as primary connectors are Main Street, Quartzsite Boulevard, and Riggles Road. Other improved and unimproved roadways exist throughout the ROI, including Plomosa Road, which accesses several campgrounds and the Town of Bouse.

Seasonal congestion exists on local roads as a result of thousands of tourists inhabiting the area during the winter months. However, the LOS is still ranked at LOS C or better, which are acceptable levels of service.

There are four large-scale construction projects being proposed within the ROI; however, only the EnviroMission project is anticipated to result in a cumulative impact to transportation. The Bouse, NextLight, and La Posa projects are not actively advancing their applications; therefore their potential impacts are too speculative to be considered here. The EnviroMission project is scheduled to initiate construction in 2014, possibly at a similar time as the Applicant's Proposed Project, although Western has not initiated an EIS for the interconnection. The EnviroMission project is located approximately 2 miles northwest of the Applicant's Proposed Project, on SR 95. Exact impacts to transportation as a result of this project are unknown given where the EnviroMission project is in the approval process. It is assumed that EnviroMission would have impacts comparable to other large scale renewable energy development, but that it would incorporate traffic control measures into their design to minimize impacts to vehicles traveling along SR 95.

Construction and operation of the Project under the Applicant's Proposed Project and Alternative 1 would contribute to the increase in traffic volume and alter the LOS. Under the Applicant's Proposed Project and Alternative 1, there would be an increase of 450 vehicle trips to and from the construction site twice per day (morning and afternoon). The LOS at most Project area intersections would remain at LOS C or better. At Quartzsite Boulevard/Main Street and at SR 95/Access Road, westbound left-turning traffic would experience LOS D during the evenings. This decrease in LOS and short-term impacts to traffic and transportation would improve as the peak construction of 2012 is completed and as the Project moves toward operation. The additional operations traffic that would be generated by the Project after peak construction would have limited effect on the LOS of the existing Project area intersections. Construction and operation of the Project under these alternatives would contribute to the increases in traffic and decreases in levels of service during the construction in the ROI, but would return to existing levels during operations.

4.5.7 Short-Term Uses versus Long-Term Productivity

The short-term use of the Project area (the 30-year lifespan of the Project) would not have a long-term effect on the traffic and transportation system in the surrounding area.

4.5.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible impacts associated with the Applicant's Proposed Project or Alternative 1.

4.6 AIR QUALITY AND CLIMATE

This section describes the analysis conducted to assess Project air quality effects and evaluate whether the Project complies with applicable Clean Air Act requirements and State air quality regulations. Emission estimates of both criteria pollutants and GHG are presented in Appendix D for Project construction, commissioning, and operation. Project GHG emission estimates are presented for information purposes. As there are no established significance criteria, this analysis makes no conclusions regarding GHG emissions.

4.6.1 Methodology for Analysis

For this Project, the air quality impact analysis area comprises the vicinity of the Project area, including the solar field and the adjacent transmission corridor to Western's switchyard.

The locale of the Project area in La Paz County is under the jurisdiction of the ADEQ with respect to air quality permitting and compliance. Certain State regulations would apply to the installation and temporary operation of construction and commissioning facilities. For the commissioning and operation of the Project, a Class II (minor source) Air Quality Permit would be obtained from the ADEQ prior to commencing construction.

The particulate emission contributions from earthmoving and vehicle travel within the Project area were determined using emission factors from the URBEMIS Version 9.2.4 program (an urban emissions software program). Similarly, the on-road emissions from daily worker commute were estimated using the URBEMIS program, with the default vehicle population profile, and travel mileages and ambient temperatures adjusted to reflect conditions for the Project locale. A summary of construction phase criteria pollutant emissions is provided in Appendix D.

Operation of diesel- and gasoline-fueled construction-related vehicles and temporary stationary equipment generates emissions of gaseous pollutants including NO_X, CO, and VOCs. South Coast Air Quality Management District factors were used as a tool for off-road vehicle and diesel-engine powered construction emissions analyses in this EIS. These South Coast Air

Quality Management District factors are based on the anticipated penetration of Tier II and more stringent engine performance standards into the population of construction vehicles and engine-driven equipment, and are acceptable for air quality analysis in Arizona. Emissions due to off-site vehicle travel related to construction (e.g., deliveries and commuter travel) were estimated using emission factors from the South Coast Air Quality Management District 2007 emission factor model for on-road delivery trucks and passenger vehicles. For this analysis, the factors associated with 2012-year vehicle and equipment population were used to assemble the inventory of emission rates for equipment exhausts. The estimates likewise assume the use of ultra-low sulfur diesel fuels that are now mandatory in California, Arizona, and elsewhere. The gaseous exhaust emissions of NO_X, CO, and VOC for onsite and offsite construction vehicles are listed in Table 1-1 in Appendix D.

4.6.2 Indicators

This analysis compares the Project emissions to significance thresholds for general air quality conformity analysis. Annual direct and indirect criteria pollutant emission rates were calculated for the construction and operational phases of the Project. The construction and commissioning phase emissions are non-recurring, discrete, and of limited duration and extent.

In a general sense, a significant impact on air quality as a direct result of the Project may be assessed based on the following indicators:

- Project emissions that would result in a declaration of non-attainment in a specific area for one or more criteria pollutants, or would cumulatively contribute to a net increase in any criteria pollution that would result in non-attainment of the area.
- Project emissions would result in a significant increase of any criteria pollutant for which the Project region is in non-attainment under an applicable local, State, or Federal ambient air quality standard.
- Air emissions that would cause sensitive receptors to be exposed to pollution concentrations that exceed State and Federal standards.
- Predicted emissions that would conflict with or obstruct implementation of an applicable air quality plan (general conformity).

For projects subject to the NEPA process, and for which maximum emissions would be above Major Source thresholds, a State Implementation Plan Conformity Analysis must be conducted in accordance with the general conformity rule, promulgated by the EPA on November 30, 1993 (58 FR 63214). The applicable regulations are provided within Title 40 of the CFR, Part 6, Part 51 Subpart W, and Part 93. For the Project, a reasonable Significance criterion is compared to the annual air pollutant emission trigger thresholds for the General Conformity Analysis. Because these thresholds are applicable to major sources of air pollution to be located in non-attainment areas, they provide a very conservative analysis tool to assess the Significance of the Project that would be located in an attainment/unclassifiable area.

4.6.3 Direct and Indirect Effects by Alternatives

In general, the extent of direct Project and cumulative impacts on air quality depend on emission source characteristics, pollutant types, emission rates, and meteorological and topographical conditions. For this Project, the air pollutant emissions would primarily occur during the construction and commissioning timeframe. The potential for air quality effects are, therefore, not long-term in nature, and this shapes the methodology of the impact assessment. There would be conventional earthmoving and construction vehicle emissions during the construction phase and emissions from fuel-burning equipment that would operate on a temporary, non-recurring basis during the latter steps in plant construction and commissioning. The impacts from these operations would be temporary and limited to the local area surrounding the Project.

For both phases of the Project, GHG emissions have been estimated. A conventional emission factor analysis was conducted to estimate phase-specific quantities of CO_2, methane (CH_4) and nitrous oxide (N_2O) emissions. The total of these GHG constituents, weighted for their relative global warming potential values, provides total GHG emissions in terms of carbon dioxide equivalent (CO_{2eq}). There may be small emissions of additional GHG constituents, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, but these trace components were not included in this analysis.

4.6.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

The net air quality benefits for making solar generation available to supply the current and future demands would not be realized under the No Action Alternative. In addition to possible net increases in conventional regulated pollutants, the burning of fossil-fuels to generate the equivalent power output would generate GHG emissions. For example, if natural gas were consumed to generate 110 MW for 5,000 hours per year, the total GHG emissions would be over 400,000 tons per year of CO_2 equivalent (a typical emission factor for natural gas-fired generation is 0.76 ton CO_{2eq}/MWh electricity).

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the direct air quality emission impacts from construction, salt conditioning, and operation from the proposed Project would occur and none of the indirect emission reduction benefits of the proposed Project from displacing fossil-fuel fired generation would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.6.3.2 **Applicant's Proposed Project Alternative – Dry-Cooled**

Construction Phase Air Emissions

Construction emissions can vary from day-to-day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. These emissions are primarily fugitive dust emissions from earthmoving and construction vehicle exhaust emission. In addition, there are fugitive and point sources associated with the aggregate plant and concrete batch plant, should these construction phase options be employed for Project area development. The emission inventory presented in Appendix D addresses estimated construction activity emissions associated with development of the Project area, including these onsite activities.

For GHG calculations from internal combustion, emissions factors have been published by the EPA/Climate Registry (EPA 2008a) and by the California Climate Action Registry (2009). For the planned construction period with the highest population and activity of construction equipment (Months 10 to 21), Table 1-4 in Appendix D lists the mass emission rates for each GHG constituent in metric tons.

Operational Phase Air Emissions

There is no combustion involved in the production of electrical power and the Project will have no connection to the natural gas pipeline network. Emission sources associated with operation of the Project are two emergency diesel fire pumps, and two emergency diesel generators. Additionally, the process of initial melting and conditioning of the liquid salt that takes place during the commissioning period will emit criteria pollutants, primarily nitrogen dioxide as a result of decomposition of magnesium nitrate, a contaminant in the salts, and operation of a fired heater necessary to melt the salt mixture from solid to liquid form. The initial melting of the salt is completed during the commissioning phase and this process is not necessary during the operational life of the project. Consequently, standard operation of the plant will not result in air emissions from permitted sources. The potential air quality effects of the salt conditioning process during commissioning and from periodic running of emergency diesel engines during operations will be mitigated by the use of appropriate control technology as required. During the operational phase of the Project there would be no routine air pollutant emissions associated with generation of electricity. The key parameters for each emission source category for the operational phase are summarized in Table 1-6 of Appendix D.

Summary of Project Air Emissions and Conformity Assessment

An overall summary of the Project air emissions during the construction and operational phases on the basis of highest 12-month period emission rates is provided in Table 1-8 in Appendix D. These emission rates reflect the period of the highest planned construction activity (Months 10 to 21), and a representative, peak-operation year during the operational phase. Even with the conservative operating assumptions described for this equipment, the annual emissions are below both Prevention of Significant Deterioration and Title V major source thresholds (EPA 2008b, 2010b). As discussed in the following section, none of these emission rates present the likelihood of a significant impact with respect to air quality.

Few of these criteria can be applied to the Project because the operational phase emission rates, which are the only emissions associated with the Project over the longer term, are far below both prevention of significant deterioration and similar significance thresholds for air quality impacts. This factor is recognized by ADEQ, in that an air quality permit is not generally required for new sources with criteria pollutant emissions that would be less than State permitting de minimis thresholds. (Note: certain types of sources, such as rotating machinery, may require a permit regardless of annual emission rate).

Consequently, it is reasonable to conclude that none of the significance criteria that pertain to the magnitude of criteria pollutant emissions, or to the modeled ambient concentration, increment consumption, or deposition effects, represents applicable significance criteria for the Project. Unlike conventional utility generation projects, the proposed Project does not rely on combustion of fuels to produce electricity. The long-range significance criteria that usually arise for fuel combustion at generating facilities, namely visibility impacts, and pollutant concentration increases in Class I and Class II protected areas would not pertain to the Project.

The Project would not pose the possibility of causing or contributing to a violation of air quality standards, or result in a change in pollutant concentrations in a non-attainment area. Several potential significance criteria, listed above, address the emissions of hazardous air pollutants.

Since the Project area is in a relatively undeveloped area of the State, it is outside the boundaries of the non-attainment areas associated with metropolitan Phoenix and surrounding developed areas. In accordance with the second step of the conformity determination process, the Project would not cause or contribute to any adverse change in air quality in a non-attainment or maintenance area. On this basis, the Project is formally exempt from a Federal General Conformity determination.

However, a reasonable indicator of Significance for the Project is comparison of maximum 12-month period emissions for the Project to the annual emission rate trigger thresholds for General Conformity Analysis. Because these thresholds are applicable to major sources of air pollution to be located in non-attainment areas, they provide a very conservative analysis tool to assess the Significance of the Project that would be located in an attainment/unclassifiable area.

The Clean Air Act General Conformity Requirements for the NEPA process provide the following conformity review steps:

1. Determine whether criteria pollutants or their precursors would be emitted from the Project
2. Determine whether emissions of criteria pollutants or precursors would occur in a non-attainment or maintenance area
3. Determine whether the Project is exempt from conformity determination
4. Estimate emissions and compare to the threshold emissions and the emissions inventory in the non-attainment or maintenance area

As presented in the section, there are emissions of criteria pollutants and precursors associated with the construction and operation of the Project. The ADEQ has designated all of La Paz County as being either in attainment or unclassifiable, with respect to the NAAQS.

As a conservative measure of Project significance, or in the unlikely event that the La Paz County locale is designated a non-attainment or maintenance area, Table 1-8 in Appendix D summarizes the emission estimates for the construction and operational phases of the Project, each on a maximum emission rate, 12-month basis. As discussed in the preceding sections, direct Project emissions during the operational phase relate to periodic operation of the emergency equipment and Project cooling towers. Indirect emission sources include employee vehicle commute, third-party trips to the plant. The magnitude of these emissions are far below both the General Conformity and the ADEQ air permitting de minimis thresholds, and thus do not present a likelihood of significant impacts. The facility would need to have an ADEQ Class II (Minor Source) air permit due to the categories of sources present, regardless of estimated actual emissions.

The construction phase emission inventory reflects the greatest potential for localized effects on air quality. However, even based on the conservative assumptions in this analysis, maximum 12-month emissions for the Project construction do not exceed the thresholds for a General Conformity analysis. Therefore, the magnitude of the emissions would not present a likelihood of significant impacts. In addition, construction emissions are transient in nature and would move through the Project area during construction. Project construction would occur at less-intense levels during most of the construction timeframe, compared to the 12-month period addressed in this analysis. Consequently, air quality impacts that could occur due to construction would not affect the same location for a significant period of time.

Closure and Decommissioning

The anticipated lifespan of the Project is estimated to be 30 years, unless the Project remains economically viable. Closure and decommissioning-related impacts would occur from the onsite and offsite emissions that would result when the facility is dismantled and the site is restored. Such impacts would be a one-time, limited-duration event. Given expected advances in fuel efficiency and other air quality control methods, it would be speculative to project the types and volumes of air emissions that would be associated with the construction and other equipment that would be necessary to decommission the Project. Nonetheless, as a conservative worst-case scenario, air quality impacts associated with the ultimate decommissioning of the Project are anticipated to be comparable in type and magnitude, but likely to be lower than, construction-related emissions.

4.6.3.3 **Alternative 1 – Hybrid-Cooled**

Construction Phase Air Emissions

It is reasonable to conclude that construction emissions would be nearly identical, within the conservative set of assumptions, for either of the Project cooling alternatives for the generation cycle (either dry-cooling or a hybrid-cooling system).

Operation Phase Air Emissions

The key parameters for each emission source category for the operational phase under Alternative 1 are summarized in Table 1-10 in Appendix D. Of the two cooling options, only the hybrid-cooling system would represent an air emission source. As discussed below, each option would have different air emission characteristics.

For the hybrid-cooling system option, aerosol drift release rate is based on the design water circulation rate in the water-cooled condenser tower of 36,691 gpm. The water-cooled condenser cooling tower would be equipped with a drift elimination system rated at 0.0005 percent by weight efficiency for either option. The PM_{10} and $PM_{2.5}$ emissions from the hybrid system cooling tower were calculated based on the estimated total dissolved solids concentration in the groundwater. From historical solar data, it is estimated that the Project would not be operated for more than 5,000 hours per year. For the hybrid case, the cooling tower would operate for up to 50 percent of the total generation plant operating hours.

The emergency diesel engine emissions are based on 60 minutes of maintenance testing once every 2 weeks, and a total annual operation of 50 hours. The diesel driven fire pumps emissions are based on 30 minutes of weekly testing, and a total annual operation of 50 hours.

Summary of Project Air Emissions and Conformity Assessment

The summary and conclusions of air emissions would be essentially the same as the Applicant's Proposed Project Alternative – Dry-Cooled. For the hybrid-cooling alternative, the generation cooling system would contribute less than 1 ton of particulate emissions per year.

4.6.3.4 Western's Switchyard and Telecommunications System

Western's Switchyard

Since construction of Western's switchyard would occur at the same time as the solar facility, impacts on air quality from construction of Western's switchyard are analyzed in section 4.5.3.2.

Western's proposed switchyard and the Project substation may include sulfur hexafluoride (SF_6) gas-filled circuit breakers. SF_6 is another GHG listed in EPA's endangerment finding. Since 2000, Western has had an aggressive program to identify and repair leaks throughout the transmission system to reduce SF_6 emissions. Western personnel would monitor the use, storage, and replacement of SF_6 to minimize any releases to the environment. The likelihood for accidental release is low, as SF_6 gas is supplied in sealed units. Both the breakers and gas cylinders are factory-certified not to leak. During operation of the new switchyard, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage and replacement of SF_6 to minimize any releases to the environment. During inspections, equipment would be monitored for detection of leaks, and repairs would be made as appropriate.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The installation of approximately 12 miles of new overhead fiber-optic cable on existing transmission line structures would be located within an existing utility right-of-way along an existing dirt road. Above-ground cable installation would generate minor amounts of vehicle exhaust emissions. The diesel PM emissions generated from proposed construction equipment and mobile sources are not anticipated to subject sensitive receptors to adverse levels of diesel PM or other emissions.

Installation of fiber-optic cable would be short-term (less than 2-weeks) in duration. Dust control measures, as described in Section 2.7, would be implemented during construction to minimize fugitive dust to less than significant levels.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or communication sites at Metal Mountain or Cunningham Peak would create short-term emissions from installation equipment and vehicle travel. Control measures, as described in Section 2.7, would reduce equipment and fugitive dust emissions to less than significant levels.

4.6.4 Mitigation Measures

For the Project, under either the hybrid- or dry-cooled alternative, mitigation of air quality effects would focus on the construction phase. Under ADEQ regulations, reasonable precautions to prevent the generation of airborne fugitive dust are required construction management practices. To meet this requirement, dust control measures as outlined in Section 2.5 would be implemented during Project construction to mitigate fugitive dust releases. As construction activities move from completed areas of the Project area, and along the transmission line corridor, disturbed surface soils would be stabilized by either watering/crusting, application of palliatives, or installation of a layer of gravel. These options are accepted techniques to reduce the likelihood of windblown dust. Taken together, the range of proposed mitigation measures would reduce the magnitude and extent of construction phase particulate emission impacts.

4.6.5 Residual Effects

The Applicant-committed measures and additional mitigation measures described in this air quality analysis would not avoid all effects on air quality due to the Project. The residual effects consist of the air pollutant emissions that would continue during the operational phase.

For both Project cooling alternatives, the operational phase air emissions do not cause significant residual effects. Based on the magnitude of annual emissions, the air quality regulations that apply, as issued by ADEQ, do not impose a permitting requirement or additional control requirements beyond the Applicant-committed measures. The total annual emission rates are far less than the annual rates deemed Significant under ADEQ rules.

4.6.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance and decommissioning of the Applicant’s Proposed Project could result in a cumulative effect on air quality when combined with the air quality impacts of other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis area consists of the La Posa Plains (see Figure 3-8). This geographic scope was established based on the natural boundaries of the affected resource, and not on jurisdictional boundaries.

There are two pending projects within the air resources ROI. They include the EnviroMission Solar Energy Project and the expansion/reopening of the American Bonanza Copperstone Gold Mine. There are several proposed solar energy projects within the ROI (Bouse Solar Energy Project, La Posa Solar, NextLight Solar); however, given the inactivity on the permit applications for those projects, there is no data available to assess the potential impacts that would result from their construction, operation, maintenance, and decommissioning. Therefore potential impacts associated with those projects are considered too speculative to be considered as part of this cumulative impacts analysis.

With respect to air pollutant emissions, it is anticipated that cumulative impacts would not be significant. The inherent nature of the atmosphere is that air emissions do not accumulate in a given locale, reducing the likelihood of cumulative impacts if emission rates are sufficiently small. Applying this principle, the ADEQ has generally adopted Federal regulatory significance levels for annual air emissions attributable to a given Project. These significance levels serve as an indicator of *de minimis* air emission levels. Projects with annual emissions below this level are presumed to not pose a significant cumulative risk to public health over the long-term. Emissions from the Applicant's Proposed Project are below these thresholds, and it is anticipated that the emissions from the EnviroMission project, consistent with other large scale renewable energy developments, would also be below those thresholds.

Construction of the reasonably, foreseeable projects within the ROI airshed would generate similar types of emissions and could contribute individually and cumulatively to impacts to local and regional air quality. During construction of the proposed Project, mitigation measures would be in effect to control and minimize equipment and fugitive dust emissions. If the EnviroMission project and mine project were to occur at the same time as the proposed Project, there would be potential for cumulative air quality impacts; however, each project would be required to implement mitigation measures, such as dust control to minimize the magnitude of those air quality impacts.

Examining the long-term Project emissions during the operational phase, even including onsite and commuter vehicles (which are not considered in the ADEQ significance criteria), the annual emissions per pollutant are at most 40 percent of the pre-Project significance levels. The comparison of annual emissions to regulatory significance levels for the hybrid-cooling alternative (the alternative with the higher particulate emissions), shows that maximum annual Project emissions would be 6.4 tons per year PM_{10} compared to 15 tons per year significance level. Further, since fossil-fuel combustion during the operational phase is limited to internal combustion emergency engines and vehicles, the emissions of hazardous or bio-accumulative constituents is closely regulated, and would be minimal. Based on where the EnviroMission project is in the approval process, there is no data available to characterize potential operational emissions associated with that project.

4.6.7 Short-Term Uses versus Long-Term Productivity

From the perspective of air quality resources, the short-term use of the resource by the Project, by generating relatively small quantities of air pollutant emissions, does not affect the long-term productivity of other resources in the Project area or the vicinity of the Project. The levels of emissions during the construction and the operational phases are not of sufficient magnitude to affect the long-term air quality in the locale of the Project.

4.6.8 Irreversible and Irretrievable Commitments of Resources

The inherent nature of the atmosphere is that air emissions do not accumulate in a given locale, which means that any air quality effects are transient if emission rates are sufficiently small. However, it is possible that air pollutant emissions would be captured and removed from the atmosphere by precipitation. This pathway does create a potential for some longer-lasting, even if not completely irreversible, effects. Examples include the lasting effects due to air emissions from fossil-fueled generation, such as acid rain, ozone damage to vegetation, and accumulation of nitrate, sulfate, or bio-accumulative toxins in soils. These long-lasting impacts are avoided with solar generation projects and would not occur as a result of the Project.

4.7 GEOLOGICAL RESOURCES

This section describes and evaluates the potential impacts on geological and mineral resources that may result from amending the YFO RMP and from implementation of the Applicant's Proposed Project or alternatives. This section also describes and evaluates the impacts that geological hazards may have on the Applicant's Proposed Project or alternatives.

4.7.1 Methodology for Analysis

For geological hazards, sensitivity was determined by the likelihood of a geological hazard occurring in the future by using the past occurrences of geological hazards in the same area as a guide. Geological hazards, such as earthquakes, typically cover large areas. Quaternary faults are considered to have a high level of sensitivity because they are probably still active and capable of generating strong earthquakes in the near future. Inactive (pre-Quaternary) faults are considered to have a lower sensitivity, because these faults could be reactivated in the distant future.

For mineral resources, sensitivity was determined by the presence of active mines and mining claims, as well as by any past mining operations.

4.7.2 Indicators

4.7.2.1 Geological Hazard Indicators

The following indicators were used for geological hazards:

- A geological hazard that exposes people or structures to potential and adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, or seismic-related ground failure (liquefaction).
- Is located on a geological unit or soil that is unstable or that would become unstable as a result of the Project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

4.7.2.2 **Mineral Resources Indicators**

The primary impact issue for mineral resources is the loss of economically significant mineral resources. The primary cause of direct and permanent disturbance of mineral resources is ground disturbance associated with construction of the Project, such as grading, excavation, or other ground-disturbing activities that may damage, remove, or cover up the geological units that host mineral resources. The following indicators were used for mineral resources:

- Results in the loss of availability of a known mineral resource that would be of value.
- Results in the loss or availability of a locally important mineral resource delineated on a local general plan, specific plan, or other land use plan.
- Results in the restriction of access to or of the availability of mineral resources.

4.7.3 Direct and Indirect Effects by Alternatives

4.7.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to geological resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.7.3.2 **Applicant's Proposed Project Alternative – Dry-Cooled**

All effects are considered to be direct effects, as no indirect effects were identified for geological hazards or mineral resources.

Unique geological resources would not be impacted by the Project because there are no known unique geological resources associated with the Project area.

The potential for earthquakes, ground shaking, or ground rupture in the Project area is low, but not non-existent. Ground-shaking as a result of an earthquake represents the most significant geological hazard to the Project area. Earthquakes have been recorded to the west of the Project area (in California) and can be expected to occur in the future at a similar magnitude and frequency as previously recorded. However, the Project area is not located within the trace of any known active fault. The Project would, therefore, not be likely to be exposed to ground rupture. Seismic hazards would be minimized by conformance, with recommended seismic-design criteria.

The probability of impact to the Project from slope stability, liquefaction, collapsible soils, expansive soils, or land subsidence is low to negligible. The gentle slope of the Project area limits the possibility of slope failure or of land sliding. There is no evidence of liquefying sediment or problem soils in the Project area. Land subsidence has not been observed in the La Posa Plain.

Given the absence of currently active mining or known mineral resources within the Project area, the potential impact to mineral resources is considered low. Nevertheless, indirect and permanent disturbance of mineral resources would be caused by the loss of mining-claim eligibility within the Project area for the life of the Project. The mineral-resource inventory found active mining claims within the ROI approximately 0.4 mile due west of the Project area, as well as an active gold mine (Copperstone Mine) located approximately 5 miles due west of the Project area. Both the active mining claims and the mine are operated by American Bonanza Gold Corporation. Project-related activities are not anticipated to have any impacts on these existing mining operations.

Closure and Decommissioning

The future decommissioning and closure of the Project should not negatively affect geological resources since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the Project.

4.7.3.3 Alternative 1 – Hybrid-Cooled

Impacts to geological and mineral resources from construction and operation of a hybrid-cooled solar plant would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative). Impacts from geological hazards would also be similar to those described above for the Applicant's Proposed Project.

4.7.3.4 Western's Substation and Telecommunication System

Western's Substation

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. There are no unique geological resources or existing mining claims that would be impacted by construction and operation of Western's switchyard. Impacts from geological hazards would be similar to those described above for the Applicant's Proposed Project.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

All construction activity associated with fiber-optic cable installation would be within an existing utility ROW. Construction of the telecommunications facilities would not impact geological resources or access to known mineral resources.

Microwave Alternative

Impacts to geological resources are not expected from the installation of a new microwave dish at the Bouse Substation or communication sites at Metal Mountain or Cunningham Peak. All construction activities would occur in previously disturbed areas within the facility ROW.

4.7.4 Mitigation Measures

Geological hazards would be minimized by conformance with recommended seismic-design criteria and BMPs. Specific mitigation measures are not necessary for geological or mineral resources in the Project area.

4.7.5 Residual Effects

No residual effects to geological resources or from geological hazards would result from implementation of the Applicant's Proposed Project or alternatives. The Applicant's Proposed Project would preclude excavation of mineral resources within the Project area for the lifetime of the Project.

4.7.6 Cumulative Impacts

No cumulative impact is foreseen from geological hazards. There may be cumulative impacts on mineral resources, if the proposed Project, combined with other reasonably foreseeable future projects restrict access to mineral resources in the future. However, impacts to mineral resources are generally localized and do not result in regionally cumulative impacts. Mineral resources vary according to the geological units containing them and may vary over short distances, effectively limiting the geographical range of the effects on mineral resources. Incremental impacts on mineral resources resulting from the construction, operation, and maintenance of the Project, alone or together with other present and reasonably foreseeable projects, should have minimal cumulative impacts.

4.7.7 Short-Term Uses versus Long-Term Productivity

Short-term Project uses would not affect the long-term productivity of geological or mineral resources.

4.7.8 Irreversible and Irretrievable Commitments of Resources

Mineral resources are considered nonrenewable and any disturbance to them would constitute an irreversible commitment of resources. However, the potential impact to mineral resources is considered low, as there are currently no active mining or known mineral resources within the Project area.

4.8 SOIL RESOURCES

This section describes and evaluates the potential impacts on soil resources that may result from amending the YFO RMP and from implementation of the Applicant's Proposed Project or alternatives.

4.8.1 Methodology for Analysis

Soil units within the Project area were assessed for high or moderate susceptibility to water or wind erosion. Soil susceptibilities to water and wind erosion were assessed based on standards from the Natural Resources Conservation Service.

4.8.2 Indicators

An impact on soil resources is considered potentially significant and, therefore, an indicator if it would:

- Result in increased potential for soil erosion.

4.8.3 Direct and Indirect Effects by Alternatives

4.8.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to soil resources from the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.8.3.2 **Applicant's Proposed Project Alternative – Dry-Cooled**

Construction activities would result in surface disturbance and removal of vegetation leading to increased potential for wind- and water-driven erosion. The only soil map unit within the Project area, the Superstition-Rositas series, exhibits a moderate to high susceptibility to water and wind erosion.

Grading activities would be conducted during the first few months of the construction schedule, and would be phased to minimize water needed for dust control. A small portion of the overall Project area would be paved; primarily the site-access road, the service roads to the power block, and portions of the power block (paved parking lot and roads encircling the steam turbine generator and solar steam generator areas). The remaining portions of the power block would be surfaced with gravel. The solar field would remain unpaved and without a gravel surface in order to prevent rock damage from mirror wash vehicle traffic. Water would be used for dust suppression on the dirt roadways within and around the solar field. Roads and parking areas located within the power block area and adjacent to the administration building and warehouse would be paved with asphalt.

Prior to construction, a Project-specific SWPPP would be developed that includes site-appropriate BMPs to reduce localized soil impacts from wind and water erosion. The site-appropriate BMPs may include stormwater BMPs; temporary erosion control measures, including BLM-approved dust suppression; and construction of berms and ditches, all of which would prevent accelerated soil erosion or dust generation.

As the construction activity is concluded in a given area of the Project area, the disturbed areas would be treated to greatly reduce, if not eliminate, the potential for future windblown dust. Such measures are necessary for the operation of the solar heliostat array. Dust accumulation on the mirror surfaces reduces solar collection efficiency and must be washed off periodically. As has become accepted practice for large solar generation facilities, the Project facility would maintain substantive dust abatement measures throughout the operational phase. Disturbed surface soils would be stabilized by either watering/crusting, application of palliatives, or installation of a layer of gravel. Such mitigation measures represent accepted techniques to reduce the likelihood of windblown dust and generally represent the "reasonable precautions" required by ADEQ regulations.

Incidents of elevated levels of windblown dust are unpredictable in La Paz County, but common experience is that these events may occur 10 to 20 hours per month on average, especially during the mid-summer monsoon pattern. At such times, short-duration, windblown dust plumes in the region significantly impair visibility. It is expected that the developed Project area would not contribute more to this phenomena than do the surrounding dry desert and/or agricultural areas. The combination of soil binder application, repeat soil watering to promote crust formation, and graveled vehicle roadways would make the Project area no more susceptible to release of windblown dust than native bare soil and likely less susceptible than the agricultural and desert areas in the vicinity.

Closure and Decommissioning

After the end of the Project's useful life, it would be decommissioned. The removal of the existing facility could result in disturbance to soil resources. These impacts would be similar to impacts that could occur during construction. To mitigate for any potential impacts associated with Project closure, the Applicant would be required to prepare a Decommissioning and Site Restoration Plan that meets the requirements of the BLM. The Plan would identify likely decommissioning scenarios and develop specific plans for each scenario that would identify actions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after decommissioning. Actions may include such measures as a decommissioning SWPPP, revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of Project materials and chemicals, groundwater well abandonment, and access restrictions.

4.8.3.3 **Alternative 1 – Hybrid-Cooled**

Impacts to soil resources from construction and operation of a hybrid-cooled solar plant would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

4.8.3.4 **Western's Substation and Telecommunication System**

Western's Substation

Approximately 6.9 acres of soil would be disturbed during construction of Western's switchyard. Prior to construction, Western would prepare and implement a site-specific SWPPP that describes BMPs to be used to reduce localized soil impacts from wind and water erosion. The BMPs may include stormwater BMPs; temporary erosion control measures, including BLM-approved dust suppression; and construction of berms and ditches, all of which would prevent accelerated soil erosion or dust generation.

Following construction, the switchyard would be fenced within a 4.6 acre area. Temporary disturbance areas would be reclaimed per BLM guidance.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The fiber-optic line route would cross soils that have moderate to high erosion potential by surface runoff and eolian processes. Soil disturbed during cable stringing is more susceptible to erosion, and compacted soil can accelerate storm water erosion. In addition, the proposed fiber-optic line route would cross numerous ephemeral streams. Vehicles and equipment crossing these ephemeral streams would disturb and compact the soil and potentially cause the loss of stabilizing vegetation. With implementation of measures and BMPs described in Section 2.7 that would ensure proper re-vegetation, erosion control, drainage, and seismic design, among other site-specific requirements, impacts from installation of fiber-optic cable would result in minor impacts to soil resources.

Microwave Alternative

Impacts to soil resources are not expected from the installation of a new microwave dish at the Bouse Substation or communication sites at Metal Mountain or Cunningham Peak. All construction activities would occur in previously disturbed areas within the facility ROW. Control measures identified in Section 2.7 would reduce equipment and fugitive dust emissions to less than significant levels.

4.8.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.8.5 Residual Effects

No residual effects to soil resources would result from implementation of the Applicant's Proposed Project or alternatives.

4.8.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on soil resources when combined with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for soils consists of the La Posa Plains (see Figure 3-8). This geographic scope was established since soils could be transported offsite by wind, and the watershed boundary, since surface flows could carry eroded soils offsite. Potential cumulative effects could occur at any point during the overall lifespan of the project, from pre-construction activities, to the conclusion of facility decommissioning and site reclamation.

Construction of the Applicant's Proposed Project or any other ground-disturbing activity within the soil resources ROI would result in soil disturbances that could incrementally increase local wind-borne soil erosion, fugitive dust events, and stormwater runoff. However, the Applicant's Proposed Project would be expected to contribute only a small amount to any possible short-term cumulative impacts related to soil erosion, because the Applicant would be required to implement soil and erosion control mitigation measures during construction and operation. It is anticipated that any other large-scale construction project would be required to implement similar mitigation measures during construction and operation, the net effect of which would be to minimize the magnitude of impacts to soil resources from such activities.

4.8.7 Short-Term Uses versus Long-Term Productivity

The construction and operation of the Project would result in short-term and long-term impacts that would affect soil resources. For the lifespan of the Project, vegetation would be cleared from the land surface within the Project area. This would result in accelerated rates of wind and water erosion within the Project area. Following the termination and restoration of the Project area, rates of wind and water erosion would return to naturally occurring rates. However, soil material lost to erosion over the lifetime of the Project would be permanently lost.

4.8.8 Irreversible and Irretrievable Commitments of Resources

The construction and operation of the Project would result in temporary and permanent changes to soil resources resulting from the disturbance of the land surface and removal of vegetation. Impacts on soil resources would be irretrievable for the life of the Project and until restoration is completed. Provided that the Project area is successfully rehabilitated with full restoration of the vegetation, irreversible impacts on soil resources would be minimal.

4.9 PALEONTOLOGICAL RESOURCES

This section describes and evaluates the potential impacts on paleontological resources that would result from amending the YFO RMP and implementation of the Applicant's Proposed Project or alternatives.

4.9.1 Methodology for Analysis

Sensitivity levels were determined based on the PFYC used by the BLM and the inventory of fossil localities. Literature research, institutional record searches, and the PFYC provided the information necessary to assign a sensitivity level of high, low, or moderate/undetermined to the Project area. Any future provisions for mitigation of adverse impacts to significant paleontological resources exposed during construction-related activities are based upon these determinations of sensitivity level. The terms "high sensitivity level," "moderate/undetermined sensitivity level," and "low sensitivity level" are defined below.

4.9.1.1 High Sensitivity Level

Geological units with a high sensitivity for containing significant paleontological resources are determined to have a high sensitivity level. In these cases, the geological unit contains a high density of recorded fossil localities, has produced fossils in or near the vicinity of the Project area, and is very likely to yield additional fossils during construction. Areas identified as having a class 4 or 5 in the PFYC system are considered to have a high sensitivity level.

4.9.1.2 Moderate/Undetermined Sensitivity Level

The geological unit has limited exposure in the Project area, is poorly studied, or contains no recorded paleontological resource localities. However, in other areas, the same or similar geological units may contain sufficient paleontological localities to suggest that exposures of the unit in the Project area would have at least a moderate potential for yielding fossils. Areas with a class 3 in the PFYC system are considered to have a moderate or undetermined sensitivity level.

4.9.1.3 **Low Sensitivity Level**

The geological unit contains no, or a very low, density of recorded fossil localities, has produced little or no fossils in the vicinity of the Project, and is not likely to yield any fossils. Nevertheless, geological units with few or no prior recorded fossil localities can still prove fossiliferous during paleontological mitigation activities. Areas identified as having a class 1 or 2 in the PFYC system are considered to have a low sensitivity level.

4.9.2 Indicators

The primary impact issue for paleontological resources is the loss of scientifically significant fossils and their contextual data. Two types of impacts could potentially affect paleontological resources:

- Direct and permanent ground disturbance during construction.
- Indirect and permanent disturbance due to changes in public accessibility or erosion.

An impact on paleontological resources is considered potentially significant and, therefore, an indicator if it would have a loss of or inaccessibility to scientifically significant paleontological resources. The primary concern regarding impacts to paleontological resources is that direct damage to or destruction of fossils would result in the loss of important scientific information. It is possible that ground disturbance, such as grading, could encounter important paleontological resources. In addition, adverse impacts indirectly associated with construction are a concern. For example, fossils could be subject to damage or destruction by erosion that is accelerated by construction disturbance. Improved access and increased visibility as a result of construction could cause fossils to be damaged, destroyed, or collected as a result of unauthorized collection or vandalism. However, not all impacts of construction are adverse to paleontology. Excavation can and often does reveal significant fossils that would otherwise remain buried and unavailable for scientific study. In this manner, excavation can result in beneficial impacts. Such fossils can be collected properly and catalogued into the collection of a museum repository so that they can be available for scientific study.

A rating of low residual impact assumes that scientifically significant fossil specimens and contextual information would be adequately collected from localities if they could not be avoided. Therefore, residual impacts on paleontological resources would be considered low to nonexistent, as long as proper mitigation procedures allowed the collection of significant fossils along with their contextual data.

4.9.3 Direct and Indirect Effects by Alternatives

4.9.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to paleontological resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.9.3.2 **Applicant's Proposed Project Alternative – Dry-Cooled**

The Applicant's Proposed Project is anticipated to have a low impact on paleontological resources within the Project area. The Project area contains only young alluvial deposits and eolian deposits. Based on a PFYC of 2 for these geological units and the absence of known fossil localities, the Project area is considered to have a low sensitivity level. However, fossil tortoises were found in similar eolian deposits approximately 20 miles north of the Project area; so there is a slight possibility of fossil vertebrates in the eolian deposits.

Closure and Decommissioning

The future decommissioning and closure of the Project should not negatively affect paleontological resources, since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the Project.

4.9.3.3 **Alternative 1 – Hybrid-Cooled**

Impacts on paleontological resources from construction and operation of a hybrid-cooled solar plant would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

4.9.3.4 **Western's Substation and Telecommunication System**

Western's Substation

Impacts on paleontological resources from construction and operation of Western's switchyard would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

__Fiber-optic Cable Alternative__

All construction activity associated with fiber-optic cable installation would be within an existing utility ROW. Construction of the telecommunications facilities would not be expected to disturb known paleontological resources located within the Project area.

__Microwave Alternative__

Because of the limited area impacted by the installation of a new microwave dish at the existing Bouse Substation, or at the Metal Mountain or Cunningham Peak communication sites, impacts to paleontological resources from construction-related ground disturbances are not expected.

4.9.4 Mitigation Measures

Specific mitigation measures are not necessary because of the low potential for paleontological resources in the Project area. However, should significant paleontological resources be discovered during construction, mitigation measures should be implemented to reduce potential adverse impacts to significant paleontological resources resulting from Project construction. The BLM requires a discovery stipulation, described below.

The Applicant will immediately notify the BLM Authorized Officer of any paleontological resources discovered as a result of operations under this authorization. The Applicant will suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and will protect the discovery from damage or looting. The Applicant may not be required to suspend all operations if activities can be adjusted to avoid further impacts to a discovered locality or be continued elsewhere. The Authorized Officer would evaluate, or would have evaluated, such discoveries as soon as possible, but not later than 10 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources would be determined by the Authorized Officer after consulting with the operator. Within 10 days, the operator would be allowed to continue construction through the site, or would be given the choice of either: (1) following the Authorized Officer's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource; or (2) following the Authorized Officer's instructions for mitigating impacts to the fossil resource prior to continuing construction through the Project area. Per IM 2009-011, the Applicant is responsible for the cost of any investigation necessary for the evaluation and for any mitigation measures, including museum curation.

4.9.5 Residual Effects

No residual effects to paleontological resources would result from implementation of the Applicant's Proposed Project or alternatives.

4.9.6 Cumulative Impacts

Impacts on paleontological resources are generally localized and do not result in regionally cumulative impacts. Paleontological resources vary according to the geological units that contain them. Geological units may also vary over short distances, effectively limiting the geographical range of impacts on paleontological resources. The impacts of the Applicant's Proposed Project on paleontological resources would be localized within the Project area. The suggested mitigation measures would ensure that the potential for adverse impacts on paleontological resources are minimized. There is, however, the potential for future projects in the vicinity to disturb areas that may contain known or unknown paleontological resources. Future projects with potentially significant impacts on paleontological resources would be required to comply with Federal and State regulations and ordinances protecting paleontological resources through implementation of similar mitigation measures as proposed here. Therefore, the potential construction impacts of the Applicant's Proposed Project in combination with other projects in the area would not contribute to a cumulative significant impact to paleontological resources.

4.9.7 Short-Term Uses versus Long-Term Productivity

Short-term Project uses would not affect the long-term productivity of paleontological resources.

4.9.8 Irreversible and Irretrievable Commitments of Resources

Paleontological resources are considered nonrenewable and any disturbance to them would constitute an irreversible commitment of resources. However, implementation of mitigation measures described above would minimize the potential for impacts to paleontological resources.

4.10 VEGETATION AND SPECIAL STATUS SPECIES

This section discusses the effects on vegetation and special status species that may occur from amending the YFO RMP, with implementation of the Applicant's Proposed Project and alternatives.

4.10.1 Methodology for Analysis

Analyses for impacts to vegetation resources were accomplished through a variety of methods, including literature review of habitat requirements for target sensitive species, onsite biological reconnaissance, review of various internet websites and databases, and discussions with resource personnel from the AZGFD, BLM, Desert Botanical Garden, and University of Arizona. Additional analysis included review of regional vegetation community classifications (Turner and Brown 1982; Lowry et al. 2005) and University of Arizona herbarium specimens.

A combination of aerial photograph interpretation, contract biologists' onsite experience, discussions with faculty and staff from the University of Arizona, Desert Botanical Garden, AZGFD biologists, and GIS software was used to characterize habitat types and quality.

4.10.2 Indicators

The Applicant's Proposed Project would impact vegetation resources if it:

- Alters the structure, function, value, and persistence of sand dune communities.
- Affects plant species such that the diversity or numbers of local populations were altered by interference with survival, growth, or reproduction.
- Destroys, degrades, or fragments habitat on a long-term basis.
- Introduces and/or increases the presence of invasive plants and noxious weed species.
- Interferes with desired future management outcomes identified for the Dunes WHA.

4.10.3 Direct and Indirect Effects by Alternatives

4.10.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to vegetation resources from the proposed Project would occur and none of the benefits of the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.10.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Native Vegetation Communities

The creosote bush-white bursage vegetation community covers the vast majority of the Project area, and is the most widespread community within the entire Lower Colorado River Valley Subdivision of the Sonoran Desert (Turner and Brown 1982). The degree of impacts would depend upon the extent (acres and linear feet) and duration (long- versus short-term) of the disturbance. The rate at which vegetation recovers following restoration and the effectiveness of restoration activities would also determine the degree of long-term impacts to vegetation communities.

Construction of the Project would result in either the removal or cutting to the soil surface of all vegetation within the heliostat array field. During the life of the Project, regular mirror washing and dust control measures would introduce moisture into the soil, which may allow native vegetation to reestablish in the spaces between the heliostat pedestals.

Site preparation would include the grading and clipping of vegetation within all areas to be disturbed. As described in Table 2-3, only 115 acres of the 1,675-acre Project area would require complete removal of all vegetation. The root system of existing vegetation would remain intact to the extent possible, to limit fugitive dust and soil erosion and to allow native vegetation to regrow. Impacts to Arizona native plants, including salvage, would be consistent with the ANPL.

Vegetation removal would not occur in areas where disturbance would be temporary. Rather, trucks and equipment would drive over and crush existing desertscrub vegetation without direct removal; or the vegetation would be cut to ground level, leaving the root system in place for soil stabilization. Temporary disturbance areas, such as staging and laydown areas would be re-vegetated with native plant species to the extent practicable after Project construction is finished.

Invasive Plant Species

Invasive species already present within the Project area (e.g., Asian mustard and schismus) could potentially spread as a result of increased moisture in the soil. Mirror washing and dust control measures would effectively introduce greater amounts of moisture into the soil than would otherwise be naturally occurring. This increased soil moisture has the potential to improve regeneration of plant species already established within the soil seedbank.

Land-disturbing construction activities could provide opportunities for invasive, non-native plants to initially establish or to become more widely established. To minimize the potential spread of invasive species, BMPs and mitigation measures to prevent the spread of non-native plant species would be identified in the Construction, Operation, and Maintenance Plan. A Weed Management Plan (as described in Section 2.7.3) would be developed.

Special Status Species

Scaly Sandplant

All available information indicates the scaly sandplant, a root parasite, does not occur within the Project area or in the immediate vicinity. The potential for occurrence of the species within the Project area is low. Activities associated with the construction, operation and maintenance, or decommissioning of the Project are anticipated to have little to no impact to this species.

Closure and Decommissioning

The proposed Project has an estimated life of at least 30 years, unless it remains economically viable. Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint, conditions that would have been maintained for the life of the Project. Over-compaction of the soil can resist seed movement into the soil profile, seed germination, subsequent seedling growth through the soil, and movement of water and nutrients into the root zone. A return to the drainages and topography that existed at the time of construction may not be appropriate and could, in fact, result in unacceptable impacts to surrounding properties. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. Measures identified in the

Weed Management Plan to minimize or avoid the spread of noxious weeds would be implemented during decommissioning.

While the Decommissioning and Site Reclamation Plan will be used as the basis for determining the standard for reclamation, revegetation, restoration, and soil stabilization of the Project area following decommissioning, the appropriate rehabilitation of the site would need to be revisited to determine consistency with land uses existing at the time of closure.

4.10.3.3 **Alternative 1 – Hybrid-Cooled**

Under the hybrid-cooled alternative, impacts to vegetation resources would be similar to those described for the Applicant's Proposed Project.

4.10.3.4 **Western's Substation and Telecommunication System**

Western's Substation

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. During construction, all vegetation within the footprint of the switchyard would be removed and the area would be covered with a layer of gravel. A Weed Management Plan would be prepared and implemented during construction and operation of the switchyard.

Following construction, temporary construction areas around the switchyard would be restored according to BLM requirements. In general, restoration activities would include the removal of excess rock/gravel, re-establishing pre-construction contours, spreading of stockpiled topsoil, and re-vegetation as appropriate.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-optic Cable Alternative

Although construction activities would occur in an existing utility ROW, temporary and permanent ground disturbance would occur and the use of construction equipment could result in various direct and indirect impacts to vegetation. Prior to construction, a rare plant survey would be required along the ROW corridor to identify the distribution of potentially affected special-status species. Direct impacts to native vegetation communities and special-status plants could occur during grading, or if plants are crushed or otherwise damaged by construction equipment and vehicle or foot traffic.

Ground-disturbing activities have the potential to indirectly affect adjacent vegetation communities by facilitating the transport and dispersal of invasive weed propagules, thereby potentially introducing new weeds and exacerbating invasions already present in the Project vicinity. Implementation of BMPs for weed management described in Section 2.7 would reduce the potential for the spread of noxious weeds from construction activities.

Microwave Alternative

Because of the limited area impacted by the installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites, impacts to vegetation or special status plant species from construction-related ground disturbances are not expected.

4.10.4 Mitigation Measures

The 1,675-acre Project area is entirely located within the Dunes Habitat Management Area. The Project footprint has been situated to avoid as many sensitive dunes as possible, within the ROW application area. This location would result in the loss of an estimated 11.5 acres of sensitive dune habitat. The remainder of the Project area comprises sand sheet (containing no dune features) and barren desert pavement (containing no loose sand and practically no vegetation).

The following represent mitigation measures that have been identified to minimize or reduce impacts to vegetation resources:

- In areas where sensitive biological resources have been identified, biological monitors would be assigned during construction operations. Responsibilities would include: (1) to promote avoidance, to the maximum extent possible, impacts to sensitive species, native vegetation, or other unique resources; (2) as appropriate, flagging boundaries of areas to be excluded from construction activities to protect native plants or sensitive species such as scaly sandplant; (3) monitoring such restricted areas during construction.

- The Applicant will develop a Weed Management Plan as described in Section 2.7.3 to control the impacts of the Proposed Project on invasive species on the Project site and to the extent that it does not exacerbate spread of invasive species on surrounding land. The Applicant does not propose to control invasive species outside of the proposed Project site.

- The Weed Management Plan will incorporate BMPs and Performance Standards as outlined in Section 2.7.3.

4.10.5 Residual Effects

Generic mitigation measures identified in the previous section do not mitigate all impacts. Residual impacts would include the long-term removal or disturbance of habitat in all areas occupied by the Project. This EIS would be used as a basis to create a long-term Biological Mitigation Action Plan that would promote adaptive-management strategies to mitigate unforeseeable impacts as they occur, including the spread of invasive species. In addition, any knowledge gained regarding effective treatment of invasive species, including Asian mustard and Arabian schismus, which may result from the Applicant's implementation of its Weed Management Plan, would be shared with the relevant agencies.

4.10.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on vegetation resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for vegetation includes the La Posa Plains (see Figure 3-8). The dominant vegetation community within the La Posa Plain is the creosote bush-white bursage series. This series occurs primarily in broad valleys, plains, and lower bajadas of the Mojave and lower Sonoran deserts. Creosote bush and white bursage are commonly co-dominant, with other associates such as saltbush, ocotillo, and a variety of cactus species.

Any development within the La Posa Plains that results in the clearing and grading of existing desert lands would have cumulative effects within the vegetation ROI. As of July 2011, there are only two reasonably foreseeable future projects within the vegetation ROI: the Applicant's Proposed Project and the EnviroMission Solar Project. If the proposed Project and the EnviroMission project were to be approved and constructed, up to 7,425 acres of desert lands would be disturbed. This includes the estimated 1,675 acres associated with the proposed Project and up to 5,750 acres for the EnviroMission project. The actual amount of lands to be permanently disturbed by the EnviroMission project is unknown; this acreage is based on EnviroMission's requested ROW application to the Arizona State Land Department; therefore the amount of disturbance could be less. Collectively, this acreage represents a very small percentage (less than 0.01 percent) of the La Posa Plains ROI. Additionally, both the Applicant's Proposed Project and the EnviroMission project would be required to restore their respective project sites after plant decommissioning, and therefore, most cumulative impacts to vegetation resources would only occur during the operational lifetime of the projects.

Other cumulative impacts may result if non-native invasive species are allowed to spread or be introduced in the area. Two invasive, non-native plant species are known to occur in the La Posa Plains area: Asian Mustard and schismus, an annual grass. To minimize the potential spread of invasive species, QSE will be required to implement agency-approved BMPs and prepare a Weed Management Plan prior to any ground-disturbing activities. It is assumed that if approved, EnviroMission would be subject to the same requirements to minimize the spread of invasive species.

The scaly sandplant is an Arizona BLM sensitive species and an Arizona Department of Agriculture highly safeguarded species. Scaly sandplant was not found within the Project footprint during biological surveys; however, a small population is known to occur approximately 7 miles north of the Project site. It is unknown whether the EnviroMission project site contains suitable habitat for the species, but it is anticipated that such habitat would be avoided to the extent practicable, if it were present on the EnviroMission project site.

4.10.7 Short-Term Uses versus Long-Term Productivity

Vegetation removal in the Project area footprint, linear facilities, and transportation and access corridors would negatively impact the long-term productivity of vegetation resources for the life of the Project. The vegetation communities present in the Project area are typically slow to recover, following reclamation and restoration activities. Estimates of the time that creosote bush-white bursage vegetation communities would require to recover vary; but other solar projects in similar creosote bush-white bursage vegetation communities have estimated that long-term productivity would be from a minimum of 5 to 10 years to more than 50 years following Project termination.

4.10.8 Irreversible and Irretrievable Commitments of Resources

Applicant-committed measures detailed in the mitigation measures would require the reclamation of disturbed areas immediately following temporary disturbances and termination of the Project. Long-term disturbance areas would constitute an irretrievable commitment of vegetation resources until active site reclamation and restoration of vegetation takes place. No irreversible commitment of vegetation resources is anticipated under the Applicant's Proposed Project and alternatives.

4.11 WILDLIFE AND SPECIAL STATUS SPECIES

This section discusses the effects on wildlife and special status species that may occur from amending the YFO RMP and with implementation of the Applicant's Proposed Project and alternatives.

4.11.1 Methodology for Analysis

Analyses for impacts to wildlife resources were accomplished through a variety of methods, including literature review of habitat requirements for target sensitive species, onsite biological reconnaissance, review of various internet websites and databases, and discussions with resource personnel from the AZGFD, BLM, and University of Arizona.

4.11.2 Indicators

The Applicant's Proposed Project would impact biological resources if it:

- Alters the structure, function, value, and persistence of sand dune communities.
- Affects wildlife species such that the diversity or numbers of local populations were altered by interference with survival, growth, or reproduction.
- Interrupts daily and/or seasonal wildlife movement and migration corridors.
- Destroys, degrades, or fragments habitat on a long-term basis.
- Introduces environmental changes that increase opportunities for predatory species, especially those of special status species.

- Interferes with desired future management outcomes identified for the Dunes WHA.

4.11.3 Direct and Indirect Effects by Alternatives

4.11.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to wildlife resources from the proposed Project would occur and none of the benefits of the proposed Project, such as the proposed Mojave fringe-toed lizard study, would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.11.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

General Wildlife

Construction and operation of the Applicant's Proposed Project would result in the direct loss of up to 1,675 acres of habitat currently used by a variety of native wildlife species, ranging from small invertebrates, mammals, and birds, to medium-sized mammals and raptors. Direct impacts to wildlife from ground-disturbing activities include injury and/or mortality from vehicles and earth moving equipment (e.g., collision, crushing, burying/suffocation in collapsed burrows).

Because construction and operation of Project facilities would require removal of vegetation, this impact to wildlife represents a loss of cover, nesting material, food sources, and soil stability. Native shrubs provide stability to loose, sandy soils, thereby enhancing the structure of small mammal-constructed burrows, commonly used by a host of additional species (i.e., arthropods, lizards, snakes).

Disruption of normal wildlife activity patterns is likely with the introduction of construction activity and ongoing operation of the Project. Disruptions could include introduction of artificial light sources and obstruction of movement routes due to perimeter fence installation. An increase in noise associated with construction and operation of the facility would dissuade many species from occupying or otherwise using habitat in the immediate vicinity of the Project. Wildlife species that tend to benefit from the introduction of human activities and related facilities, trash, and debris, such as ravens and coyotes, could pose a potential increased threat to resident prey species such as lizards, small mammals, and ground-nesting birds.

Mammal Species

The only mammalian species on the Arizona State BLM list of sensitive species are bats. Although no roosting habitat exists on the Project area, a few insectivorous bat species may forage over the Project area and could be attracted to the evaporation ponds for drinking or hunting of insects attracted to the ponds. Potential impacts from ingestion of the pond water would be similar to those discussed for avian species below.

Avian Species

The concentrating solar technology to be used for the Project involves the use of a large field of mirrors reflecting sunlight on a central receiver mounted on a solar collecting tower approximately 653 feet in height. In California's Solar One/Solar Two facility, a pilot project built with similar technology, some risk to birds was observed (McCrary et al. 1986). Birds would occasionally collide with the mirrors, which represented approximately 80 percent of bird mortality at the site. The risk of bird collision would exist at the Project, but is anticipated to be lower than at Solar One/Solar Two. The pilot project was sited in an agricultural area with nearby surface water and relatively high bird abundance for an arid region. The Quartzsite Project area is extremely arid with low bird abundance and diversity and very few year-round resident species. Any collision risk presented to birds by the Project may be minimized by reducing the overall attractiveness of the Project area. If bird abundance and impacts are determined to be at a level requiring additional measures to reduce the area's attractiveness, mitigation may include: vegetation management in the solar field, netting evaporation ponds, or hazing birds.

The remainder of bird mortality at Solar One/Solar Two involved a small number of species including swallows and swifts that fly and forage at much greater heights than most birds. Standby, maintenance, or test operations involved focusing mirrors on points away from the solar collecting tower and created areas with very high air temperatures capable of causing fatal burns to birds. This risk may be minimized by reducing the use of standby points during periods of observed avian activity and by measures implemented to reduce the overall attractiveness of the area to birds.

Evaporation ponds for the Project would be located just outside of the heliostat field. Such ponds can pose a hazard to wildlife, particularly birds. High levels of dissolved solids, such as sodium and sulfates, would be present and can affect birds that drink the water. Waterfowl may also be affected by the formation of salt crusts on feathers, reducing flight capabilities. Designing ponds to have steep banks with a depth greater than 3 feet reduces their attractiveness to some species. If needed, the Project evaporation ponds could incorporate netting or other measures to deter birds from pond use. If required, an Avian Protection Plan would be developed that would address monitoring and response to mortality events from collisions, burns, and any bird use of the evaporation ponds.

Although resident bird diversity in the Project area is low, a number of migratory bird species are likely to nest there. Compliance with the MBTA would require surveying for, delineating, and adhering to non-disturbance buffers for nesting birds during the breeding season.

Wildlife Linkages

Linkage 45 (La Posa Plain) was analyzed for impacts. The Applicant's Proposed Project would not preclude wildlife movement in the area.

Special Status Species

Golden Eagle

Although the potential for golden eagles occurring within the Project area is low, with the recent publication of the BLM's IM regarding the BGEPA – Golden Eagle NEPA and Avian Protection Plan Guidance for Renewable Energy (IM 2010-156), increased attention from Federal and State wildlife and land management agencies has increasingly focused on bald and golden eagle protection. This IM directs the BLM to incorporate "consideration of golden eagles and their habitat … into the National Environmental Policy Act [NEPA] analysis for all renewable energy projects." Specifically, IM 2010-156 stresses consideration of "whether breeding territories/nests, feeding areas, roosts, or other important golden eagle use areas are located within the analysis area" and further states that such determination is to be made in coordination with the USFWS. Coordination with the BLM, AZGFD, and USFWS has been ongoing throughout the NEPA process for this Project, to adequately address golden eagles.

The AZGFD and BLM have adopted a metric for identification of suitable nesting substrate as sloped with a 45-degree incline or greater within 10 miles of a project. Digital elevation data indicate that the nearest cliff ledges that could provide nesting habitat for golden eagles are approximately 5 miles to the east of the Project area in the Plomosa Mountains. The Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) shows no confirmed golden eagle breeding evidence for the entirety of La Paz County. Helicopter surveys conducted by the AZGFD in 2011, found no evidence of active golden eagle nesting sites within 10 miles of the Project area. With an apparently meager prey base in the area and no suitable nesting substrate, the potential for golden eagles using the Project area is low.

Indirect impacts would likely be a minor decrease in prey animals through the loss of native desert habitat. Construction of Project facilities would effectively result in the loss of up to 1,675 acres of potential foraging habitat because eagles are too large to maneuver between heliostats or other ancillary facilities while hunting. Additionally, increased vehicular traffic related to construction and operation of the facility, and potential increase of public traffic by Project workers or curious spectators on SR 95 could result in increased potential for collisions with eagles, especially if eagles are scavenging road-killed animals.

American Peregrine Falcon

Potential occurrence of peregrine falcons in the Project area is low due to distance from suitable nesting and foraging areas. Potential impacts to the species are those general to other raptors, namely collision or electrocution hazards posed by transmission towers, wires, the solar collecting tower, and heliostats.

Western Burrowing Owl

Burrowing owl burrows are not known to occur within the Project area; however, impacts could include the loss of foraging and breeding habitat, and potential loss of nest sites, eggs, or young.

USFWS Bird Species of Conservation Concern

Impact threats to USFWS Bird Species of Conservation Concern are primarily the same threats addressed above: loss of nesting and foraging habitat; increased predation from predators benefitting from artificial perches (i.e., fences, transmission towers); accidental destruction of nests, eggs, or young; and vehicle collisions.

Mojave Fringe-Toed Lizard

The geographic scope for impact analyses for the Mojave fringe-toed lizard was established at different scales: most immediate to the Project is the 5-mile ROI, secondarily, the species' range within Arizona was investigated in order to determine impacts to Arizona's Mojave fringe-toed lizard population, and finally, the species' entire distribution was taken into consideration to estimate the Project's potential impact to the species range-wide.

Implementation of the Applicant's Proposed Project would result in the loss of approximately 1,127 acres of sand sheet habitat that has not been documented onsite as supporting fringe-toed lizards, and 51.5 acres of moderate habitat that includes dune features and a 50-yard buffer (Section 3.11.4.5). No optimal habitat (active dunes) exists on the Project area. Total habitat acreage for the species rangewide is unknown, but because the vast majority of the range occurs in California, the potential loss of habitat by the Applicant's Proposed Project represents only a small fraction of the species' total habitat.

Direct impacts to the species would be loss of habitat and possible mortality from vehicular crushing. Eleven individuals were observed within the Project area during surveys in 2009 (EPG 2010a). Individuals within the area would be subject to these direct impacts.

Indirect impacts include fragmentation and possible degradation of remaining habitat, increased predation pressure from avian predators (such as loggerhead shrike [*Lanius ludovicianus*]) using new perching structures, and the introduction and spread of invasive plants.

Banded Gila Monster

Because Gila monsters seldom occur on low valley floors, it is very unlikely the species occurs within the Project area. No Gila monsters were observed within the Project area during site visits; however, the species does occasionally travel through the La Posa Plain. The only impacts the Applicant's Proposed Project may pose would be vehicle-caused injury or mortality.

Cheese-Weed Moth Lacewing

The cheese-weed moth lacewing was not observed on the Project area in three field visits. It is not known whether this species occurs on the site, but there is only a moderate potential of occurrence. If implemented, the Applicant's Proposed Project would result in the loss of habitat for the species because some vegetation would be cleared from the site. Because so little is known about this species, percentage of total cheese-weed moth lacewing habitat that would be lost is indeterminable.

MacNeil Sooty Wing Skipper

The MacNeil sooty wing skipper uses saltbush species as larval food plants. No saltbush plant species are known to occur within the Project area; therefore, vegetation clearing would not impact this species.

Wildlife Management Areas

The Project area is within the largest of four subunits comprising the Dunes WHA. As stated in the YFO RMP, the primary management focus for the Dunes WHA "would be that the amount of human disruption should decrease in proportion to the significance of the sand dune features, with more intensive use directed to sand dune areas of lesser significance or sensitivity" (BLM 2010a). Because level of significance or sensitivity criteria for sand dune features are not present in the YFO RMP, the present analysis is based upon contract biologists' onsite observations, aerial photograph interpretations, and conversations with other individuals experienced with biological research in the Project area.

Eolian sands mapped in this EIS, adapted from Muhs et al. (2003), account for approximately 48 percent of the Dunes WHA (26,569 acres of the total 54,696 acres) in which the Project is situated. The sand dune features within the Project area and within the southern half of the Dunes WHA are of lesser quality than those in the northern half of the WHA. The highest quality dune features in the area are beyond the WHA, within the Lake Havasu Field Office in the northern La Posa Plain and Cactus Plain. Acknowledging that sensitivity or significance of the dune habitat has not been determined, impacts to the Dunes WHA are based solely on acreage totals for the entire Dunes WHA (all four units); the Applicant's Proposed Project would result in conversion of up to 1,675 acres of Dunes WHA to solar energy generation facilities and associated infrastructure. This represents 3.1 percent of the total Dunes WHA.

Closure and Decommissioning

Once constructed and in operation, the proposed Project has an estimated life of at least 30 years. Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint; conditions that would have been maintained for the life of the Project. Appropriate rehabilitation of the site would need to be revisited to determine consistency with management requirements existing at the time of closure. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. Activities associated with decommissioning would comply with the MBTA and any other applicable regulations at the time of closure. Measures to avoid migratory bird nests and Mojave fringe-toed lizards should be taken.

4.11.3.3 Alternative 1 – Hybrid-Cooled

Under the hybrid-cooled alternative, larger evaporations ponds would be required. This would result in proportionally greater potential impacts to avian and bat species. Mitigation measures similar to those described for the Applicant's Proposed Project would be implemented. All other impacts to biological resources would be similar to those described for the Applicant's Proposed Project. Impacts from either telecommunications alternative would be similar to those described under the Applicant's Proposed Project.

4.11.3.4 Western's Substation and Telecommunication System

Western's Substation

Direct impacts to wildlife during construction of Western's substation may include injury or mortality from vehicles and earthmoving equipment (e.g., collision, crushing, burying/ suffocation in collapsed burrows). Sand dunes provide preferred habitat for the Mojave fringe-toed lizard. No sand dunes would be directly impacted by the switchyard, and no impacts to Mojave fringe-toed lizard are anticipated as a result of activities related to the switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Although construction activities would occur in an existing utility ROW, temporary and permanent ground disturbance would occur and the use of construction equipment could result in various direct and indirect impacts to wildlife. Prior to construction, a wildlife survey would be required in potential work areas along the ROW corridor to identify affected special-status species. Potential impacts to special-status wildlife include direct mortality from encounters with construction equipment, burrow/nest destruction during equipment staging, entombing adults, eggs, or young, and disruption or harassment. In addition, short- and long-term habitat loss and modification, as well as the potential spread of noxious weeds, could decrease local and regional wildlife habitat values. BMPs (Section 2.7) and mitigation measures to be used as part of the Project would minimize impacts to wildlife.

Microwave Alternative

Because of the limited area impacted by installation of a new microwave dish at the Bouse Substation, or at the Metal Mountain or Cunningham Peak communication sites, measurable impacts to wildlife or special status species from construction-related ground disturbances are not expected.

4.11.4 Mitigation Measures

The Project area has been situated to avoid as many sensitive dunes as possible, within the ROW application area. This location would result in the loss of an estimated 11.5 acres of sensitive dune habitat. The remainder of the Project area comprises sand sheet (containing no dune features) and barren desert pavement (containing no loose sand and practically no vegetation).

The following represent mitigation measures that have been identified to minimize or reduce impacts to wildlife resources:

- If wildlife species are found to be negatively impacted from access to the evaporation ponds, measures would be employed to restrict access or otherwise deter wildlife use.

- Evaporation ponds would be constructed with interior side slopes of at least 3:1 to discourage birds wading into the ponds. Also, pond hydrology (i.e., water volume and chemical concentrations) would be actively managed to minimize mortality associated with salt encrustation and/or salt toxicosis from ingestion of water.

- Mitigation for potential impacts to sand dune habitats in the Dunes WHA as a result of construction of this Project would be via an extensive study of Mojave fringe-toed lizard use of sand sheets and dunes that would be funded by SolarReserve. The Applicant has followed the YFO RMP guidelines to avoid and minimize impact to the habitat but recognizes that it will remove 1,675 acres of the Dunes WHA and has proposed the study with guidance from the BLM and AZGFD. See Appendix E for research proposal for "Status and ecology of the Mohave Fringe-toed Lizard (*Uma scoparia*) in the Bouse Dunes ecosystem, Arizona, focusing on the significance of peripheral sand-sheet habitat" dated March 25, 2011, and includes the following elements:

    - Occupancy, density, home range, and demography of Mojave fringe-toed lizard using statistical protocols combined with field sampling visits.

    - Asian mustard and other invasive vegetation species will be considered as part of this lizard study as confounding or interacting variables in the statistical sampling analysis.

    - As of the time of this writing, the study has received a commitment for additional funding sponsorship by the University of Arizona, elevating it to part of a PhD thesis. High quality scientific knowledge developed through the course of the study and in the final deliverables may be used by the AZGFD to create or improve the effectiveness of its species management policies, and by the BLM to create or improve the effectiveness of its land management policies or actions.

The proposed study assists with attainment of the Desired Future Condition identified in the Yuma RMP for the Dunes WHA to maintain sand dune habitats "to support native wildlife and plant species…"

4.11.5 Residual Effects

Generic mitigation measures identified in the previous section do not mitigate all impacts. Residual impacts would include the long-term removal of breeding, foraging, and cover habitat in all areas occupied by the Project. The Applicant's Proposed Project would include the removal of known and potential Mojave fringe-toed lizard habitat. General wildlife species that currently inhabit the Project area would be displaced into adjacent habitat.

Although efforts would be made to educate drivers on the potential for wildlife to cross the proposed access roads, the risk of wildlife mortality due to collisions with vehicles could not be fully mitigated. The mitigation measures listed above would help to lower the potential for road kills.

Road-related mitigation measures would attempt to make roads and other linear features more permeable to wildlife movement. Signs educating drivers on the potential for wildlife crossings on the road surface would help to reduce road barrier effects on large-bodied species. Slow speed limits (15 mph) would further increase the permeability of access roads. Despite these mitigation measures, road-related barrier effects may still occur and result in reduced gene flow between some wildlife populations.

Excluding wildlife from access to potentially toxic constituents within the evaporation ponds would help to reduce the long-term impacts of constituent bioaccumulation in bird and bat species. Although health effects to some individuals may still occur, this measure would lessen the potential for effects on individuals and populations.

This EIS would be used as a basis to create a long-term Biological Mitigation Action Plan that would promote adaptive-management strategies to mitigate unforeseeable impacts as they occur. As an example, an adaptive management strategy for bird and bat species may include the following components:

Post-Construction Monitoring

The process to detect incidents may include:

- Surveying the site periodically and with lower frequency over time, if warranted
- Reporting and recording mortality impacts to the USFWS, AZGFD, and BLM
- Training staff to implement a protocol including detection, response, documentation, reporting, and disposal

Post mortality Consultation

A collaborative determination (with the USFWS, AZGFD, and BLM) of the need to implement adaptive management strategies may be in consideration of several factors, including:

- Species impacted and its listing status
- Rarity of the species
- Effects to the population level of that species
- Whether previous mortality of the species has been reported at the ponds
- Total mortality of all species reported at the evaporation ponds

Implementation of Adaptive Management Measures

Strategies that may be employed after consultation with the USFWS, AZGFD, and BLM may include:

- Textured liner installed at corners of evaporation ponds to allow fallen bats and birds to crawl out of the water
- Anti-perching devices installed around the perimeter of each evaporation pond
- Visual deterrents to mimic avian and terrestrial predators
- Gas-fired “bird cannon” to frighten them away from the ponds, used intermittently to prevent acclimation
- Netting: After all other adaptive management techniques are exhausted, if it is determined that impacts from the evaporation ponds remain unacceptable, as a last and final resort netting can be installed on one or more of the ponds. The ponds would

initially be designed with adequate spacing for the installation of net support structures and cable tie down so the netting can be installed, while allowing the ponds to function as a means of evaporation.

4.11.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on wildlife resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for wildlife includes the La Posa and Cactus Plains (see Figure 3-8). The ROI was selected based on recommendations from the BLM, USFWS, and AZGFD biologists in order to facilitate an adequate assessment of the Mojave fringe-toed lizard and their habitat within Arizona. Other wildlife species considered in the cumulative analysis include general desert wildlife species (see Section 3.11.3 and 4.11.3.2) and sensitive Federal and State listed wildlife species (see Section 3.11.4 and 4.11.3.2).

Any development within the La Posa and Cactus Plains that results in the clearing and grading of existing desert lands would have cumulative effects on wildlife resources. As of July 2011, there are only two reasonably foreseeable future projects within the wildlife ROI: the Applicant's Proposed Project and the EnviroMission Solar Project. If the proposed Project and the EnviroMission project were to be approved and constructed, up to 7,425 acres of desert lands would be disturbed. This includes the estimated 1,675 acres associated with the proposed Project and up to 5,750 acres for the EnviroMission project. The actual amount of lands to be permanently disturbed by the EnviroMission project is unknown; this acreage is based on EnviroMission's requested ROW application to the Arizona State Land Department; therefore the amount of disturbance could be less. Collectively, this acreage represents a very small percentage (less than 0.01 percent) of the La Posa Plains ROI. Additionally, both the Applicant's Proposed Action and the EnviroMission project would be required to restore their respective project sites after plant decommissioning, and therefore most cumulative impacts to potential wildlife habitat would only occur during the operational lifetime of the projects.

Because construction and operation of the solar facilities would require removal of vegetation, this impact would represent a loss of cover, nesting material, food sources, and soil stability. Disruption of normal wildlife activity patterns is likely with the introduction of construction activity and ongoing facility operations. Disruptions could include introduction of artificial lights, obstruction of movement routes, and an increase in noise which may deter many species from occupying or otherwise using habitat in the immediate vicinity of the two projects.

The primary species of concern in the Project area is the Mojave fringe-toed lizard, a BLM-sensitive species. The preferred habitat for the Mojave fringe-toed lizard are areas containing fine, windblown sand dunes, flats, riverbanks, and washes of very arid desert with low growing vegetation (generally within creosote bush scrub desert habitat). Within Arizona, the species only occurs in La Paz County, at the extreme western edge of the state near Parker, into the Cactus Plain, Parker Dunes (also known as the Bouse Dunes), Bouse Wash area and the La Posa Plain from elevations of approximately 300 to 3,000 feet. Within these areas, suitable habitat is typically present only as discrete patches of windblown sand.

Implementation of the Applicant’s Proposed Project would result in the loss of 1,127 acres of desert pavement / non-dune habitat and 536 acres of sand sheet habitat that includes marginal dune features. Approximately 12 acres of optimal / moderate dune habitat for the Mojave fringe-toed lizard exists on the Project site. Total habitat acreage for the species rangewide is unknown. The vast majority of the species range, estimated to cover a 600 square-mile area, is located in the Mohave Desert in southern California (USFWS 2008). The cumulative effect from construction and operation of the Applicant’s Proposed Project and the EnviroMission project would result in the potential disturbance of up to 7,425 acres. The amount of suitable Mojave fringe-toed lizard habitat within this acreage is unknown. However, due to the concerns about potential impacts of the Applicant’s Proposed Project on Mojave fringe-toed lizard habitat, the prevalence of the Mojave fringe-toed lizard habitat was one of the considerations that factored into the site selection process. Additionally, the mitigation measures described in Section 4.11.4, would be required if the BLM plan amendment and ROW grant are approved to address what impacts do occur associated with the Applicant’s Proposed Project.

Both QSE and EnviroMission use solar power towers and above ground transmission interconnection facilities as part of their project design. As a result, there is a potential for bird collisions with those towers and the associated transmission interconnection facilities. Due to the lack of water within the ROI, bird diversity is very low, and therefore, the actual potential for bird collisions with either of these project features is low.

Other species of concern include bats, golden eagles, American peregrine falcons, western borrowing owls, banded Gila monsters, cheese-weed moth lacewing, and the MacNeil sooty wing skipper. These species are known to occur in the ROI, however, these species were not observed during biological surveys. However, as described above, any development within the La Posa and Cactus Plains that result in the clearing and grading of wildlife habitat would have cumulative effects on wildlife resources.

4.11.7 Short-Term Uses versus Long-Term Productivity

Impacts associated with construction activities would degrade the short-term quality of wildlife habitat. Construction impacts include increased human noise and activity, increased vehicle traffic on the access road, and the removal of wildlife habitat. After construction has finished, levels of human noise, activity, and vehicle traffic would be reduced, and temporary habitat disturbances would be reclaimed. This Project would reduce the amount of habitat available to wildlife species and displace wildlife individuals from habitat that has been removed or degraded.

4.11.8 Irreversible and Irretrievable Commitments of Resources

Irreversible impacts would consist of the increased risk of bioaccumulation of potentially toxic constituents in some bird and bat individuals through use of evaporation ponds. Irretrievable commitments would consist of wildlife habitat removal and wildlife displacement for the Project footprint and associated roads and power lines, which would be reclaimed after the temporary facilities usage or after the life of the Project.

4.12 WATER RESOURCES

This section discusses effects on water resources/hydrology that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives.

4.12.1 Methodology for Analysis

The methodology used to assess impacts to water resources/hydrology included a review of the water modeling studies conducted for the Project, and review of regional and local water resources investigations and studies.

4.12.2 Indicators

The Applicant's Proposed Project would affect water/hydrology resources if it would:

- Decrease groundwater supply or interfere with groundwater recharge
- Degrade the quality of groundwater such that it is no longer suitable for its intended use
- Degrade the quality of surface water by increasing erosion, increasing sedimentation, or introducing contaminated waters
- Increase the potential for flood hazards

4.12.3 Direct and Indirect Effects by Alternative

4.12.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to water resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.12.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

As described in Chapter 2, the Project would require 1,000 acre-feet of water during the first year of construction, and approximately 150 acre-feet per year over the next 2 years of construction. The construction phase water estimates include water for dust suppression during grading and along roadways as necessary; grading and compaction for the solar field, power block area, and building foundations; and concrete work. Water needs during operations and maintenance include three primary uses:

- Steam cycle makeup water – estimated at 100 acre-feet per year
- Mirror wash water – estimated at 70 acre-feet per year
- Other uses including a wet-surface air cooler for auxiliary equipment, service water, quench water – estimated at 30 acre-feet per year

Total Project use is not expected to exceed 200 acre-feet per year.

Project water would be pumped from wells onsite for both construction and Project operation. At this time, it is anticipated that up to three wells would be used. The Project pumping wells are located at the center, the southeast, and southwest corners of the Project area. All three wells would be active during the first year of construction, the period of highest water demand (1,000 acre-feet per year). Any one or more of the wells would be active during the subsequent two years of construction and the 30 years of operation.

Groundwater

Water removed from the La Posa sub-basin during Project pumping would be derived by removing water from storage, intercepting a small amount of subsurface outflow that would otherwise discharge to the Parker Valley Basin, and inducing a small increase in inflow from the Ranegras Valley Basin. Given the distance to the boundaries with these adjacent basins and the relatively modest water demand of the Project, the potential impact to the water budgets of these adjacent basins is not expected to be significant.

To support the evaluation of potential impacts from Project pumping, an analytical drawdown model was constructed in THWells version 4.01 (van der Heijde 1996). The THWells modeling code uses this equation to simulate drawdown and recovery from mountain front recharge, Project pumping, and subsurface underflow. Predictive simulations were run to assess the potential impacts of pumping on water levels in the La Posa sub-basin. Potential impacts to the basin water budget, surface water resources, recharge, solute transport, and subsidence were evaluated based on the results of the groundwater model.

Project pumping rates and durations for simulating drawdown from construction and operational phases of the Project were based on the following scenarios:

- After 1 year of construction pumping (the period of highest water usage – 1000 acre-feet per year)

- After 10 years of groundwater pumping (including 2 years of construction groundwater pumping at a reduced rate of 150 acre-feet per year and 7 years of operational pumping at a rate of 200 acre-feet per year)

- After 33 years at the end of the 30-year Project life.

For simplicity, the 2 years of pumping at the lower construction rate were grouped together and pumping was simulated at 200 acre-feet per year for 32 years.

Contour maps of estimated drawdown were produced for the end of the first year of construction as well as after 10 years and 33 years of construction and operational pumping. These contour maps show the estimated drawdown at each of the known wells onsite within the model domain. Projected drawdown is predicted to be at a maximum at the end of the first year of Project construction. Drawdown at this time is estimated to be approximately 14 feet at the three production wells and to decrease rapidly away from the wells. Drawdown is predicted to decrease to 2 feet at a distance of approximately 0.5 mile from the wells, and to decrease to less than 1 foot at distances greater than 0.75 mile from the Project area. Projected drawdown after 10 and 33 years of pumping is approximately the same, and is estimated to be approximately 1 foot near the site boundary and decreasing farther away from the Project area. The similarity of drawdown after 10 and 33 years indicates that drawdown would stabilize relatively quickly after operational pumping begins. While drawdown near the wells would be greatest after the first year of construction pumping, drawdown at distance would be greatest at the end of the Project life. These drawdown impacts to nearby wells are considered negligible and would not result in wells becoming unstable or significantly diminishing in capacity, and would not cause significant increases in well electrical usage or maintenance requirements.

Surface Water

The proposed Project would be designed, to the extent possible, to avoid washes within the Project area. Although the precise location of each heliostat is unknown at this time, the heliostats can vary within a few feet of the designated coordinates in order to avoid sensitive areas within the solar field such as washes, flora, or subsurface irregularities. Based on the initial engineering design, total acre loss of waters of the U.S. resulting from Project development is estimated at approximately 0.023 acre.

Potential impacts to water resources during construction would be primarily associated with surface disturbing activities, but could also be a result of accidental spills and handling and storage of hazardous chemicals. Small amounts of chemicals solvents, herbicides, and petroleum products would be used during construction and operation of the Project. Additionally, large volumes of mineral oil would be utilized and stored in the transformers. The greatest potential for contamination of surface water from these materials would be from petroleum products in the transformer and at the vehicle refueling stations. The Applicant’s emergency response plan (construction phase) and SPCC plan (operation phase) would provide for hazardous material spill prevention and cleanup measures, were a spill to occur.

Other sources of liquid waste with the potential for contamination would come from sanitary waste. Construction-phase sanitary waste would be removed by a contracted sanitary service. A septic tank and drain field system would be constructed near the Operation & Maintenance building to accommodate operation phase sanitary waste. The septic system would be constructed and maintained in accordance with ADEQ requirements for septic system installation. Adherence to this permit would prevent impacts to groundwater quality from the septic system.

Water quality impacts due to pumping from the upper alluvial aquifer are anticipated to be less than significant because existing water quality is known to be degraded only in portions of the Perched Aquifer near the Town of Quartzsite, well outside the cone of depression generated by the proposed pumping. In addition, the Upper Aquifer is separated from the Perched Aquifer and the Lower Aquifer by regional aquitards, impeding vertical mixing of groundwater. To the extent that vertical mixing does occur, the water quality of the aquifer systems underlying the Project area is expected to be generally similar.

Water Quality

Surface water quality can be degraded by increasing rates of erosion and sedimentation, introducing contaminants, violating water quality standards, or otherwise changing the character of surface waters. There would be potential for increased erosion or sedimentation onsite or offsite due to Project construction and Operation & Maintenance activities. Although there are no perennial waterbodies within the Project area, there are drainages (dry washes and sheet floods) in the Project area that are characteristic of alluvial fans where surface water flows during and after heavy rains. While no surface water quality data are available for these temporary water bodies, it is expected that bed loads and suspended loads are quite high during significant storm events.

The Applicant would incorporate the construction-phase erosion and sediment control measures listed in Section 2.5 – Best Management Practices and Built-In Mitigation. These measures are consistent with regional BMPs and Federal, State, and local regulations including the Project's General Permit and SWPPP. These measures would control erosion and sediment transport during construction.

Flood Potential

The Project area is located on a portion of the La Posa Plain that slopes at less than 1 percent. The stormwater drainage system would be designed to separate the "offsite" flows from "onsite flows". The offsite flows are flows originating outside of the developed area of the solar generating facility. The onsite flows are considered the flows of stormwater generated from rain that falls inside the developed area of the solar generating facility.

A collector ditch and dike system would divert offsite flows around the solar generating facility and discharge these flows to pre-existing locations downslope from the developed area and to the existing swale crossings on SR 95. These offsite flows would then follow the existing drainage patterns.

The solar generating facility would be graded as a series of planes to allow onsite flows to generally follow the pre-development flow patterns. A detention facility would be constructed on the west portion of the solar field to detain the release of onsite flows to match pre-development conditions.

Concentration of flows would be minimized by the use of check dams, stone filters, armored areas, and diversion swales that keep water from concentrating in areas of steeper slope. The detention facility located in the west portion of the solar field would be constructed in order to slow the water, allow it to infiltrate, and promote flow patterns into their existing drainage patterns.

The stormwater drainage system would be designed using the Soil Conservation Service method (TR-55) to determine the amount of rainfall during a specific rainfall event, and in accordance with requirements specified in the most current version of the La Paz County design requirements.

All surface water runoff during and after construction would be controlled in accordance with the requirements of the General Construction and General Industrial Stormwater NPDES permit, the requirements of La Paz County, and all other applicable laws, ordinances, regulations, and standards.

Closure and Decommissioning

During decommissioning, the Project site would be restored to a level acceptable to the BLM. Flood control structures surrounding the site would be removed, and onsite drainage facilities would be removed. The site would be graded to be as consistent as possible with adjacent natural drainage areas. Washes and channels that currently exist onsite would not be restored precisely to their current shapes and locations, but would be allowed to naturally re-form following completion of the decommissioning process.

4.12.3.3 **Alternative 1 – Hybrid-Cooled**

The wet/dry– or hybrid-cooled alternative would incorporate similar construction, operational, decommissioning, and reclamation components as the Applicant's Proposed Project (dry-cooling system), but would use an alternative cooling technology that requires more water during operations. A hybrid-cooling system uses parallel trains of wet- and dry-cooling systems. This system will dry cool only the load necessary to remain below the maximum turbine backpressure; the rest of the cooling will be accomplished by an evaporative cooling tower. This will allow water consumption by the cooling systems by only using them as much as necessary.

Operational water requirements would be between 500 and 700 acre-feet per year and would require an approximately 18-acre evaporation pond surface area of process wastewater disposal. Water use would depend largely on site conditions, water quality, and the efficiency of the air-cooled condenser and the cooling tower.

4.12.3.4 **Western's Substation and Telecommunication System**

Western's Substation

The construction of Western's switchyard would require the use of water or an approved dust suppressant during grading and concrete pouring activities. Less than 10 acre feet of water would be required during construction. Based on the low volumes of water required for construction of the switchyard and the lack of any permanent water usage, Western's substation would not deplete groundwater or other water sources.

Western's proposed switchyard would not be constructed within waters of the U.S. Western would ensure that local washes are protected from pollution caused by construction activities, and require its construction contractor to obtain the appropriate permits. Therefore, construction and operation of Western's switchyard would not degrade or eliminate any wetlands or waters of the U.S.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The fiber-optic line route would cross soils that have moderate to high erosion potential by surface runoff and eolian processes. Soil disturbed during cable stringing is more susceptible to erosion and compacted soil can accelerate stormwater erosion. In addition, the proposed fiber-optic line route would cross numerous ephemeral streams. Vehicles and equipment crossing these ephemeral streams would disturb and compact the soil and potentially cause the loss of stabilizing vegetation. With implementation of measures and BMPs described in Section 2.7 that would ensure proper re-vegetation, erosion control, and drainage, impacts from installation of fiber-optic cable would result in minor impacts to water resources.

Microwave Alternative

Because of the limited area impacted by the installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites, impacts to water resources from construction-related ground disturbances are not expected.

4.12.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.12.5 Residual Effects

The Project is not expected to have any residual effects to water resources.

4.12.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on water resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for groundwater resources consists of the La Posa groundwater sub-basin, which is located within the Parker groundwater basin (see Figure 3-8). The cumulative effects surface water ROI consists of the Tyson Wash watershed. There are no perennial streams, wetlands, or riparian areas within the water resources ROI. Larger ephemeral washes that cross the area include Tyson and Kaiser Washes, which only flow during high-intensity rainfall events.

Existing groundwater conditions within the water resources ROI are described in detail in Section 3.12. As described in Section 3.12.4.1, there are five distinct hydrostratigraphic units within the aquifer that underlies the La Posa sub-basin. Groundwater occurs at a depth of approximately 550 feet bgs, depending on geologic conditions. Groundwater is used as a municipal drinking water supply for the Town of Quartzsite, which is the primary water user in the La Posa sub-basin. Scattered domestic wells exist across the basin, but are primarily concentrated around the Town of Quartzsite.

Reasonably foreseeable future projects within the groundwater resources ROI include the proposed EnviroMission Solar Energy Project and the expansion/reopening of the Copperstone Gold Mine. According to EnviroMission's press releases, operation of their facility requires no water for power generation, although it is anticipated that some water will be required for sanitary facilities and other plant needs. Based on where the EnviroMission project is in the approval process, information about their construction water needs is not available, nor is data available about other water needs. However, based on standard construction practices, water will be needed during earth-moving activities, road building, concrete pouring, and for dust control.

According to the Decision Record for the Proposed Reopening of the Copperstone Mine (BLM 2010), if the mine were to reopen, the mining operation would require the use of up to 100.8 million gallons of water (309 acre-feet) annually. For the Applicant's Proposed Project during the 30-month construction period, up to 1,000 acre-feet of groundwater will be used during the first year of construction, and approximately 150 acre-feet per year over the next 2 years of construction. During the operations and maintenance phase, the facility will require up to 200 acre-feet per year over a 30-year period. The extraction of groundwater for the two solar projects, the mine reopening, when considered with the existing water usage within the La Posa groundwater sub-basin would result in a cumulative effect on available groundwater within the aquifer.

In the State of Arizona, groundwater consumption is closely monitored and regulated in five active management areas (AMAs). Outside the AMAs, groundwater consumption is less restricted. The La Posa Plains sub-basin is not located within an AMA. According to the ADWR, outside of an AMA, the only requirement for groundwater extraction and well installation is the submittal of a Notice of Intent which includes information about the well and is directed towards assuring compliance with Arizona well standards and avoidance of land owner conflicts. Water rights are not regulated outside the AMAs and groundwater extraction at or below the specific discharge rate on the Notice of Intent is permitted indefinitely for the life of the well.

There is potential for cumulative groundwater or surface water quality impacts to occur during construction of any industrial site. However, all reasonably foreseeable projects, including the Applicant's Proposed Project, are required by law to implement a site-specific SWPPP and SPCC Plan which contain measures that minimize or avoid these impacts. Additionally, given (i) the absence of perennial streams, wetlands, or riparian areas, (ii) the depth to groundwater within the Project area, and (iii) the limited rainfall that occurs in the Project area, it is highly unlikely that any spills during construction or operation would impact ground or surface water resources.

4.12.6.1 **Hybrid-Cooled Alternative**

Construction of the hybrid-cooled alternative would have similar cumulative construction impacts on water resources as the Applicant's Proposed Project (dry-cooled alternative). The largest difference between the two alternatives is the amount of operational water to be obtained.

4.12.7 Short-Term Uses versus Long-Term Productivity

The short-term use of the Project area for constructing, operating, and maintaining the Project would have no impact on the long-term productivity of surface-water resources. Applicant-committed environmental protection measures and implementation of Project-appropriate BMPs would allow the quality and quantity of surface water to be maintained for the life of the Project and beyond (following decommissioning).

The short-term use of water resources for the Project would result in a long-term (but not permanent) impact on the productivity of the groundwater resources in the La Posa sub-basin. Under the groundwater consumption scenarios described above, projected groundwater drawdown after 10 and 33 years of pumping (the modeled scenario) is estimated to be approximately 1 foot near the site boundary, decreasing farther away from the site. At Project decommissioning, groundwater consumption would cease. However, groundwater levels would be reduced until natural groundwater recharge replenishes the groundwater resource in the area.

4.12.8 Irreversible and Irretrievable Commitments of Resources

For the purposes of this analysis, an irreversible commitment of water resources would be the permanent contamination of surface water bodies or a groundwater aquifer, a decrease in aquifer recharge, the overuse of these resources by the Project to the point that they would not be available for other uses, or changes in runoff patterns that would increase erosion, sediment flow, or the risk of flooding.

Although the Project would use up to 1,500 acre feet of groundwater during the 30-month construction period and up to 200 acre-feet per year for the life of the Project, it would not contaminate surface water bodies or groundwater aquifers. Changes in groundwater levels would be long-term direct impacts because groundwater levels would be lowered throughout the life of the Project. This change in groundwater levels would be an irretrievable impact because groundwater levels would be lowered until natural recharge replenishes the aquifer. Implementation of appropriate Project-design measures and BMPs would ensure the Project would not significantly change runoff patterns to induce flooding, or increase erosion or sedimentation.

4.13 CULTURAL RESOURCES

This section describes and evaluates the potential impacts on cultural resources that would result from amending the YFO RMP with implementation of the Applicant's Proposed Project or Alternatives.

4.13.1 Methodology for Analysis

An impact assessment methodology was developed to identify and evaluate the potential impacts to cultural and historic resources associated with the Applicant's Proposed Project and alternatives. The methodology takes into consideration previously recorded resources, the sensitivity of the resources, Project alternatives that have been systematically surveyed, and the anticipated Project disturbances.

4.13.2 Indicators

In order to evaluate the impact each alternative may have on cultural resources, anticipated impacts to NRHP eligible sites, traditional cultural properties, sacred sites, and human remains were examined for each alternative.

A significant impact on cultural resources may result if any of the following significance criteria were to occur from construction or operation of the Project:

- Loss or damage to the integrity and qualities that qualify a property for inclusion in the NRHP.
- Loss or degradation of a traditional cultural property or sacred site, or if the property or site is made inaccessible for future use. The nature and significance of effects on any sacred sites and places of traditional cultural importance are assessed in consultation with Indian tribes and related communities.
- Disturbance of human remains, including those interred outside of formal cemeteries.

4.13.3 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. Both direct effects and indirect impacts on views from places of tribal importance were identified for this resource. The results of visual simulations to assess impacts to resources are discussed further in Section 4.16 – Visual Resources.

Visual impact specialists assessed the potential visual and color contrast impacts to not only previously recorded cultural resources, but also locations of traditional tribal importance. Impacts to specific sensitive viewers were described as: (1) moderate overall visual impacts to the access road to Dome Rock Mountains, located 9.8 miles southwest of the proposed tower location; (2) moderate overall visual impacts to Copper Peak, located 6.7 miles west of the proposed tower location; (3) low/moderate overall visual impacts to the Fisherman Intaglio, located 6.3 miles east of the proposed tower location; (4) low overall visual impacts to the communication site on Black Peak, located 20.2 miles north of the proposed tower location; (5) low overall visual impacts to the Blythe Intaglios Cultural Site, located approximately 19 miles west of the proposed tower location; (6) low overall visual impacts to the cultural resources area adjacent to Black Point, located 19.5 miles west of the proposed tower location; and (7) low overall visual impacts to the Big Maria Mountains, located 19.8 miles west of the proposed tower location. These impacts are also summarized in Section 4.16, and particularly in Table 4-14.

The Tribes have not identified any sacred sites which would be disturbed by construction and operation of the proposed Project. The scarcity of archeological materials indicates that the area was used primarily for travel and associated short-term activity, rather than regular settlement or resource use. The lack of settlements and the absence of topographic features that many tribes used as burial sites, indicate that the potential for the discovery or disturbance of human remains is low.

4.13.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to cultural resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.13.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

There are four cultural properties within the APE of the Applicant's Proposed Project. Two of these properties (AZ R:4:30[ASM] and AZ L:12:15[ASM]) are recommended or determined not eligible for inclusion in the NRHP, so the Applicant's Proposed Project would result in no effects to historic properties for these. For a third property (AZ L:7:30[ASM]), the portion of the property within the APE of the Applicant's Proposed Project does not possess characteristics of significance that contribute to the property's eligibility for inclusion in the NRHP. As a result, the Applicant's Proposed Project would result in no effects to historic properties for this property. A fourth cultural property (AZ R:4:18[ASM]) is an archaeological site within the APE of the Applicant's Proposed Project that was recommended during recordation as being potentially eligible for inclusion in the NRHP. The site is located 100 meters north of an existing utility structure, and the Applicant's Proposed Project may involve installation of fiber optic lines above the ground using existing utility poles. To avoid damage to or loss of this archaeological site as a result of implementation of the Applicant's Proposed Project, it is recommended that the site be avoided and that an archaeological monitor be present during construction activities in the vicinity of the site. If this recommendation is followed, this would result in the Applicant's Proposed Project having no adverse effects to cultural resources.

Closure and Decommissioning

The future decommissioning and closure of the Project should not negatively affect cultural resources, since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the Project.

4.13.3.3 Alternative 1 – Hybrid-Cooled

Impacts to cultural resources from construction and operation of a hybrid-cooled solar plant would be identical to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

4.13.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. Based on records review and pedestrian surveys, no known cultural resources are known to be present within the boundaries of the switchyard site. Direct effects to cultural resources are not likely to occur.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Direct impacts to cultural resources would potentially occur from ground disturbance during construction. Ground disturbance associated with the installation of fiber-optic cable on existing transmission towers is expected to be minor and temporary. Cultural sites mapped during a previous archaeological survey of the ROW would be avoided.

Indirect impacts to cultural resources can have both physical and cultural or spiritual components. Western and the BLM are responsible for consulting with local Native American groups regarding impacts and potential mitigation resulting from construction of the telecommunication system alternative.

Microwave Alternative

Because of the limited area impacted by the installation of a new microwave dish at Bouse Substation, or at the Metal Mountain or Cunningham Peak communication sites, impacts to existing or known cultural resources from construction-related ground disturbances are not expected.

4.13.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.13.5 Residual Effects

No residual effects to cultural resources would result from implementation of the Applicant's Proposed Project or alternatives.

4.13.6 Cumulative Impacts

Based on the location of the proposed Project and the results of the cultural resources study conducted for the EIS analysis, the potential for cumulative impacts to archaeological and historic sites as of result of construction, operation, maintenance, and decommissioning of the Project is considered low. Impacts to cultural resources are generally localized and do not result in regionally cumulative impacts. The impacts of the Applicant's Proposed Project to cultural resources would be localized within the Project area. There is, however, the potential for future projects in the vicinity to disturb areas that may contain known or unknown cultural resources. Future projects with potentially significant impacts to cultural resources would be required to comply with Federal and State regulations and ordinances protecting cultural resources to assess and mitigate any adverse effects.

4.13.7 Short-Term Uses versus Long-Term Productivity

Short-term uses versus long-term productivity are not discussed because no cultural resources would be affected by the action alternatives.

4.13.8 Irreversible and Irretrievable Commitments of Resources

Neither irreversible nor irretrievable commitments of resources would occur for cultural resources.

4.14 SOCIAL AND ECONOMIC CONDITIONS

The following section describes and evaluates the potential effects of amending the YFO RMP and construction and operation of the Applicant's Proposed Project or alternatives on socioeconomic resources within the ROI. These effects or impacts are discussed by alternative and focus largely on the Applicant's Proposed Project.

The social and economic impacts are quantified where possible. However, where quantification of impacts is not possible, the analysis includes a qualitative discussion of possible effects. The analysis includes separate but integrated approaches to addressing social, economic, and fiscal impacts of the Project.

4.14.1 Methodology for Analysis

Methodology for social and economic analysis in this section is based on economic data presented in Chapter 3 from sources such as the ADC, U.S. Census Bureau, Bureau of Labor Statistics, and records of conversation. In most cases, projections and estimates were developed using baseline data presented in Section 3.14, Social and Economic Conditions.

4.14.2 Indicators

NEPA provides no specific thresholds of significance for socioeconomic impact assessment. Significance varies based on the setting of the Applicant's Proposed Project (40 CFR 1508.27[a]), but 40 CFR 1508.8 states that indirect effects may include those that are growth-inducing and others related to induced changes in the pattern of land use, population density, or growth rates. In addition, the regulations state, "Effects include….cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial" (40 CFR 1508.8).

For the purposes of this analysis, a significant impact on social and economic values may result if any of the following were to occur from construction or operation of the Applicant's Proposed Project:

- An increase in population that would create shortages of housing and place an excessive burden on local government and community facilities and services.
- Permanent displacement of existing residences or businesses.
- Long-term loss of economic viability of farms or other businesses.
- Permanent and irreversible loss of work for a major sector of a community.
- Cause a decrease in adjacent property values.
- Change resulting from the Project would exceed historical or estimated fluctuations in the regional economy.
- Result in a need for new infrastructure systems, including power or gas utilities, communications systems, water and sewer services, or solid waste disposal systems.

4.14.3 Direct and Indirect Effects by Alternative

4.14.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no socioeconomic impacts from the proposed Project would occur and the benefits of capital costs, construction and operation payroll, and sales taxes and property taxes of the proposed Project would not occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.14.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Implementation of the Applicant's Proposed Project would have direct and indirect short- and long-term effects on regional social and economic resources during construction and operation. The creation of direct and indirect jobs is an important concept to understand in this section. Direct jobs are those associated with investment, spending, and employment directly related to solar power construction and ongoing operations and maintenance activities. Indirect jobs are tied to economic activities such as material, equipment, and additional services purchased from the outside and related industries. Indirect jobs also include employment opportunities created when construction workers purchase services and goods in nearby communities. The discussion of these potential effects is addressed in this section.

Project Workforce and Skills

Construction

Project construction would occur over a total of 30 months. Table 4-5 represents the construction personnel by discipline.

Project construction would require an average of 280 full-time skilled and unskilled employees per month during the 30-month construction period, with manpower requirements peaking at approximately 438 workers in month 12 of construction (WorleyParsons 2010c). The primary trades required for Project construction include carpenters, electricians, insulators, ironworkers, cement masons, millwrights, operating engineers, painters, pipefitters, and skilled and unskilled laborers. Solar field craft workers are primarily laborers and equipment operators who would be directly associated with the installation and assembly of the solar field. Construction payroll is estimated to be approximately $92.5 million (assuming 8,406 man-months x $55/hour x 200 hours per month) over the life of the construction phase of this Project (WorleyParsons 2010c; U.S. Department of Labor 2010).

According to the ADC, there is an excess of available construction workers throughout the State (ADC 2010). Table 4-6 demonstrates historical and forecasted construction employment for Arizona outside of the Phoenix and Tucson metropolitan statistical areas. The overall construction employment between 2007 and 2011 is expected to decrease by 53 percent or 15,400 workers, suggesting that more unemployed construction workers would likely come from nearby communities than would be expected if the industry were experiencing growth. Between 2007 and 2011, the Phoenix metropolitan statistical area construction employment is expected to decrease by 48 percent or 81,800 workers, indicating that a large portion of construction workers from the Phoenix metropolitan area may be willing to travel to the Project area for work. Though not significant relative to the large number of unemployed construction workers across the region, development of the Project would help to reduce the number of unemployed construction workers and would provide indirect employment opportunities for others near the Project area.

Table 4-5 Quartzsite Construction Personnel by Discipline																															
Discipline	**Monthly Number**																														
	Comp. & Plant Prep					**Construction**																				**Commissioning**					
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**Totals**
CRAFT																															
Boilermakers															6	8	8	8	8	8	8	11	11	8	8	6	6	6			
Carpenters					2	2	20	22	28	30	40	50	50	50	40	30	25	25	25	20	15	15	15	10	10	10	10	6	4	4	4
Electricians					2	2	4	20	36	36	48	48	56	56	56	56	56	56	56	56	56	48	48	36	36	36	24	24	24	20	16
Insulators																							8	8	8	16	16	16	4	4	2
Ironworkers							8	20	24	26	26	32	32	32	26	30	25	25	20	20	20	20	20	20	18	18	18	12	12	6	6
Laborers		2	2	2	6	10	20	20	26	26	40	44	52	54	54	54	54	54	54	54	54	48	48	48	32	32	32	20	16	16	16
Cement Masons					1	1	1	4	4	4	4	4	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	0
Millwrights								3	3	3	16	16	16	16	16	16	16	16	16	16	16	14	14	12	12	10	10	8	6	6	6
Operating Engineers		2	2	2	10	22	22	22	36	40	40	36	36	30	30	30	30	24	24	24	20	20	20	20	20	20	20	15	15	15	12
Painters																									5	8	8	8	4	2	2
Pipefitters							45	60	60	80	80	80	80	80	80	80	80	80	70	70	60	60	50	50	40	40	40	40	40	40	15
Drivers		2	2	2	4	6	4	4	4	15	15	15	15	15	26	26	26	26	26	26	26	30	28	28	28	28	24	24	24	20	16
Heliostat Assembly Craft		0	0		0	0	0	0	15	30	45	45	45	45	45	45	45	45	45	45	45	45	0	0	0	0	0	0	0	0	0
Total Craft		**6**	**6**	**6**	**25**	**43**	**124**	**175**	**236**	**290**	**354**	**370**	**388**	**384**	**385**	**379**	**369**	**363**	**348**	**343**	**324**	**315**	**266**	**244**	**221**	**228**	**212**	**183**	**151**	**135**	**95**
STAFF																															
Construction Staff		2	4	8	10	24	36	36	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	32	32	32
Construction Management Staff		1	2	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 4-5 Quartzsite Construction Personnel by Discipline

Discipline	Monthly Number																														
	Comp. & Plant Prep					Construction																					Commissioning				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**Totals**
Subcontractors		0	0	0	3	6	6	6	6	6	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TA		0	0	0	0	0	0	0	0	0	0	0	2	4	4	4	4	4	4	4	4	4	4	4	4	6	6	6	6	6	6
Staff Total		**3**	**6**	**11**	**18**	**35**	**47**	**47**	**51**	**51**	**49**	**48**	**50**	**52**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**53**	**53**	**53**	**45**	**45**	**45**
GENERATION TIE-LINE																															
Laborer		4	4	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operator		8	9	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drivers		1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrician		7	11	11	11	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Generation Tie-line Total		**20**	**25**	**20**	**20**	**15**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total		**29**	**37**	**37**	**63**	**93**	**186**	**222**	**287**	**341**	**403**	**418**	**438**	**436**	**436**	**430**	**420**	**414**	**399**	**394**	**375**	**366**	**317**	**295**	**272**	**281**	**265**	**236**	**196**	**180**	**140**

Source: WorleyParsons 2010c

Table 4-6 Historical and Forecasted Construction Employment for Arizona					
	Historical			Forecast	
Construction	**2007**	**2008**	**2009**	**2010**	**2011**
Total Employment	29,000	23,900	16,200	13,400	13,600
Employment Change	-3,300	-5,100	-7,700	-2,800	200
Percentage Change	-10.2%	-17.6%	-32.2%	-17.3%	1.5%

Source: ADC 2010.
*Does not include Phoenix and Tucson metropolitan statistical areas.

The number of indirect jobs resulting from the creation of temporary construction jobs is expected to be up to 560 across the ROI (assuming each construction job would create two more jobs [280 workers x 2]) (Frisvold et al. 2009). These indirect forms of employment vary from basic service industry jobs such as hotels and restaurants to jobs in the transportation industry.

Operation

The operations workforce would consist of approximately 47 full-time employees for the entire facility. These employees would consist of plant operators, heliostat washing crews, maintenance technicians, and administrative personnel working 8- or 10-hour shifts for 4 or 5 days per week. The plant operations crew would be separated into five crews of four workers each and the facility would be staffed 7 days a week/24 hours a day, 365 days a year. The plant is expected to operate daily from sunrise to as late as midnight on any given day, based on the availability of sunlight and the demand for power. The operation workforce for the Project is represented in Table 4-7.

Table 4-7 Plant Operations Workforce

Department	Personnel	Shift
Operations	(20) Plant Operating Personnel (1) Plant Chemist	Standard 8-hour days, 4 operators per shift (5 crews of 4)
Heliostat Washing	(8) Heliostat Servicemen	Standard 8-hour days
Maintenance	(4) Mechanical Technicians (4) Electrical/I&C Technicians (4) Laborers (Semi-skilled)	4x10 hour shifts or 5x8 hour shifts
Administration	(1) Plant General Manager (1) Operations Superintendent (1) Plant Engineer (1) Maintenance Manager (1) Maintenance Planner (1) Administrative Assistant	4x10 hour shifts or 5x8 hour shifts

Source: WorleyParsons 2010d

Total full-time annual payroll would be expected to be $2.7 million, which includes benefits and incentive pay in addition to salaries (ADC 2008). A range of wages would be expected among those employed by the Project, from lower wages of a general laborer to higher wages of the project management staff and technical advisors. Staffing for the operations of the Project would result in beneficial long-term impacts to individuals seeking stable employment because the Project would provide long-term employment and income throughout the life of the Project.

Up to three indirect jobs are expected to be created for every full-time operational job; therefore, the number of indirect jobs would total approximately 141 (Kammen et al. 2004). These indirect forms of employment vary from basic service industry jobs to jobs in education to accommodate new students.

Fiscal Impacts

Construction

Total expenditures for construction, including employment, materials, supplies, and equipment, of the Applicant's Proposed Project is anticipated to be approximately $600 million over the 30 month construction period (personal communication, Andrew Wang 2010). Materials and supplies that would be purchased within the ROI are expected to total $169 million (WorleyParsons 2010c). Based on an average sales tax rate of 9.3 percent (for various cities within the ROI), tax revenues for the sale of materials and supplies would be approximately $15.7 million over the construction of the Project (Zip2Tax 2010). Additionally, if temporary construction workers spent 25 to 50 percent of their income within the ROI, approximately $23.1 million to $46.3 million would enter the local and regional economy.

The creation of 560 indirect jobs (jobs created as a result of construction jobs) from the construction of the Applicant's Proposed Project would result in an influx of approximately $36.4 million of personal income to the ROI over the 30-month span of the Project's construction (based on La Paz County's average annual wage of $26,002). If these workers were to spend between 25 and 50 percent of their income within the ROI, approximately $9.1 million and $18.2 million would enter the local and regional economy over the 30-month construction period.

In total, direct and indirect employment during Project construction would result in $32.3 million to $64.5 million in new personal income entering the local and regional economy.

Operation

Throughout the operation of the Project facility, the anticipated 47 employees who would operate and maintain the site would experience an influx of personal income totaling approximately $2.7 million per year. Assuming these workers spend 50 to 75 percent of their income within the ROI, approximately $1.4 million to $2 million would enter the local and regional economy annually.

The creation of 141 indirect jobs (jobs created as a result of operation jobs) from the construction of the Applicant's Proposed Project would result in an influx of approximately $3.7 million of personal income to the ROI per year over the life span of the Project's construction (based on La Paz County's average annual wage of $26,002). Assuming these workers spend 50 to 75 percent of their income within the ROI, approximately $1.9 million to $2.8 million would enter the local and regional economy annually.

In total, direct and indirect employment during the construction of the Applicant's Proposed Project would result in between $3.3 million and $4.8 million in new personal income entering the local and regional economy annually.

Population

Construction

Based on the total number of direct and indirect jobs created during the construction phase, population is expected to grow temporarily by as many as 840 individuals (280 construction jobs [direct] + 560 [indirect jobs] = 840) over the duration of the construction phase. Quartzsite, Parker, and Blythe would likely receive most of these residents. Quartzsite, Parker, and Blythe could expect temporary population increases of 104, 94, and 642 (totaling 840), respectively (calculated based on U.S. Census American Community Survey persons per household data [U.S. Census 2010a]). If these populations were to stay within La Paz County and the City of Blythe, this growth would represent a population increase of approximately 2 percent. These immigration figures are summarized in Table 4-8. Further, because of the considerable loss of construction jobs in Arizona communities as a result of the current economic recession, there is a significant pool of unemployed skilled construction labor in the region. Consequently, workers hired to construct the Project would likely be drawn from the existing workforce within the ROI.

Operation

The immigration of approximately 47 workers and their families to the area during the operation of the Project would result in an increase in population of approximately 130 (assuming the Arizona average household size of 2.77). These residents would then take advantage of service industries such as restaurants and grocery stores, creating the need for indirect jobs. Unlike indirect jobs created during the construction phase, these jobs would remain in the community as long as the Project facility is operational.

Table 4-8 Population Impacts during Construction Phase

Population	Quartzsite	Parker	Blythe	Quartzsite, Parker, Blythe	La Paz County and Blythe*
Population (2009)	3,466	3,120	21,322	27,908	41,334
Construction Force (average number of direct jobs)**	35	31	214	280	280
Indirect Jobs	70	63	428	560	560
Total Population Increase	104	94	642	840	840
Percent of 2009 Population	3.01%	3.01%	3.01%	3.01%	2.03%

Sources: U.S. Census Bureau 2010a; Frisvold et al. 2009
*Scenario assumes that population growth would only occur in La Paz County and Blythe, California
**Assuming two indirect jobs created for every one direct job (280 x 2 = 560)

Based on the total number of direct and indirect jobs created during the operation phase, population is expected to grow by approximately 521 individuals (47 x 2.77 = 130 [resulting from direct jobs] + 141 x 2.77 = 391 [resulting from indirect jobs]). Based on existing U.S. Census persons per household data (U.S. Census 2010a), the communities of Quartzsite, Parker, and Blythe could expect population increases of 66, 58, and 398 (totaling 522). If these populations were to stay within La Paz County and the city of Blythe, this growth would represent a population increase of approximately 1.1 percent. These immigration figures are summarized in Table 4-9.

Table 4-9 Population Impacts during Operation

Population	Quartzsite	Parker	Blythe	Quartzite, Parker, Blythe	La Paz County and Blythe*
Population (2009)	3,466	3,120	21,322	27,908	47,920
Operation (direct jobs)	6	5	36	47	47
Indirect Jobs**	18	16	108	141	141
Total Population Increase***	66	58	398	521	521
Percent of 2009 Population	1.9%	1.9%	1.9%	1.9%	1.1%

Sources: U.S. Census Bureau 2010a; Kammen et al. 2004
*Scenario assumes that all jobs would stay in La Paz County and Blythe, California
**Assuming 3 indirect jobs created for every one direct job (47 x 3=141)
***Assuming Arizona average household size of 2.77 (2.77 x 188 = 521)

Housing

Construction

Because a large portion of the construction workforce is expected to temporarily relocate to the Project area rather than commute, increased demands on housing could be significant if limited to the Town of Quartzsite. However, given the Project's proximity to other communities and the wide variety of available housing and lodging options in communities such as Parker and Blythe, these housing demands are expected to be minimal. Table 3-21 – Lodging and RV/Trailer Parks, indicated that there are nearly 2,000 hotel and motel rooms within 35 miles of the Project area. Additionally, RV, trailer parks, and campgrounds provide a significant number of housing options for temporary construction workers. According to the BLM YFO RMP (BLM 2010a), approximately 250,000 visitors annually use the La Posa LTVA and the five surrounding 14-day campgrounds. If workers were to commute without their families and travel home on the weekends, they could also take advantage of 14-day campgrounds (assuming that these workers have access to or own a RV or camper trailer).

Those with knowledge of housing availability in the area recognize that Quartzsite has limitations, but have expressed that the surrounding communities are highly capable of withstanding growth of up to 450 temporary workers (personal communication, Nora Yackley 2010). Proof of the area's ability to withstand immense population growth is evident in the winter months, when its population soars to nearly 100,000 at any one time (personal communication, Jeff Gilbert 2010).

Since many RV, trailer parks, and campgrounds are only open during the winter months, some concerns may surround the possibility of year-round use. Even though the availability of trailer parks may decrease during off-peak seasons, local land owners have expressed interest in opening their properties year-round to accommodate temporary construction workers (personal communication, Al Johnson 2010). Unemployed workers from surrounding communities could easily commute and therefore would not contribute to a housing shortage.

Operation

Though rental units in Quartzsite and Bouse are not widely available (347 units and 29 units, respectively), communities such as Blythe and Lake Havasu City had a high number of vacant units (788 and 5,107 units, respectively) in 2000 (U.S. Census Bureau 2010e). Parker is also a viable option for permanent housing; 76 percent of the units (878 total units) in the town are single-family detached units. Operation of the Project would be expected to have very little impact on the availability of housing, because the population increase represents a small portion of the region's total population and would be spread across communities. In addition, increased availability of year-round RV and trailer parks may reduce the need to build new homes for those who permanently locate to the area.

Public Services

Construction

Construction of the Project would not result in an increase in demand for public services. Current police, fire, and medical facilities should be sufficient to handle emergencies during construction activities at the site. The Project would rely on onsite and offsite fire protection services. The Project would establish a construction emergency action program and plan that would include emergency evacuation procedures. The Project would also develop and implement a personal protective equipment program for both construction and operation phases of the Project.

Following the development of a service contract, the Town of Parker Volunteer Fire Department would be the first responders in the case of fire and medical emergencies during construction of the Project. The department has one fire station with two fire engines, two water tenders, and a 75-foot ladder truck. The Town of Parker Volunteer Fire Department currently has the capacity to respond to a potential increase in incidents in the Project area (personal communication, John Rather 2010). The station is located at 1101 West Arizona Avenue in Parker, which is approximately 23 miles north of the Project area. Additional fire and emergency support would come from the Quartzsite Fire District approximately 10 miles south of the Project area, at 70 E. Tyson Street, in Quartzsite. If needed, the Quartzsite Fire District can provide service to the Project area for a fee.

The nearest hospital to the Project area is the La Paz County Regional Hospital (located at 1200 West Mohave Road in Parker), which is open 24-hours a day/7 days a week. Ambulance service from the Project area to the hospital would be provided by River Medical Incorporated. River Medical has ambulance teams in both Parker and Quartzsite. Depending on availability at the time of emergency, service could come from either of these locations.

Utilities – Construction of the Project would require potable water and electrical utility supplies and would generate wastewater and solid waste. Potable water would be treated and stored in a small portable water unit. Construction power may be obtained from the existing Arizona Public Service 69-kV transmission line along the western portion of the Project or portable generators.

Waste generated during construction would be disposed of at the closest landfill, located approximately 8 miles north of the Project area off of SR 95. Currently, the landfill charges

$25.50 per ton of construction debris and has adequate capacity to service the site (personal communication, Julie Huff 2010).

Schools – Given that the construction workers are unlikely to relocate their families as part of their temporary employment on the Project, impacts on school enrollment during construction are expected to be minimal. If some workers were to relocate their families, there is ample room for growth in Bouse, Parker, and Palo Verde Unified (Blythe) school districts. In total, these districts have the capacity to grow by approximately 16 percent of 750 students in grades K-12 (see Table 3-33; note that the Quartzsite School District was not included because total capacities were not available). Because of the remote location of the site, the construction of the Project is not expected to impact any school activities.

Operation

Regional or local population would not be expected to change as a result of the operations of the facility; therefore, capacity of the local emergency services should not change. The services provided by Parker Volunteer Fire Department, Quartzsite Fire District, River Medical Incorporated, and La Paz County Regional Medical Hospital would not be affected by the Project's operation.

Utilities – The Project would utilize onsite groundwater wells and would therefore have no impact on local water utilities. Project sanitary wastes would be disposed of by an onsite waste treatment system, with a septic tank and two permanent leach fields. Operations would have no impact on the availability of local wastewater treatment capacity.

The Project area would not utilize natural gas and therefore would not impact natural gas in the area. The Project may also require electrical power for maintenance activities during nighttime hours when the facility is not generating its own power.

Schools – The operation of the Project facility would have little to no impact on schools, given the small population increase expected in the area (521 residents). Assuming Arizona's average household estimate that approximately 26 percent of the State's population is under 18, 135 new students may potentially relocate to the area (US Census 2010b). Across the four closest school districts closest (Quartzsite, Parker, Bouse, and Palo Verde Unified in Blythe) to the Project area, an influx of 135 students represents an increase of approximately 3.3 percent of current enrollment (estimated to be 4,032 students). As mentioned previously, these four districts have capacity for more than 750 additional students.

Closure and Decommissioning

The anticipated lifespan of the Project is estimated to be 30 years. Closure- and decommissioning-related social and economic impacts would be related to both the discontinuation of the solar operations and the short-term effects of the necessary facility deconstruction and subsequent site reclamation activities.

The direct economic impact associated with discontinuation of the solar energy generation site would result in job losses for the operations workforce, which would no longer be needed to maintain the facility's daily operations and/or repair the solar power generation equipment and related infrastructure. Closure would also directly reduce future revenues to any local material, equipment, and service suppliers previously supporting the facility's daily operations.

In addition, closure would have the additional adverse economic effect of reducing the employment and revenues for other local or regional businesses that rely on spending by the Project's operations staff or suppliers. As a result of the reduced income and revenues of these affected businesses, the Project's staff and support businesses would make few purchases from other local businesses that, in turn, would reduce these businesses and employees' income and purchasing ability.

Deconstruction activity could, however, result in a short-term increase in local spending from the employment, equipment, and materials required to dismantle the solar facility and reclaim the site. The cost and duration for the deconstruction activities is likely to be roughly comparable to that of the construction; except that the amount of labor and materials would be less than that required for the facility development because the facility would not need to be operational.

4.14.3.3 **Alternative 1 – Hybrid-Cooled**

Impacts to socioeconomic resources from construction and operation of a hybrid cooling solar plant would be similar to the impacts described for the Applicant's Proposed Project (dry-cooled).

Direct and indirect impacts to job creation, infrastructure, housing demand, and the overall economy would remain the same between the alternative and Applicant's Proposed Project.

4.14.3.4 **Western's Switchyard and Telecommunication System**

Western's Switchyard

Construction of Western's switchyard would occur over a 12-month period and would coincide with construction of the solar facility. Western would issue a separate solicitation for the construction of the proposed switchyard in accordance with Western's contracting requirements Up to 10 construction workers would be employed over the 12-month period. Construction and operation of the switchyard would not cause an adverse impact on population, employment, housing, public finance, local economies, or public services.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

In comparison to construction of the Project, a minimal workforce would be required for construction of any of the telecommunication system alternatives. The telecommunication system construction would not cause an adverse impact on population, employment, housing, public finance, local economies, or public services. In addition, because there would be no adverse Project-related socioeconomic impacts, minority and low-income populations would not be disproportionately impacted.

Microwave Alternative
Similar to the fiber-optic cable alternative discussion above, no adverse socioeconomic impacts are expected.

4.14.4 Mitigation Measures

There are no mitigation measures for socioeconomic resources because mitigation measures for resources such as transportation, visual, biological, and land use resources would each help to reduce impacts to socioeconomic resources for visitors and residents within proximity to the Project. Mitigation measures for these resources are aligned with the BLM's management goals, which serve to minimize Project impacts.

4.14.5 Residual Effects

There are no mitigation measures for socioeconomic resources; therefore, there are no residual effects.

4.14.6 Cumulative Impacts

The potential for cumulative socioeconomic impacts exists where there are multiple projects proposed in an area that have overlapping construction schedules and/or project operations that could impact similar resources. Projects with overlapping construction schedules and/or operations could collectively result in a demand for labor that cannot be met by the region's labor pool, which could lead to an influx of non-local workers and possibly their dependents. This population increase could impact social and economic resources if there are insufficient housing resources and/or infrastructure and public services to accommodate the new residents' needs.

Cumulative impacts to socioeconomic resources would mostly be limited to the local and regional economy within the Quartzsite, Blythe, Bouse, and Parker area. However, due to the limited labor pool in these communities, it is likely that most workers would temporarily relocate from larger, more distant metropolitan areas, such as Phoenix, Las Vegas, and Los Angeles.

Section 4.14.3 – Direct and Indirect Effects by Alternative concluded that each of the alternatives would have no significant impacts to utilities; therefore, cumulative effects on utilities are not analyzed in this Draft EIS. Due to the type of existing, present, and foreseeable projects, socioeconomic resources such as public services, workforce, the economy, and housing are the focus of this section.

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on socioeconomic resources with other past, present, or reasonably foreseeable future actions. When combined, the development of the Project and other reasonably, foreseeable future projects such as the EnviroMission solar project, the expansion/reopening of the Copperstone Gold Mine, and other renewable energy projects in the desert southwest, would be expected to influence socioeconomic resources in La Paz County, Arizona and Riverside County, California. As of July 2011, the only solar project under construction in the regional area is the Blythe Solar Project, which is approximately 30 miles west of Blythe, or approximately 60 miles west of the Project area. The Blythe Solar Project is anticipated to be constructed in multiple phases, with construction occurring over a 60-month timeframe (BLM 2010). The Blythe Solar Project Final EIS identified 13 major BLM solar projects in eastern Riverside County, California. Within the La Posa Plains in La Paz County, Arizona, there are four pending solar project applications. The majority of these pending solar projects have not advanced into the permitting phase and very limited data is available to assess the potential impact from their construction and operation.

Regardless, if any of the pending solar or other large-scale construction projects within commuting distance of the proposed Project were to have overlapping construction and/or project operations, cumulative impacts on socioeconomic resources are likely to occur.

A large number of workers would be needed during the construction of these projects, which would reduce the availability of temporary housing if these projects were constructed simultaneously. Given the large number of winter visitors that La Paz County experiences, temporary housing availability would be especially strained during these months.

The relatively close distance of the Project site to a number of communities, such as Quartzsite (approximately 10 miles), Blythe (approximately 26 miles), Parker (approximately 21 miles), Ehrenberg (approximately 23 miles), and Bouse (approximately 11 miles), increases the likelihood that cumulative impacts to public services would be spread across the region. Three factors suggest that impacts to public services would be minimal during construction and operation: the unlikelihood of multiple projects overlapping, the dispersion of population across various communities, and the fact that a large number of winter visitors are currently sustained by existing public services (estimated to be up to 100,000 visitors at one time during the winter months).

The local and regional economy stands to benefit immensely from the development of renewable energy projects in the area. These projects would likely draw on the unemployed work force, bringing employees from other counties in Arizona and populations across the California border. Workers from each of these regions would be expected to spend their income locally, helping support existing local businesses and create new businesses associated with population growth such as housing, restaurants, and other services. Projects would also draw on locally and regionally procured materials, creating new jobs and stimulating these types of businesses. As more and more renewable energy projects are developed, new local and regional suppliers would emerge and begin to expand their inventories to accommodate clean energy industries. The emergence of local suppliers would keep dollars circulating within the local economy, helping generate more taxes and revenues that were previously lost to other counties and communities. In addition, the construction and operation of numerous renewable energy projects can spawn new educational opportunities for those out of work and those seeking to retool themselves for new industries.

4.14.7 Short-Term Uses versus Long-Term Productivity

Construction and operation of the Project would preclude revenues that could be generated by recreational opportunities or other recreational activities that could take place within the Project area. Each of the action alternatives would result in short- and long-term job creation throughout the construction and operation phases of the Project. Additionally, new solar-related educational and training opportunities could result during the operational phase of the Project if clusters of similar facilities are developed in the region.

As mentioned previously, those familiar with the area would recognize and experience an altered landscape from a natural desert habitat/ecosystem to a more industrialized environment. These perceptions would be experienced primarily by visitors to the area, but could also be experienced by residents living close to the Project.

4.14.8 Irreversible and Irretrievable Commitments of Resources

An irreversible impact to socioeconomic resources under all action alternatives would be a permanent change to the landscape. While the site may be decommissioned and new uses are introduced to the area, it may not result in the same perceptions held by visitors and residents who had previously visited the site.

An irretrievable socioeconomic impact that would result from the each of the action alternatives would be the preclusion of other uses for the land during operation of the facility. Once decommissioned, however, other uses for the site could take place. These uses may or may not generate revenue, but could represent a return of quality of life perceptions associated with the area.

4.15 ENVIRONMENTAL JUSTICE

This section describes and evaluates the potential effects on environmental justice from amending the YFO RMP and construction and operations of the Applicants Proposed Project including Western's switchyard and telecommunication system, or alternatives. The analysis is consistent with EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994). Environmental justice analysis ensures that any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations are identified and addressed.

4.15.1 Methodology for Analysis

Methodology for environmental justice impacts is based on data obtained from the 2000 Census and presented in Section 3.15 – Environmental Justice, and key indicators set forth by EO 12898.

4.15.2 Indicators

For this analysis, a significant impact related to environmental justice issues may result if any of the following were to occur from construction or operation of the Applicant's Proposed Project:

- A disproportionate negative effect on minority or low-income populations in the area, as defined by EPA criteria.
- Affected minority or low-income populations were not informed of and offered an opportunity for meaningful involvement to ensure that their interests and concerns about the Project would be considered.

4.15.3 Direct and Indirect Effects by Alternatives

4.15.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no environmental justice impacts from the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.15.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

The data presented in Section 3.15 determined that there are environmental justice populations located within the ROI. However, due to the distance of these populations from the Project area, direct impacts are not expected to result from the Applicant's Proposed Project. This is supported by the fact that no environmental justice populations are located within census tract 205 (which spans 65 miles and covers La Posa Plain, the Town of Quartzsite, unincorporated Bouse, and BLM land south of I-10) surrounding the Project area. Therefore, there are no direct or indirect effects associated with the Applicant's Proposed Project. Neither adverse health nor environmental impacts to these groups would result from the development of the Project. Impacts to any of these potential environmental justice groups would be the same as those expected to impact the entire population during construction and operation. The development of the Applicant's Proposed Project is expected to create employment opportunities, economic multiplier effects, and tax revenue that would indirectly, and possibly directly, benefit all populations across the ROI.

Closure and Decommissioning

Once constructed and in operation, the proposed Project has an estimated life of at least 30 years. Decommissioning and closure of the Project is not anticipated to have any adverse impacts to environmental justice populations. Impacts during decommissioning would be similar to those during construction of the Project. The creation of employment opportunities through direct and indirect jobs and tax revenue would potentially benefit all populations across the ROI, including environmental justice populations.

4.15.3.3 Alternative 1 – Hybrid-Cooled

Impacts from construction and operation of Alternative 1 to environmental justice populations would be identical to the Applicant's Proposed Project (dry-cooled). Thus, there would be no direct or indirect effects to environmental justice populations as a result of the hybrid-cooling alternative.

4.15.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

No adverse environmental justice impacts are expected from construction and operation of Western's switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Similar to the fiber-optic cable alternative discussion under Section 4.14 – Social and Economic Conditions- no adverse environmental justice impacts are expected.

Microwave Alternative

Similar to the fiber-optic cable alternative discussion under Section 4.14 – Social and Economic Conditions- no adverse environmental justice impacts are expected.

4.15.4 Mitigation Measures

There are no impacts to environmental justice populations; therefore no mitigation measures are prescribed.

4.15.5 Residual Effects

There are no impacts to environmental justice populations; therefore, no residual effects exist.

4.15.6 Cumulative Impacts

Cumulative impacts to environmental justice are not analyzed for the Applicant's Proposed Project or other alternatives because each would not result in any disproportionately high or adverse effects on minority, low-income populations, or Native American communities. As presented in Section 3.15, no environmental justice communities exist within close proximity to the Project area, which is largely undeveloped and uninhabited.

4.15.7 Short-Term Uses versus Long-Term Productivity

Short-term uses versus long-term productivity are not discussed because no minority populations would be disproportionately or adversely affected by the action alternatives.

4.15.8 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources are not discussed because no minority populations would be disproportionately or adversely affected by the action alternatives.

4.16 VISUAL RESOURCES

This section describes the visual impact assessment and impact results associated with amending the YFO RMP and implementation of the Applicant's Proposed Project or alternatives. The purpose of the visual impact assessment is to analyze and characterize potential impacts to sensitive viewers and scenic quality and describe compliance with applicable VRM objectives. The determination of impact intensity (levels) and compliance with VRM objectives was based on assessing the level of perceptible change (contrast) to the landscape resulting from the construction and operation of the Project.

4.16.1 Methodology for Analysis

4.16.1.1 **Contrast**

Contrast is the measure of change to the landscape resulting from the proposed Project. Specifically, in regard to solar generation projects, visual contrast is typically associated with clearing vegetation, grading and other topographical modifications, and the introduction of vertical features (structures) into naturally appearing landscapes. The visual analysis also considered the presence of existing cultural modifications (i.e., man-made modifications such as transmission lines, primitive roads, industrial development, etc.) and their effect on the landscape in relation to sensitive viewers.

Per BLM VRM contrast methodology, the level of contrast associated with the Project was measured by assessing changes to the landscape's physical features (including landform/water, vegetation, and structures) in terms of form, line, color, and texture as seen from sensitive viewing locations. Contrast was documented using Visual Contrast Rating Worksheet – BLM

Form 8400-4. Additional contrast resulting from the operations of the facilities was considered, such as the solar collecting tower glowing brightly, night-lighting, and glint and glare.

The resulting levels of contrast, which are based on the establishment of the existing landscape character, are defined below in Table 4-11.

Table 4-10 Degree of Contrast

Degree of Contrast	Criteria
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Weak	The element contrast can be seen, but does not attract attention.
None	The element contrast is not visible or perceived.
Source: BLM VRM Manual 8431 – Visual Resource Contrast Rating	

In some cases it was appropriate to identify a contrast level between two of the four levels. For example, the Project may demand attention, but does not completely dominate the landscape from a given viewpoint. In this example the contrast level would be moderate/strong.

4.16.1.2 **Sensitive Viewers**

Contrast rating worksheets (Visual Contrast Rating Worksheet – BLM Form 8400-4) were completed from critical key observation points, referred to as KOPs per BLM VRM policy. Impacts to sensitive viewers and their associated KOPs were assessed using the following criteria:

- Viewer sensitivity (high or moderate)
- Distance of sensitive viewer from the Project (foreground, middleground, or background)
- Viewing position (superior, level, or inferior views)
- Visibility (unobstructed, screened, skylined, or backdropped views)

The consideration of these elements resulted in a contrast level rating, or level of visual change for each KOP, consistent with the BLM's VRM Manual H-8431-1, Visual Contrast Rating.

For sensitive viewers with level views of the Project, as distance from the Project increases the perception of the Project decreases due to the relatively low profile of the heliostat arrays, although the solar collecting tower is still evident. In this regard, specific distance zones were identified within the framework of BLM-specified distance zones, as described below.

4.16.1.3 Distance Zones

The following distance zone definitions (Table 4-12) were developed for the Project and are consistent with BLM VRM procedures. These distance zones were used to describe the Project in regard to sensitive viewers and associated KOPs.

Table 4-11 Distance Zones

Distance Zone	Criteria (per BLM)	Project viewing conditions – Level Viewer
Immediate Foreground	0 to 1 mile	The Project is in close proximity to the viewer, where details are discernible and the scale of the solar collection tower dominates the view, resulting in potentially strong contrast.
Foreground	1 to 3 miles	Project features are visible, but details such as texture and color are not apparent. The heliostat array begins to blend with the horizon line and the solar collection tower is apparent.
Middleground	3 to 5 miles	The heliostat array and power block (excluding the solar collecting tower) are not apparent to the casual observer. The receiver tower becomes the primary element of the Project that is still evident to sensitive viewers.
Background	5 miles or beyond	The solar collecting tower would be discernible in the landscape, but would not dominate the view.

Distance zones are critical in providing context for the Project within the landscape. The solar collecting tower is visible from the foreground through background distance zones, even as details such as color and texture begin to become indistinct. Visual contrast is further reduced if seen in the context of existing cultural modifications such as existing transmission lines, roadways, cell phone towers, etc.

4.16.2 Indicators

4.16.2.1 Establishment of Indicators

The Project would be located on BLM-designated VRM Class III land. The BLM management objective for Class III lands is:

> "*…to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape*" (BLM VRM Manual 8410-1 VRI).

4.16.2.2 Determination of Impacts and VRM Compliance

Sensitive viewer impacts consider the sensitivity of the viewer and contrast based on distance and associated viewing conditions within the context of the existing setting. Compliance with VRM classifications was assessed by evaluating the level of visible change (contrast) from sensitive viewers KOPs (see Table 4-14). Using BLM form 8400-4 (Visual Contrast Rating Worksheet) contrast was characterized and documented (per BLM guidance) from KOPs that demonstrate compliance with VRM classes (Table 4.13 [BLM Manual H-8410-1]; see Appendix F for KOP Worksheets).

Table 4-12 Compliance with Agency Management Objectives

Contrast Level	**VRM Class**			
	I	**II**	**III**	**IV**
Strong	No	No	No	Yes
Moderate/Strong	No	No	Yes	Yes
Moderate	No	Yes	Yes	Yes
Weak/Moderate	No	Yes	Yes	Yes
Weak	Yes	Yes	Yes	Yes

Simulations

To represent the range of potential visual impacts resulting from the construction and operation of the Project, 11 photo simulations were prepared, per BLM direction, and are located in Appendix G. The simulations were prepared based on high-resolution photography and corresponding GPS data gathered during field investigations. Photographs taken with a 50 mm lens are the best approximation of the perspective and depth-of-field associated with the human eye. The photographs for this Project were taken with a 45 mm lens which, although not fully representational of the depth and perception of the human eye, was determined by the BLM to be acceptable for the purposes of this study.

4.16.3 Direct and Indirect Effects by Alternatives

4.16.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the visual impacts from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.16.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Facilities for the Project include a solar collecting tower, salt storage tanks, heliostat array, evaporation ponds, administrative/warehouse buildings, heliostat assembly building, heliostats, switchyard, and linear facilities (access road) constructed on approximately 1,675 acres (see Table 4-13 for sizes of Project elements and Section 2.4 for a complete list of specific Project elements).

Table 4-13 Structure and Building Dimensions

Permanent Structure/Building Description	Length (feet)	Width (feet)	Height (feet)
Solar Collecting Tower (115' dia. base; 86' dia. top of tower)	-	-	563
Heliostat (individual panels)	24	28	12-26
Administration (Pre-Engineered)	153	63	13
Warehouse (Pre-Engineered)	102	63	24
Control/Operations (Pre-Engineered)	93	64	13
Steam Generation (Engineered)	195	152	150
Electrical (Pre-Eng or Modular)	94	34	13
Water Treatment	120	60	30
Switchyard (including perimeter wall)	300	300	30
Heliostat Assembly Building (Pre-Eng)	400	200	30

Note: Measurements are approximate and based preliminary engineering
Source: Diep 2011

Construction activity would create short-term visual impacts, depending on the specific construction activity. These visual impacts include, but are not limited to, the temporary concrete plant construction and operation for the duration of the Project (the alternative would be to truck in concrete from Quartzsite). The solar collecting tower would require a construction crane for the duration of the tower being built. In addition to specific construction activities impacting visual resources, normal construction activities could add to the short-term visual impacts associated with the construction of the Project such as temporary construction parking, construction laydown areas, construction trailers, and temporary toilets. Construction parking, laydown areas, and construction trailers would be on the SR 95 side of the Project and would have a temporary fence similar to fencing around the heliostat array perimeter road.

Three 4-acre evaporation ponds would be located on the southwest quadrant of the heliostat array perimeter. These ponds would be visible to travelers along SR 95, with northbound travelers having the most direct views. The evaporation ponds would introduce and increase contrast for form, line, color, and texture. It is anticipated that the ponds would have an 8-foot high chain link fence around the perimeter.

Project Contrast

The Project would introduce an overall moderate level of Project contrast. The regular geometric forms and defined diagonal and horizontal lines associated with clearing of desert shrubs and land grading for the solar collecting tower and heliostat array would result in a weak/moderate level of contrast. The introduction of geometric and regular line and form associated with the power block would result in moderate/strong contrast when compared to the diagonal and angular lines associated with adjacent scenery (i.e., Plomosa Mountains to the east).

The large expanse of the heliostat array would appear to be low and horizontal in the foreground distance zone, resulting in moderate/weak contrast due to the relatively short stature of the heliostats (12 feet tall when mirrors are horizontal; 24 feet tall when mirrors are vertical). The monopole generator tie-line is similar in form and line as the existing H-frame towers. The proposed switchyard would be adjacent to the existing H-frames at SR 95 and would introduce a new element in form, line, color, and texture for foreground viewers due to the switchyard components, but would not likely be seen for viewers in the middleground through background.

The solar collecting tower would introduce a strong overall contrast in the foreground distance zone, with strong contrast for form, line, color and texture due to the size of the tower structure and the illuminated receiver. Under certain conditions (i.e., increased levels of humidity or increased PM in the atmosphere) reflected light from the solar collecting tower would appear to be emanating from the tower top (referred to as a "halo" effect). This effect would be seen from the foreground through background distance zones, but would typically occur in the mornings, last less than an hour, and would decrease as humidity decreases. (Note: the solar collecting tower would not be illuminated during cloudy conditions)

Overall, the construction and operation of the Project would result in a moderate/strong level of Project contrast for foreground viewers. However, in the context of sensitive viewers, overall contrast is anticipated to be moderate because the Project would:

- Be located in primarily the middleground to background distance zone of sensitive viewers (exceptions being SR 95 travelers in the foreground to middleground and dispersed recreation on adjacent BLM land in the middleground)
- Be seen in the context of existing Utility corridor for SR95 travelers
- Be constructed on land with minimal topographic variation occupied by primarily low-growing, uniformly spaced Sonoran Desert vegetation (i.e., creosote bush); thus decreasing the apparent profile
- Occur at an elevation where typical viewers would have level (neutral) views of the majority of the Project

In addition to contrast associated with normal viewing conditions associated with the Project facilities, operation of the Project requires nighttime lighting for safety and security, and is further discussed below.

It is important to note that the closest residence is 9 miles away, and that the Project would not block views of the existing landscape for any sensitive viewers unless noted.

Glint and Glare

This section focuses on glint and glare as it relates to visible light (photometric) from the solar collecting tower and heliostats. A visible-light study has not been conducted for this specific Project; however, some of the following conclusions are based on the Central Tower Receiver Radiance report and supplement (Diep 2010), which discusses the optical hazards of an illuminated receiver in terms of radiometric (non-visible light) and photometric (visible light).

Glint is defined as a bright, momentary flash of light, while glare is defined as a more continuous and sustained presence of light. With solar collecting tower projects such as Quartzsite, the solar collecting tower brightness is described as glare, while the heliostats are more associated with glint. Glint and glare, as it relates to the visual resources in this section, focuses on the irradiance of light from the solar collecting tower as it is the primary element seen by sensitive viewers outside of the Project perimeter. The heliostats reflect light to the solar collecting tower, but viewers would not typically see this reflection due to position of the heliostats, the distance from receiver, and level views in the foreground/middleground.

Studies show luminance (light intensity) diminishes over distance exponentially; thus views from 5.3 miles or more would see levels significantly lower than that of the 50-watt bulb at 9.8 feet. It is anticipated that impacts from glint and glare would increase contrast to color for all KOPs. Following are typical results for sensitive viewers as it relates to glint and glare.

Residential

Residential viewers would most likely not be affected by glint from the heliostats, but glare from the receiver would potentially be visible for long durations. The nearest residence is in the Town of Quartzsite and is approximately 9 miles away from the receiver in the background distance zone with reduced contrast from glare.

Tribal Viewers

Sensitive viewers from tribally-sensitive areas would see glare for a longer duration and, from superior viewing positions, would be more likely to see glint from the heliostats. Tribally-sensitive views would range from the middleground (Copper Peak, Fisherman Intaglio) to background (Black Point) and would likely be for a moderate to long viewing duration. All tribal viewers are more than 5 miles away, with the likely impacts from glare being diminished.

Travel Routes

Travelers along SR 95 would see the solar collecting tower in the background to foreground for a short duration, due to a high rate of speed. The potential exists for travelers to see glare from the receiver as they travel along the highway. There would be less effect due to continuous glare than that of stationary observers, due to travelers being in motion. Although traveling observers would likely be momentarily distracted while trying to identify the source of light as they pass, the glare source would be outside the normal cone of vision for foreground viewers. It is anticipated that impacts as a result of glint and glare would be high for short time durations, depending on time of day and rate of travel speed.

Recreation

Sensitive viewers from dispersed recreational areas would see glare for a longer duration than those from travel routes. Viewers at a superior vantage point (such as Black Peak) would be more likely to see glint from the heliostats. There are no superior viewing locations in the foreground distance zone. Recreation views would range from foreground level views for moderately sensitive dispersed recreation viewers to level and superior background views for high sensitive recreation viewers, and would likely be for a moderate to long viewing duration.

Night Lighting

Potential effects to night lighting would result from the nighttime operations of the Project. Normal operations would require lighting for safe and secure operations of the facility, as well as regular maintenance (specifically, mirror cleaning).

The exterior lighting plan is not completed at this time, but would be designed to minimize light pollution by (1) utilizing sensor-activated lights that are directed to the site needed the most, and (2) shielding lighting facilities using light hoods such that light or glare would be minimized. Lighting for the heliostat array is not anticipated, but would be expected for the following areas:

- Building interior equipment, office, control, maintenance, and warehouse
- Solar collecting tower (Note: does not operate at night and safety lighting would be per FAA requirements)
- Building exterior entrances
- Outdoor equipment within the power block and tank area
- Power transformers
- Power block roadway
- Parking areas within the power block area
- Entrance gate
- Water treatment area
- Air-Cooled Condenser (for maintenance only)

Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible offsite.

Project construction would typically occur during daytime hours Monday–Friday; however, nighttime construction activities that would require lighting may occur depending on the construction schedule. To the extent possible, task-specific lighting for any construction activity would be directed to the construction activity and would utilize shielded lights.

Scenic Quality

The Project would be located within a BLM-designated Class C landscape (see Figure 3-10) where flat to low rolling topography is occupied by primarily low-growing creosote shrubs. The local setting has been modified by existing transmission lines and transportation routes. Regionally, the landscape is relatively intact with the exception of the intense agricultural development of the Parker Valley, the towns of Quartzsite and Parker, and the La Paz County Regional Landfill. Because the land in which the Project would be located has been designated as Class C, and existing landscape character has already been modified by human development at both the local and regional levels, impacts to scenic quality are anticipated to be moderate.

Sensitive Viewers and KOPs

Impacts to sensitive viewers are anticipated to range from predominantly low, where Project contrast would be imperceptible due to distance or screening, to high, where moderate sensitivity viewers have unobstructed views of the Project in the immediate foreground (0-1 mile) distance zone. The regular geometric forms associated with the power block elements (especially solar collecting tower), heliostat array, and transmission lines would contrast with the irregular, organic forms associated with the landscape setting. In addition, color contrast associated with the solar collecting tower and heliostat array would vary throughout the day, although glare from the tower would provide the greatest consistent contrast. In limited situations, glint associated with the reflection of the sun on the heliostats would increase contrast and could occur based on viewer position (typically elevated above the Project), angle of solar arrays, and atmospheric conditions. Typically, viewers with a superior viewing position would perceive stronger contrast as compared to a level viewing condition. There are, however, no sensitive viewers with superior views in the foreground or middleground for this Project. Impacts to specific sensitive viewers are described below and in Table 4-14.

Residential

Each grouping of residences listed below are anticipated to have a high sensitivity based on a long viewing duration, and heightened concern for aesthetics or changes in the landscape.

Quartzsite (KOP 11, S-8). This KOP represents residential views from the north end of the Town of Quartzsite as seen from the Quartzsite Fire Station. Residents along the northern edge of town would have level, partially-screened views of the Project in the background distance zone (approximately 10 miles). The solar collecting tower would be skylined; however, the heliostat array as well as any changes to land or vegetation would be screened by topography and vegetation. The power block elements viewable from the Town of Quartzsite would be seen in the context of existing utility lines and an existing cell phone tower north of town, reducing structure contrast to weak/moderate. The Project would attract attention, but would not dominate from this vantage point. Impacts are anticipated to be low.

- **Parker** (KOP 18). This KOP represents residential views from the southern end of the Town of Parker. Residents along the southern edge of town would have inferior, partially-screened views of the Project in the background distance zone (approximately 19 miles). From this vantage point, topographic changes such as the edge of the La Posa Plain in the foreground would screen any views of land and vegetation contrast. In addition, distant views of the solar collecting tower would be seen in the context of cultural modifications such as ranching/agricultural equipment, decreasing structure contrast to weak. Based on these conditions, the Project would not be visually evident to residences within the Town of Parker and, therefore, low impacts are anticipated.

Table 4-14 Key Observation Points – Contrast Levels								
KOP #	**Simulation #**	**Description**	**Sensitive Viewer**	**Contrast Level**				**Overall Impacts**
				Land/Water	**Vegetation**	**Structure**	**Overall Contrast**	
1	S-1	Access road to Dome Rock Mountains; 9.8 miles southwest of the proposed tower location	Tribal/Recreation	Weak/Moderate	Weak	Moderate	Moderate	Moderate
2	S-2	La Paz County Hospital; 21.6 miles north of the proposed tower location	Community Facility	None	None	Weak	Weak	Low
3	n/a	US 95 and entrance to LTVA; approximately 16 miles south of the proposed tower location	Recreation	None	None	Weak	Weak	Low
4	S-3	I-10 westbound; 11.9 miles southeast of the proposed tower location	Travel Route	Weak	Weak	Moderate	Weak/ Moderate	Low
5	S-4	Copper Peak; 6.7 miles west of the proposed tower location	Tribal	Moderate/Weak	Moderate/ Weak	Moderate/Strong	Moderate	Moderate
6	S-5	Plomosa 14-Day Campground; 5.8 miles south of the proposed tower location	Recreation/Other	None	None	Moderate	Moderate	Moderate
7	S-6	Fisherman Intaglio; 6.3 miles east of the proposed tower location	Tribal	None	None	Moderate/Weak	Weak	Low/ Moderate
8	S-13	Plomosa Back Country Byway; approximately 6 miles southeast of the proposed tower location	Travel Route	Weak	Weak	Moderate/Strong	Moderate	Moderate
9	S-7 S-12	SR 95; approximately 1.7 miles northwest of the proposed tower location	Travel Route	Moderate	Moderate	Strong	Strong	High

Table 4-14 Key Observation Points – Contrast Levels

KOP #	Simulation #	Description	Sensitive Viewer	Contrast Level				Overall Impacts
				Land/Water	Vegetation	Structure	Overall Contrast	
10	n/a	Entrance to WSA at SR95/72 intersection; approximately 10 miles north of the proposed tower location	Recreation/Other	None	None	Moderate	Weak / Moderate	Low
11	S-8	Northern boundary of the Town of Quartzsite; 9.9 miles south of the proposed tower location	Residential	None	None	Weak/Moderate	Weak	Low
12	n/a	La Pera Elementary School; approximately 14 miles northwest of the proposed tower location	Recreation/Other	None	None	Weak	Weak	Low
13	S-9	Communication site on Black Peak; 20.2 miles north of the proposed tower location	Tribal	None	None	Weak	Weak	Low
14	n/a	Blythe Intaglios Cultural Site; approximately 19 miles west of the proposed tower location	Recreation/Tribal	None	None	Weak	Weak	Low
15	n/a	I-10 eastbound; approximately 13 miles southwest of the proposed tower location	Travel Route	Weak	Weak	Weak	Weak	Low
16	S-10	Cultural resources area adjacent to Black Point; 19.5 miles west of the proposed tower location	Tribal	None	None	Weak	Weak	Low
17	S-11	Big Maria Mountains; 19.8 miles west of the proposed tower location	Recreation/Tribal	None	None	Weak	Weak	Low
18	n/a	Residence in Parker, Arizona; approximately 19 miles north of the proposed tower location	Residential	None	None	Weak	Weak	Low

Tribal Viewers

- **Black Point** (KOP 16, S-10). Contrast associated with land and vegetation would not be visible from this sensitive viewing location, due to screening associated with vegetation. Contrast associated with structure (solar collecting tower) would be weak, based on the distance from the KOP to the Project; therefore, low impacts are anticipated for this KOP.

- **Copper Peak** (KOP 5, S-4). Moderate contrast is anticipated for high sensitivity viewers associated with Copper Peak. Views of the Project would be unobstructed in the middleground to background distance zone (approximately 6 miles). Visible components of the Project from this KOP include the heliostat array, power block (including solar collecting tower), and the proposed switchyard. The solar collecting tower and heliostat field would be backdropped by topography, which reduced contrast. The Project would attract attention, but would not dominate from this vantage point. Therefore, overall impacts are anticipated to be moderate.

- **Black Peak** (KOP 13, S-9). The Project is anticipated to result in weak contrast for high sensitivity viewers associated with Black Peak. The Project would be visible from a superior viewing position in the background distance zone. Project elements discernible from this KOP include the heliostat array and power block (especially solar collecting tower). However, these components would be backdropped by the distant Dome Rock Mountains. Also, there would be no discernible contrast associated with land and vegetation modifications. Therefore, the Project would be discernible, but would not dominate from this vantage point resulting in a low impact.

- **Dome Rock Mountains** (KOP 1, S-1). Moderate contrast is anticipated for high sensitivity viewers from the Dome Rock Mountains. The Project would be visible in the background distance zone (approximately 10 miles). Although the heliostat array would be visible, contrast would be reduced based on the low profile of the facilities seen in context (i.e., backdropped) with the Plomosa Mountains. From this KOP position, contrast associated with land and vegetation would be weak, although contrast associated with structure would be moderate. The Project would attract attention, but would not dominate the view; therefore, impacts are anticipated to be moderate.

- **Fisherman Intaglio** (KOP 7, S-6). High sensitivity viewers are anticipated to have level, partially-screened views of the Project in the background distance zone. The Project would be partially screened by topography from the foothills of the Plomosa Mountains that are located between the KOP and the Project area, approximately 1 mile to the west of the KOP. From the Intaglio trail trailhead, approximately ¼ mile east of the intaglio site, visitors hike west with focal views of the solar collecting tower. From this viewing position, there would be no visible contrast associated with land and vegetation, but contrast associated with structure would be moderate. Based on these conditions, impacts to visitors are anticipated to be low/moderate.

- **Big Maria Mountains** (KOP 17, S-11). The Project, as seen from the Big Maria Mountains, is expected to result in weak visual contrast in the background distance zone (approximately 19 miles). From this viewing position, there would be no contrast associated with land and vegetation. Furthermore, based on topographical screening associated with the Moon Mountain Range, the upper portion of the solar collecting tower would be the only portion of the Project that would be visible. Therefore, impacts are anticipated to be low for viewers within the Big Maria Mountains.

- **Blythe Intaglios** (KOP 14). This KOP represents tribal viewers and is accessible for recreational hikers from a nearby trailhead. The Intaglio is slightly inferior relative to the Project area, which affords panoramic views of the Parker Valley. However, visibility of the Project is reduced based on intervening topography associated with the Moon Mountain range. Based on this viewing condition, the solar collecting tower is the only component of the Project that would be seen, resulting in weak contrast. Impacts, therefore, are anticipated to be low.

Travel Routes

U.S. Highways – Travelers on these highways are typically moderately sensitive to landscape modifications and are typically focused on commuting to a destination with moderate concern of aesthetics. As traveler's speeds increase, their cone of vision (i.e., angle needed to quickly fixate on an object) decreases, thus lowering perceptions of visual change in their peripheral vision.

- **Interstate 10** (KOP 4, KOP 15, S-3). KOP 4 represents moderately sensitive viewers traveling westbound on I-10 looking toward Quartzsite. Any potential viewers along the highway would be traveling at a high rate of speed and would see the Project to the north in the background distance zone for a short duration of time. Viewing position would range from superior to the east (KOP 4) to level from KOP 15. Travelers would have panoramic views of the La Posa Plain with views of the Dome Rock Mountains for travelers headed west and the Plomosa Mountains for travelers headed east. Travelers in either direction would have views of the Project as seen in the context of the Town of Quartzsite and existing utilities (cell tower, utilities, etc.). The Project would attract attention, but would not dominate from this vantage point. Travelers along I-10 would view weak contrasts for land and vegetation, but weak/moderate contrast for structure form and line and weak structure color and texture, as the solar collecting tower is a new structure introduced into the otherwise flat landscape. Visibility of the Project ranges from backdropped to skylined views. Based on these conditions, low impacts are anticipated.

- **US 95** (KOP 3). US 95 south of I-10 is a scenic road that terminates scenic status south of the Town of Quartzsite. This viewing location (KOP 3) is approximately 15 miles south of the Project area with level views. High sensitivity viewers would have level views for short durations from the background distance zone. Travelers would have partially-screened views of the Project with the solar collecting tower visible as seen in the context of existing structures associated with the Town of Quartzsite and the existing H-frame structures parallel to US 95. The solar collecting tower, as seen from the designated scenic portion of US 95, would possibly attract attention due to glare associated with the solar collecting tower, but would not dominate the landscape due to the cultural modifications between the viewer and the Project area. Overall impacts are anticipated to be low.

- **SR 95** (KOP 9, S-7 and S-12). This KOP was used to assess effects to travelers along SR 95 between Quartzsite and Parker. As compared to KOP 3 (see above), this portion of the SR 95 is not designated as a scenic route. This portion of SR 95 affords panoramic views across the La Posa valley toward the Plomosa Mountains to the east and the Dome Rock Mountains to the west. The Project (including the power block and switchyard) would be visible in the foreground distance zone and seen in context with existing transmission facilities on the east of the state route. The formal geometric form and line associated with the power block and solar collecting tower would contrast with the jagged and irregular form and line associated with the Plomosa Mountains. In this regard, strong structure contrast is anticipated, although the presence of existing transmission line facilities has locally modified the setting. Based on these conditions, the Project would attract attention and could dominate from this vantage point; therefore, impacts are anticipated to be high.

- **Plomosa Back Country Byway** (KOP 8 and S-13). High sensitivity viewers along the designated scenic Plomosa Back Country Byway would have unobstructed views of the Project in the foreground distance zone to partially-screened views in the middleground to background. Weak contrast resulting from modifications to landform and vegetation is anticipated. Contrast associated with the power block (including solar collecting tower) would range from moderate to moderate/strong based on site-specific conditions along the Byway for a limited amount of time traveling into the Plomosa Mountains. In this regard, the Project would attract attention, but would not dominate the view from this KOP; therefore, impacts are anticipated to be moderate.

Recreation Areas

- **Plomosa Campground** (KOP 6, S-5). Weak/moderate visual contrasts are anticipated for moderate sensitivity users of the 14-day camping area. Views of the Project would be partially screened in the background distance zone (approximately 6 miles) due to topography and vegetation; however, the solar collecting tower would be skylined and may be seen above the mid-sized vegetation. From this viewing position, there would be no visible contrast associated with land and vegetation, but contrast associated with the solar collecting tower would be moderate. The Project would introduce a vertical feature into a generally flat landscape, but would not dominate from this vantage point. Impacts therefore are anticipated to be moderate.

- **Long-term Visitor Area.** The LTVA entrance (Similar to KOP 3) is approximately 15 miles south of the Project. Moderate sensitive viewers would have long-duration, partially screened views of the Project. Based on the distance between the LTVA and the Project, contrast is anticipated to be weak. Additionally, structures such as an existing H-frame transmission line paralleling the east side of the highway, a cell phone tower north of the Town of Quartzsite, and a distribution line paralleling the west side of the highway are cultural structures and would be seen in the context of the Project. Impacts, therefore, are anticipated to be low.

- **SR 95/SR 72** (KOP 10). This viewpoint, approximately 12 miles north of the SR 95/SR 72 junction, represents the entrance to Cactus Plain WSA, East Cactus Plain Wilderness, Gibraltar Mountain Wilderness, and the Snake intaglio. These moderately sensitive viewers would have views of the Project in the background distance zone from a level viewing position. From this viewpoint there would be no views of modifications to landform or vegetation intervening topography. However, contrast resulting from the solar collecting tower would be weak/moderate. The Project would therefore result in low/moderate impacts.

Community Facilities

Community facilities are anticipated to have moderate sensitivity based on a moderate viewing duration and a general concern for aesthetics or changes in the landscape.

- **La Paz County Regional Hospital, Parker** (KOP 2, S-2). This KOP represents public viewing locations from the southern end of Parker. Viewers from this location would have background views of the Project that are partially screened by topography. Visible portions of the Project include the upper portion of the solar collecting tower. At this distance, contrast is anticipated to be weak and therefore impacts would be low.

- **La Pera Elementary School** (KOP 12). This moderately sensitive viewpoint would have partially-screened views of the project based on the presence of topography. Modifications to landform or vegetation would not be evident, although the upper portion of the solar collecting tower would be visible. Weak structure contrast is anticipated based on the limited visibility of the Project. Overall impacts therefore are anticipated to be low.

Compliance with Visual Resource Management Objectives

The Project would be located on BLM land designated as Class IV based on the BLM's preferred alternative for the YFO land use plan amendment (see Appendix A). Compliance with VRM objectives for Class IV designated land is anticipated because objectives for Class IV objectives are "to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements" (BLM VRM 23 Manual 8400).

Through the visual assessment, the contrast and resulting impacts identified range from low in those locations that the Project would be viewed in the background distance zone with no views of land or vegetation contrast; to weak contrast for structure; to limited areas of moderate to high impacts where travel route viewers along SR 95 would have direct, partially screened to unobstructed views of the Project in foreground-to-middleground distance zone. These impacts and associated changes to landscape character are consistent with Class IV objectives; therefore, the Project would be consistent with the amended YFO RMP.

Closure and Decommissioning

The purpose of decommissioning is to remove Project-related structures and infrastructure so that affected lands could naturalize. However, until vegetative restoration is achieved, adverse visual impacts would be similar to those described in the operation-phase impacts because large areas would be devoid of desertscrub vegetation. The impacts of decommissioning would be somewhat reduced in intensity, however, as compared to construction because the contrast in color created by the power block structures and solar arrays would be removed. The contrast in the design elements of form and line would remain. Implementation of appropriate mitigation would aid greatly in reducing the visual effects of decommissioning. To mitigate for any potential impacts associated with Project closure, the Applicant would be required to prepare a decommissioning plan that meets the requirements of the BLM. The plan would identify likely decommissioning scenarios and develop specific plans for each scenario that would identify actions to be taken to avoid or mitigate long-term impacts related to visual resources.

The removal of the existing facility would leave a very prominent visual impact over the entire site due to form, line, color, and texture contrast created between graded or disturbed soil areas and undisturbed areas in the region of the Project site. This color contrast is due particularly to the removal of the dark color element contributed by normal scrub vegetation cover. After decommissioning, the site would leave a geometric area of form, line, color, and texture contrast visible mainly to elevated locations within the adjacent wilderness area. Revegetation of areas in this desert region are difficult but have been implemented by the BLM with success over time. Thus, visual recovery from land disturbance after closure and decommissioning could take place, although over a long period of time (potentially over 40 years), and with implementation of an active and comprehensive revegetation program for the site.

4.16.3.3 Alternative 1 – Hybrid-Cooled

Implementation of the hybrid-cooling alternative would have similar construction and operational impacts on visual resources as the Applicant's Proposed Project (dry-cooled alternative), with three exceptions:

1. The hybrid condenser unit would not be as tall as the dry-cooling unit, thereby reducing the overall mass of the power block (although solar collecting tower height would not change).
2. The three evaporation ponds are expected to be 6 acres each as opposed to 4 acres, thus increasing visual impacts for travel in the foreground, especially for northbound travelers.
3. The hybrid system has a potential to create a visible vapor plume during daylight hours at certain times of year. Previous studies have shown that true wet-cooled units can produce a visible vapor plume up to 1,371 feet for up to 7 hours a year for similar atmospheric conditions as the Project. No known studies have been conducted for a hybrid system; however, the wet cooling portion of this system would not be operating under these atmospheric conditions, making it unlikely that a plume would be evident.

4.16.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Since Western's switchyard would be a component of the viewshed associated with the Applicant's Proposed Project, impacts on visual resources from construction and operation of Western's switchyard are described in section 4.16.3.2.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Construction equipment associated with installation of fiber-optic cable could create short-term (1 to 2 days) impacts to viewers along SR 95, and particularly in segments of the existing transmission line that would be visible to recreations use visitors. Visual impacts would be minor in comparison to the overall impacts from the Project.

Microwave Alternative

Since there are existing telecommunication components at the Bouse Substation, and the Metal Mountain and Cunningham Peak communication sites, impacts from installation of a new microwave dish at one of these locations is expected to be low. Metal Mountain and Cunningham Peak communication sites are located at higher elevation, have multiple antennas, and are closed to public access.

4.16.4 Mitigation Measures

Visual mitigation includes a variety of measures that, in totality, would reduce the overall visual impacts. These measures consist of a mixture of temporary construction-related measures and longer-term procedural measures. The measures are to help reduce visual contrasts and to aid in landscape restoration, and include the following:

- The Project owner would treat the surfaces of all Project structures and buildings (including temporary structures related to construction) visible to the public such that (1) their colors minimize visual intrusion and visual contrast by blending with the existing characteristic landscape colors; (2) their colors and finishes do not create excessive glare; and (3) their colors and finishes are consistent with local policies and ordinances.

- The Project owner would submit to the BLM for review and approval a specific Surface Treatment Plan that would satisfy the following requirements. The treatment plan would include:

    - A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes based on the characteristic landscape.

    - A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; mirror support structure; diversion berms/dikes, and fencing, specifying the color(s) and finish proposed for each. Surfaces of all ancillary facilities that are visible to the public, including the backs of the heliostat arrays, would be treated with paint colors that blend with the surrounding landscape and not create excessive glare.

- One set of color brochures or color chips showing each proposed color and finish (refer to BLM Standard Environmental Color Chart CC-001: June 2008). Any colors not on Color Chart CC-001 must be submitted to the BLM for approval prior to completion of construction. Colors must be identified by vendor, name, and pantone number; or according to a universal designation system
- A specific schedule for completion of the treatment.
- A procedure to ensure proper treatment maintenance for the life of the Project. Subsequent modifications to the treatment plan are prohibited without the BLM's approval.

- The contractor is to use dust control measures during construction.
- Any temporary areas that are used during the construction process are to be restored (vegetation, topographic) to pre-construction conditions.
- Mirrors move to/from stow position in late evening or early morning to prevent any potential errant glint.
- Generator tie-lines have non-specular and non refractive insulators and conductors
- Nighttime Lighting – The Proponent shall consider location and type of lighting and other dark sky mitigation measures to minimize potential light pollution to the greatest extent practicable. Mitigation measures include, but are not limited to light hoods/shields, directional lighting, minimum required brightness, setbacks from Project perimeter, and 'as-needed' usage.

4.16.5 Residual Effects

Visual impacts would be significant and long-term considering the context and intensity of the Project effects in general. Intensity of potential effects varies based on various aspects described above, and involves the unique scenic characteristics of the local landscape as indicated by the rural character of the Project viewshed; concerns expressed by public commenters to date; a degree of uncertainty as to the level of discomfort from glare associated with the solar collecting tower; and concern over cumulative visual effects of renewable projects in the Colorado River Valley as a whole. The loss of visual quality would be long-term, enduring throughout the proposed 30-year lifespan of the facility. After the end of the Project's useful life, it would be decommissioned per BLM requirements, to be further described in the Applicant's Decommissioning Plan.

4.16.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the proposed Project could result in a cumulative effect on visual resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for visual resources consists of portions of the Colorado River Valley; where views of the Project solar tower may occur. This geographic scope was established based on natural boundaries of the affected resource, i.e., potential shared viewsheds.

The possible development of proposed Project and the EnviroMission solar project could result in cumulative impacts to the viewsheds of tribal areas, public roadways, recreation areas, and residential areas. Views of the Project vicinity are panoramic and extensive given the topography of the Colorado River Valley, lack of vegetative screening, and dispersed nature of sensitive viewers. Potential cumulative visual impacts would result from the construction, operation, and maintenance of the Project in the context of current and proposed projects within the Colorado River Valley.

The proposed EnviroMission project would include two - 2,400 foot solar towers, both 1,747 feet higher than the QSEP solar tower. According to the visual analysis conducted for this Draft EIS, the QSEP solar tower would be visible from various areas within the Colorado River Valley, depending on topography and distance (see Section 4.16). At a height of 2,400 feet, it is likely that if both projects were to be built, the introduction of three solar towers would result in a cumulative effect to visual resources, depending on location. Since the EnviroMission towers are significantly higher than the QSEP solar tower, there would be a higher probability that the EnviroMission solar towers could be seen in areas beyond the cumulative effects ROI.

Construction and operation of both projects would result in an industrial landscape character in the Project area. Although details about EnviroMission's lighting plan are not available, it is anticipated that each project would have nighttime lighting that would incrementally modify the night sky. This change in landscape character in conjunction with potential viewer impacts would result in adverse cumulative impacts. The Project, along with the past, present, and reasonably foreseeable projects, could substantially alter the visual character of the areas within the Project vicinity. The increase in energy development could potentially result in increased demand for the existing transmission ROW, as well as new corridors for transmission lines and distribution lines that would incrementally increase visual impacts to sensitive viewers (e.g., residences and travel routes) and scenic quality.

4.16.7 Short-Term Uses versus Long-term Productivity

The resulting change to the landscape character as a result of the construction and operation of the Project would create short-term and long-term changes due to modifications to land and vegetation. The built structures would change the character from a naturalistic setting to an industrial setting. This change to the landscape would continue for the lifetime of the Project operation.

4.16.8 Irreversible and Irretrievable Commitments of Resources

Changes to the landscape character would occur over the lifetime of the Project, estimated to be approximately 30 years. As described in Chapter 2, the decommissioning plan outlines a process for removal of all built structures and how the landscape would be restored. There are no anticipated irreversible impacts to the landscape, although recovery for the sand dunes area and vegetation would take many years to reach pre-construction levels. Revegetation of areas in this desert region are difficult but have been implemented by the BLM with success over time. Thus, visual recovery from land disturbance after closure and decommissioning could take place, although over a long period of time (potentially over 40 years), and with implementation of an active and comprehensive revegetation program for the site.

There would be irretrievable visual impacts associated with the operation of the Project. The visual contrasts that would result from the introduction of facilities associated with the Project would be an irretrievable loss of the area's characteristic landscape, until the decommissioning is completed and reclamation has been completed.

4.17 NOISE

This section discusses the effects on existing noise levels that may occur with amending the YFO RMP and implementation of the Applicant's Proposed Project and alternatives.

4.17.1 Methodology for Analysis

The baseline noise conditions expressed in Chapter 3 were considered in evaluating what the impacts of the construction and operation of the Project would be. The indicators listed below were then utilized to determine if a significant impact on noise would occur from the construction and operation of the Project.

4.17.2 Indicators

A significant impact on noise may result if any of the following were to occur from construction or operation of the Project:

- Exceedance of local, State or Federal noise regulations or guidelines at sensitive receptors, such as residences, hospitals, or schools.
- Substantial permanent increase in ambient noise levels at the nearest sensitive receptors within the Project vicinity. An increase of 10 decibels, perceived as a doubling of noise, is generally considered to be substantial.
- Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels where they live, work, or recreate.

4.17.3 Direct and Indirect Effects by Alternatives

4.17.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no impacts would result from this alternative related to noise. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects might or might not have impacts in other locations.

4.17.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Impacts to noise levels in the Project area would occur mostly during construction. Construction of the solar facility is expected to be typical of other power plants in terms of schedule, equipment used, and other types of activities. The noise level will vary during the construction period, depending on the construction phase. Construction of power plants can generally be divided into five phases that use different types of construction equipment. The five phases are site preparation and excavation; concrete pouring; steel erection; mechanical; and clean-up (Miller et al., 1978).

The EPA Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities (EPA, 1971; Barnes et al., 1976). Because specific information on types, quantities, and operating schedules of construction equipment is not available at this point in project development, information from these documents for similarly sized industrial projects was used in this analysis. Use of these data, which are more than 30 years old, is conservative because the evolution of construction equipment has been toward quieter designs to protect operators from exposure to high noise levels.

The loudest equipment types generally operating at a site during each phase of construction are presented in Table 4-15. The composite average or equivalent site noise level, representing noise from all equipment, also is presented for each phase.

Table 4-15 Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Equipment Noise Level (dBA) at 50 feet	Composite Site Noise Level (dBA) at 50 feet
Site Clearing and Excavation	Dump Truck Backhoe	91 85	89
Concrete Pouring	Truck Concrete Mixer	91 85	78
Steel Erection	Derrick Crane Jack Hammer	88 88	87
Mechanical	Derrick Crane Pneumatic Tools	88 86	87
Cleanup	Rock Drill Truck	98 91	89

Average or equivalent construction noise levels projected at various distances from the site are presented in Table 4-16. These results are conservative because the only attenuating mechanism considered was divergence of the sound waves in open air. Additional attenuation will result from air absorption and topography. Table 4-17 presents noise levels from common construction equipment at various distances from divergence only.

Table 4-16 Average Construction Noise Levels at Various Distances

Construction Phase	Sound Pressure Level (dBA)			
	50 feet	1,500 feet	1 mile	15 miles
Site Clearing and Excavation	89	59	49	25
Concrete Pouring	78	48	38	14
Steel Erection	87	57	47	23
Mechanical	87	57	47	23
Cleanup	89	59	49	25

Table 4-17 Noise Levels from Common Construction Equipment at Various Distances

Construction Equipment	Sound Pressure Level (dBA)			
	50 feet	1,500 feet	1 mile	15 mile
Pile Drivers (20,000 – 32,000 ft-lbs/blow)	104	74	64	40
Dozer (250 – 700 hp)	88	58	48	24
Front End Loader (6-15 cu. Yds)	88	58	48	24
Trucks (200-400 hp)	86	56	46	22
Grader (13 to 16 ft. blade)	85	55	45	21
Shovels (2-5 cu. Yds)	84	54	44	20
Portable generators (50-200 kw)	84	54	44	20
Derrick Crane (11-20 tons)	83	53	43	19
Mobile Crane (11-20 tons)	83	53	43	19
Concrete Pumps (30-150 cu. Yds.)	81	51	41	17
Tractor (3/4 to 2 cu. Yds)	80	50	40	16
Unquieted Paving Breaker	80	50	40	16
Quieted Paving Breaker	73	43	33	9

Noise generated during the testing and commissioning phase of the project is not expected to be different from that produced during normal full-load operation. Starts and abrupt stops are more frequent during this period, but they are usually short lived.

A steam blow, with a noise level of 110 dBA at 1,000 feet, is an activity, rather than a piece of equipment. This activity is designed to clean scale and other debris from the boiler tubes and steam lines before admitting steam to the steam turbine where the foreign material would damage the blades. A temporary bypass line to the atmosphere is welded into the main steam line upstream of the steam turbine to divert the steam. Several short blows of about two minutes in duration each will be performed per day and the entire process generally takes several weeks. Steam blow silencers can reduce noise levels by about 30 dBA, if necessary given the distance to sensitive receptors.

Project construction activities may include early morning starts, evening work, and 24 hour operations. This may be required to maintain schedule, provide cooler periods to perform the work, perform 24 hour continuous operations, or may be due to other requirements. Due to the remote location, continuous operation would not adversely affect residential or other uses.

Construction Vibration

Construction vibrations can be divided into three classes, based on the wave form and its source (see Table 4-18). It will be limited to normal construction hours (during the daytime) and will be of short duration; therefore, no mitigation is required.

Table 4-18 Construction Vibrations

Wave Form	Example Source
Impact	Impact pile driver or blasting
Steady State	Vibratory pile driver
Pseudo Steady State	Double acting pile driver

Worker Exposure to Noise

Worker exposure levels during construction will vary depending on the phase of the project and the proximity of the workers to the noise-generating activities. Construction noise is potentially harmful to the health and hearing of construction workers. The project will develop a Hearing Protection Plan, which complies with OSHA requirements. This Hearing Protection Plan will be incorporated into the project construction Health and Safety Plan. The plan will require appropriate hearing protection for workers and visitors throughout the duration of the construction period.

4.17.3.3 Operational Impacts

Worker Exposure

Nearly all components will be specified not to exceed near-field maximum noise levels of 90 dBA at 3 feet (or 85 dBA at 3 feet where available as a vendor standard). Because there are no permanent or semi-permanent workstations located near any piece of noisy plant equipment, no worker's time-weighted average exposure to noise should routinely approach the level allowable under OSHA guidelines. Nevertheless, signs requiring the use of hearing protection devices will be posted in all areas where noise levels commonly exceed 85 dBA, such as inside acoustical enclosures. Outdoor levels throughout the plant will typically range from 90 dBA near certain equipment to roughly 65 dBA in areas more distant from any major noise source. Therefore, noise impacts to workers during operation will be less than significant.

Plant Operational Noise Levels

Noise emissions during plant operations are derived from acoustical modeling conducted for SolarReserve's Rice Solar Energy Project in Riverside County, California. The Rice Solar Energy Project would use the same type of equipment, would have the same layout and configuration, and is located in a similar remote, desert setting compared with the proposed Project. The noise levels presented below represent the anticipated steady-state level from the plant with essentially all equipment operating.

Standard acoustical engineering methods were used in the noise analysis conducted for the Rice Solar Energy Project. The computer software noise model, CADNA/A by DataKustik GmbH of Munich, Germany, is very sophisticated and is capable of fully modeling complex industrial plants. The sound propagation factors used in the model have been adopted from ISO 9613-2 *Acoustics – Sound Attenuation During Propagation Outdoors* and VDI 2714 *Outdoor Sound Propagation*. The model divides the proposed facility into a list of individual point and area noise sources representing each piece of equipment that produces a significant amount of noise. The sound power levels representing the standard performance of each of these components are assigned based either on field measurements of similar equipment made at other existing plants, data supplied by manufacturers, or information found in the technical literature. Using these standard power levels as a basis, the model calculates the sound pressure level that would occur at each receptor from each source after losses from distance, air absorption, ground effects, and blockages are considered. The sum of all these individual levels is the total plant level at the modeling point.

The A-weighted sound power levels for the major noise sources used in the model are summarized in Table 4-19. Some of the specific equipment to be used at the plant has not yet been determined. Therefore, typical noise levels for equipment associated with similar facilities have been assumed.

Table 4-19 Summary of Sound Power Levels Used to Model the Rice Solar Energy Project Plant Operations

Plant Component	**Sound Power Level (dBA)**
Large Cold Salt Pump, each of 3	112
Large Cold Salt Pump Motor, each of 3	116
Hot Salt Pump, each of 2	110
Hot Cold Salt Pump Motor, each of 2	110
Small Cold Salt Pump	108
Small Cold Salt Pump Motor	100
Steam Turbine Generator	111
Boiled Feed Pump, each of 2	105
Boiled Feed Pump Motor, each of 2	116
Air-Cooled Condenser	111
Fin Fan Cooler	102

Table 4-19 Summary of Sound Power Levels Used to Model the Rice Solar Energy Project Plant Operations	
Plant Component	**Sound Power Level (dBA)**
Generator Step-Up Transformer	101
Auxiliary Transformer	90
Service Transformer, each of 2	82

The estimated noise levels from facility operation at specific locations at the Rice Solar Energy Project fence line are shown in Table 4-20.

Table 4-20 Estimated Noise from the Rice Solar Energy Project Plant Operations	
Location	**Facility Operations Sound Pressure Level (dBA)**
Nearest Sensitive Receptor, Vidal Junction (15 miles northeast of the Rice Solar Energy project area)	4
North Project Fenceline (1.10 miles from the power block)	47
South Project Fenceline (0.67 miles from the power block)	52
East Project Fenceline (0.79 miles from the power block)	48
West Project Fenceline (0.79 miles from the power block)	45

The maximum noise level attributable to operation of the Rice Solar Energy Project at Vidal Junction, the nearest sensitive receptor to that project, is estimated to be 4 dBA, which is barely at the threshold of hearing (see Table 3-38). This estimate is based on a geometric divergence over a distance of 15 miles plus attenuation from atmospheric absorption and ground effects. The uncertainty associated with noise estimates increases with distance. Due to its closer distance (10 miles versus 15 miles), the facility noise level from the proposed Project at Quartzsite would be higher than 4 dBA estimated for the Rice Solar under certain atmospheric conditions, but is still low enough to fall within a quiet threshold. The noise from the proposed Project would therefore contribute only in a very small, and immeasurable and unnoticeable way to local ambient noise at Quartzsite.

The Plomosa Road 14-Day Camping Area offers dispersed camping along the 10-mile Plomosa Back Country Byway. The southern edge of the solar facility fenceline is approximately 3.75 miles north of the Plomosa Road camping area. The estimated dBA from project construction and operation of the Project on the Plomosa Long-Term Camping Area is 26 dBA (CH2M Hill 2011). On the basis of population density, the day-night average noise level (L_{dn}) for La Paz County is estimated to be 28 dBA Ldn. Therefore, there would be no increase in ambient noise levels at the Plomosa Road camping area from construction and operation of the Project.

Tonal Noise

The generation of audible tones is possible from plant operations. Certain sources within the facility, such as transformers and pump motors have the potential to sometimes produce significant tones. It is the Proponent’s intention to anticipate the potential for audible tones in the design and specification of the facility’s equipment and take necessary steps to prevent sources from emitting tones that might be disturbing at the nearest sensitive receptors.

Ground and Airborne Vibration

The equipment that would be used in the project is well balanced and is designed to produce very low vibration levels throughout the life of the project. An imbalance could contribute to ground vibration levels in the vicinity of the equipment. However, vibration-monitoring systems installed in the equipment are designed to ensure that the equipment remains balanced. Should an imbalance occur, the event would be detected and the equipment would automatically shut down. Given these protective measures, impacts related to ground and airborne vibrations will be less than significant.

Closure and Decommissioning

The anticipated lifespan of the Project is estimated to be 30 years. Closure and decommissioning-related noise impacts could result from the operation of construction equipment that would be required to dismantle and restore the site. Such impacts would be a one-time, limited-duration event. Anticipated noise levels would be less than expected for construction, since no high pressure steam blows would be required, but in other respects are anticipated to be comparable to construction noise levels.

4.17.3.4 Alternative 1 – Hybrid-Cooled

Impacts to noise levels as a result of the construction and operation of Alternative 1 would be similar to impacts assessed for the Applicant’s Proposed Project.

4.17.3.5 Western’s Substation and Telecommunication System

Western’s Substation

Construction of the proposed switchyard would occur over approximately 10 months, but noise-generating activities would be intermittent and limited to the operation of construction equipment. Construction access for the proposed switchyard would be from SR 95. There are no sensitive noise receptors near Western’s proposed switchyard site. Therefore, noise levels from construction would not lead to impacts to sensitive receptors, and significance thresholds for noise would not be met. The proposed switchyard would also generate noise during operation as a result of corona and occasionally disconnect switch and circuit breaker operations, which create momentary noise. Because of its remote location, noise generated at the switchyard would not impact any sensitive noise receptors.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant’s Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Fiber-optic cable installation would use typical construction equipment, estimated to generate maximum noise levels of short duration not to exceed 90 dBA at 50 feet, or average levels of approximately 80 dBA Leq at 50 feet. At 100 feet, these levels would attenuate below typical levels of significance (75 dBA Leq). Since the potential cable route would be located within an existing utility right-of-way along SR 95, off-road construction vehicle travel is anticipated to be minor.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites would create short-term noise levels from equipment installation and vehicle travel. Mitigation measures would not be needed beyond those required by applicable noise regulations or incorporated within Western's best practices.

4.17.4 Mitigation Measures

No mitigation measures are necessary in regards to noise impacts for the Project or alternatives.

4.17.5 Cumulative Impacts

Impacts from amending the YFO RMP and from construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for noise is a 10-mile radius surrounding the Project site. This geographic scope of cumulative analysis was established based on local topography, and the potential for sound to travel beyond the Project boundary to sensitive noise receptors (i.e. Plomosa Back Country Byway and the Town of Quartzsite).

In addition to the Applicant's Proposed Project, other reasonably foreseeable future actions in the noise ROI include the EnviroMission solar project, and the expansion/reopening of the Copperstone Gold Mine. According to a recent EnviroMission press release, they are expecting to begin construction in 2014, following completion of additional engineering and environmental studies. Limited mine development is occurring at the Copperstone Gold Mine; however, they anticipate full-scale production to begin within one to two years. If there were overlapping construction and/or project operations in the noise ROI, a cumulative increase in community ambient noise may occur.

As explained in Section 4.17.3, the Applicant's Proposed Project is not expected to alter ambient noise levels for the nearest receptors to the Project. Based on where the EnviroMission project is in the permitting process, it is not possible to estimate potential noise impacts of that project, because its ultimate configuration and location have not yet been refined. Therefore, it is not possible to determine what impact, if any, the EnviroMission project will have on ambient noise levels as experienced by the nearest receptor when combined with the Applicant's Proposed Project.

4.17.6 Residual Effects

There are no expected residual effects in regards to noise for the Project or alternatives.

4.17.7 Short-Term Uses versus Long-Term Productivity

During the construction period there would be an increase in ambient noise levels surrounding the Project area from construction activities occurring in the short-term over the 30-month construction phase. The operation of the Project would result in long-term, intermittent increases in daytime ambient noise levels well below thresholds. This change in the current sound environment would continue during the lifetime of the Project.

4.17.8 Irreversible and Irretrievable Commitments of Resources

There are no irreversible impacts on the sound environment of the area as a result of the construction and operation of the Project. There is an irretrievable loss of the existing sound environment until the Project is no longer in operation and reclamation activities have been completed.

4.18 PUBLIC HEALTH AND SAFETY

This section discusses the effects on public health and safety that may occur with implementation of the Applicant's Proposed Project and alternatives.

4.18.1 Methodology for Analysis

The Arizona Division of Occupational Safety and Health is responsible for ensuring compliance with the Occupational Health and Safety Act for the Project.

The public health and safety issues identified during scoping are addressed in this section. Public comments and concerns received during the scoping period included topics regarding fire hazards, operational safety requirements, air traffic safety, and potential hazards regarding reflection off of the Project's equipment. These topics are addressed below.

4.18.2 Indicators

Under NEPA, significant effects to health and safety would occur if the Project would:

- Expose people residing or working in the vicinity of the Project area or structures to safety hazards and/or a significant risk of loss, injury, or death.

4.18.3 Direct and Indirect Effects by Alternatives

4.18.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no public health and safety impacts from the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.18.3.2 Applicant's Proposed Project Alternative – Dry-cooled

To comply with regulations set forth by OSHA and the Arizona Division of Occupational Safety and Health, health and safety programs would be established for construction and operations at the site that would document potential hazards and requirements for establishing and maintaining a safe working environment during construction and operation. The programs would include identification of all hazardous substances and chemicals used within the Project facility, including Material Safety Data Sheets, a communication and training program, labeling, and identification of hazards and safe work practices. In addition, safety showers and eyewashes would be provided adjacent to, or in the vicinity of, chemical storage and use areas.

Construction Phase

Construction and operation would involve the use of the latest industrial technology and design standards and would adhere to regulatory health and safety codes and guidelines. Training, operating, inspection, and maintenance procedures that would minimize the risk and severity of potential upset conditions would be implemented.

Operational and Maintenance Phase

Fire Hazards

Some of the hazardous materials to be stored, transported, or produced onsite are considered flammable or combustible. The containment and handling processes of these materials would be subject to the Occupational Safety and Health Act Part 1910 Subpart H.

The Project would be subject to the regulations listed in the Arizona State Fire Code under Title 4 Chapter 36 of the AAC. In addition, a training program for fire protection and prevention would be provided to all employees during construction and operation of the Project. A Weed Management Plan would be developed that would include BMPs for fire hazard mitigation.

Glint and Glare

Glint and glare would occur during Project operations. Glint and glare studies of solar trough technology found that pedestrians standing within 20 meters (60 feet) of the perimeter fence when the mirrors rotate from the stowed position to a vertical position may see a light intensity equal to or greater than levels considered safe for the human retina (URS 2008). Due to the remoteness of the Project area, an immediate threat to public health and safety is unlikely. A more in depth discussion regarding glint and glare can be found in Section 4.16.3.2.

During scoping, comments were received regarding impacts to air traffic safety as a result of glint or glare from the Project. Glint or glare produced by the Project would not pose a potential hazard to aircraft, due to FAA flight regulations precluding aircraft flights within the solar collecting tower's safety hazard zone (Diep 2010). In effect, the glint that may occur is similar to the reflection from a body of water or car windshield. There are currently no regulations in regards to light reflected from solar facilities, but a Sandia Report (Brumleve 1984) identified visual tolerances and limitations that are used as standards for solar facility designs today.

Intentional Destructive Acts

Solar generation projects can be the subject of intentional destructive acts ranging from random vandalism and theft to sabotage and acts of terrorism intended to disable the facility. Acts of vandalism and theft are far more likely to occur than sabotage or terrorism. Theft usually involves equipment at substations and switchyards that contain salvageable metal when metal prices are high. Vandalism usually occurs in remote areas and is more likely to involve spontaneous acts such as shooting at equipment.

Closure and Decommissioning

Closure of the proposed Project would follow a Decommissioning Plan prepared by the Applicant and designed to minimize public health and environmental impacts. Permanent closure would presumably occur 30 years after the start of operation unless the Project remains economically viable. Decommissioning procedures would be similar to construction activities and safeguards, would have to be consistent with all applicable laws and regulations, and would be subject to BLM approval before implementation.

4.18.3.3 **Alternative 1 – Hybrid-Cooled**

Implementation of Alternative 1 would result in effects to Public Health and Safety and Hazardous Materials similar to those described under the Applicant's Proposed Project.

4.18.3.4 **Western's Substation and Telecommunication System**

Western's Substation

Construction of Western's switchyard would occur at the same time as the solar facility. Potential hazards to public safety as a result of the construction of the proposed switchyard would be limited to increased construction traffic (e.g., over-width, slow-moving vehicles on SR 95 and increased vehicular traffic from construction personnel).

Public exposure to health or safety problems from general construction activities would be unlikely because of the implementation of safety regulations and plans, and the public would not be allowed near the proposed construction areas.

Operation of Western's switchyard would result in increased electromagnetic frequency levels in the immediate vicinity of the facilities. However, due to the spacing of electrical equipment, measured field strength would be low outside of the fence line. In general, electromagnetic frequency levels close to a switchyard are produced mainly as a result of entering power lines. Western would comply with Federal and industry standards for designing and installing electrical equipment related to the switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

During installation of fiber-optic cable, standard health and safety practices would be conducted in accordance with the Occupational Health and Safety Administration's regulations, policies and procedures, and Western's Power System Safety Manual, which would reduce worker safety risks. Project implementation would not affect any local or regional emergency response plan or evacuation plan. Therefore, no significant impacts to public or worker safety would be anticipated. Compliance with these regulations would also protect the public.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites would be subject to the same regulations as described above. Project implementation would be short-term and would not affect emergency response or evacuation plans. No significant impacts to public or worker safety would occur.

4.18.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.18.5 Residual Effects

There are no residual effects associated with the Project and public safety.

4.18.6 Cumulative Impacts

Proper facility design and the development and implementation of health and safety programs for the Project would reduce the potential for cumulative impacts. Each reasonably, foreseeable, future project would be required to comply independently with OSHA regulations. Therefore, there would be a very low potential for cumulative effects on public health and safety.

4.18.7 Short-Term Uses versus Long-Term Productivity

There would be no impacts relating to this topic.

4.18.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of resources.

4.19 HAZARDOUS MATERIALS

This section discusses the effects on hazardous materials that may occur with implementation of the Applicant's Proposed Project and alternatives.

4.19.1 Methodology for Analysis

The ADEQ is the State agency in Arizona that manages hazardous wastes. The AAC Title 18, Chapter 8 describes hazardous waste management for the State of Arizona.

A variety of chemicals and hazardous substances would be stored and used during construction and operation of the Project. The storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, and regulations. The analysis in this section includes a review of the Project's Plan of Development, which lists the expected hazardous materials that would be stored and used during construction and operation of the Project.

The hazardous materials issues identified during scoping are addressed in this section. These topics are addressed below.

4.19.2 Indicators

Under NEPA, significant effects from hazardous materials would occur if the Project would:

- Use, store, or dispose of petroleum products and/or hazardous materials in a manner that results in a release to the aquatic or terrestrial environment in an amount equal to or greater than the reportable quantity for that material or creates an increased risk to human health.

- Mobilize contaminants currently existing in the soil or groundwater, creating potential pathways of exposure to humans or wildlife that would result in exposure to contaminants at levels that would be expected to be harmful.

- Expose workers to contaminated or hazardous materials at levels in excess of those permitted by OSHA in 29 CFR §1910, or expose members of the public to direct or indirect contact with hazardous materials from the Project's construction or operations.

4.19.3 Direct and Indirect Effects by Alternatives

4.19.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the Yuma RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no hazardous materials would be used and no impacts related to the use of hazardous material would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.19.3.2 Applicant's Proposed Project Alternative – Dry-cooled

The Project would be designed to meet all applicable standards to reduce the risk of an accidental release, operated in a manner that complies with safety standards and practices, and maintained so as to provide a safe workplace for Project personnel and to prevent significant adverse offsite impacts to the public at large. In addition, construction and operation would incorporate up-to-date industrial technology and design standards, and adhere to regulatory health and safety codes and guidelines, as well as established good industrial practices. Training, operating, inspection, and maintenance procedures that would minimize the risk and severity of potential upset conditions would be implemented. Plant personnel would use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored onsite for spill cleanup.

Construction Phase

Construction and operation would involve the use of the latest industrial technology and design standards and would adhere to regulatory hazardous materials codes and guidelines. Training and adherence to procedures would minimize the risk and severity of potential spill conditions.

The solar facility would require the use of a mixture of sodium and potassium nitrate salts. To ensure worker safety, the hot and cold molten salt tank areas would be designed such that any release would be contained in a basin. The Construction SWPPP would specify procedures to prevent contact between molten salt and stormwater during processing of this material prior to plant startup. In addition, the processing area would be cleaned to ensure residual molten salt is removed from surface soil after processing.

Operational and Maintenance Phase

Hazardous materials would be used and stored onsite during operations and maintenance. The hazardous material inventory, the general operational safety practices employed during hazardous material storage and use, the material-specific handling practices, and the toxicity of each hazardous material are discussed below.

Chemicals would be stored or processed in vessels or tanks specifically designed for their individual characteristics. All hazardous materials storage or process vessels would be designed in conformance with applicable codes and standards. Large quantity (bulk) liquid chemicals would be stored outdoors in aboveground storage tanks manufactured of carbon steel or plastic, or in 400-gallon (nominal) capacity plastic totes, if applicable.

Site-specific SPCC Plans would be prepared for construction and operation of the Project. The plans would include spill prevention and countermeasures procedures to be implemented, including but not limited to, a spill record (if applicable), analysis of potential spills, description of containment facilities, fill and overfill prevention facilities, spill response procedures, and personnel training.

Several methods would be used to properly manage and dispose of hazardous wastes generated by the Project. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor, spent lubrication oil filters would be disposed of in a Class I landfill, and workers would be trained to handle hazardous wastes generated at the site.

Hazardous Materials Inventory

A list of the large-quantity hazardous materials that may be stored and used at the Project area along with the toxicity and storage practices for each material is provided in Table 4-21. For the purpose of this discussion, “large quantity” is defined as those chemicals stored or used in excess of 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases. In addition to the chemicals listed below, small quantities (less than 55 gallons, 500 pounds, or 200 cubic feet) of janitorial supplies, office supplies, laboratory supplies, paint, degreasers, herbicides, pesticides, air conditioning fluids (chlorofluorocarbons), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets may also be stored and used at the Project area. These materials would be stored in the maintenance warehouse or office building. Flammable materials (e.g., paints, solvents) would be stored in flammable material storage cabinet(s) with built-in containment sumps.

The remainder of the materials would be stored on shelves as appropriate. Due to the small quantities involved, the controlled environment, and the concrete floor of the warehouse, a spill can be cleaned up without significant environmental consequences.

Hazardous Material Transportation and Delivery

Hazardous materials would be delivered to the Project area via truck along SR 95, and then into the gated and fenced site via the Project access road. Transportation of hazardous materials to the site would remain in compliance with the rules and regulations set forth by the Federal Motor Carrier Safety Administration and ADOT.

Unexploded Ordnance

Millions of acres of land have historically been transferred from military munitions ranges to be used for other purposes. These lands are called formerly used defense sites, and have the potential to be contaminated with military munitions. According to the Defense Environmental Programs Annual Report to Congress 2009, there are no formerly used defense sites located within the Project boundary; however, Browning machine gun rounds were discovered during cultural resource surveys. Any unexploded ordnance which is discovered during construction and operation of the Project would be disposed of properly in accordance with applicable regulations.

Closure and Decommissioning

The requirements for handling of hazardous materials remain in effect until such materials are removed from the Project site, regardless of facility closure. Therefore, the facility owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner that poses a risk to the surrounding populations, the BLM would coordinate with the Arizona Division of Emergency Management, Quartzsite Fire Department, and ADEQ's Waste Program's Division, as the BLM would be the landowner of the abandoned facility. To ensure that any unacceptable risk to the public is eliminated, funding for such emergency action as well as site removal, rehabilitation, and revegetation activities would be available from a performance bond required of the Applicant by the BLM.

The closure or decommissioning of the Project would produce both hazardous and nonhazardous solid and liquid waste. The decommissioning plan would document non-hazardous and hazardous waste management practices, including the inventory, management, disposal of hazardous materials and wastes, and permanent disposal of permitted hazardous materials and waste storage units.

4.19.3.3 **Alternative 1 – Hybrid-Cooled**

Implementation of Alternative 1 would result in effects to Public Health and Safety and Hazardous Materials, similar to those described under the Applicant's Proposed Project.

4.19.3.4 **Western's Switchyard and Telecommunication System**

Western's Switchyard

Chemicals or other potentially hazardous materials used during construction of the switchyard would include diesel fuel, lubricants, and hydraulic fluids. These hazardous materials are used for operating construction equipment and are transported in small amounts, making public or environmental exposure unlikely and limited in severity. Implementation of BMPs identified in Section 2.5 would ensure applicable spill and hazardous waste requirements are met and significance standards would not be exceeded.

Western's proposed switchyard would include transformers with oil. Implementation of BMPs identified in Section 2.5 would ensure applicable spill and hazardous waste requirements are met and significance standards would not be exceeded. If required, secondary containment would be installed within the switchyard to prevent the migration of oil from the switchyard site.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Waste management activities associated with the telecommunications system alternatives would include the storage, transport, recycling, or disposal of all project waste streams. Waste streams would most likely be limited to solid waste such as empty cable reels, the steel groundwire removed, and cut-off pieces of fiber-optic cable. Waste streams can be either hazardous or non hazardous, depending on the constituents in the waste stream and the characteristics (e.g., ignitability, reactivity, toxicity, and corrosivity) of the waste. The status of the waste stream determines both the storage options for the material, and the disposal method for the material. Limited quantities of waste materials would be generated by installation of fiber-optic cable. These waste materials would be transported to the appropriate landfill, similar to the Project.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites would generate a limited amount of waste and would be subject to the same regulations as described for the fiber-optic cable alternative.

4.19.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.19.5 Residual Effects

There are no residual effects associated with the Project and hazardous materials.

4.19.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative impact relating to hazardous materials, including the use, storage, and transport of hazardous materials, with other past, present, or reasonably foreseeable future actions. For example, cumulative impacts would exist or could result from the interaction of one or more controlled release of hazardous materials, e.g., airborne or subsurface plumes, within the same geographic area, and within the same timeframe. The geographic area of the cumulative impacts analysis area for hazardous materials management is a two-mile buffer surrounding the Project site. The ROI was selected to consider the proposed expansion/reopening of the American Bonanza Copperstone Gold Mine, approximately 1.5 miles west of the Project site, and the proposed EnviroMission solar facility, approximately 2 miles northwest of the Project site.

Collectively, the impacts associated with the construction, operation, maintenance, and decommissioning of the proposed Project is not expected to cause or contribute to cumulative effects relating to hazardous materials management because of the nature of the materials used, compliance with applicable laws and regulations, and the engineering and administrative controls that would be implemented to prevent and control accidental releases of hazardous materials.

Proper facility design and the development and implementation of safe material handling programs for the Project would reduce the potential for cumulative impacts from release of hazardous materials on the environment. Each reasonably, foreseeable, future project would be required to comply independently with hazardous materials regulations, depending on their specific circumstances (e.g., nature and quantities of hazardous materials stored and used). In short, Project construction and operation activities would not cause or contribute to significant cumulative impacts with respect to hazardous materials handling from either a local or regional perspective.

4.19.7 Short-Term Uses versus Long-Term Productivity

There would be no impacts relating to this topic.

4.19.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of resources.

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Hydrogen	Low toxicity; hazard class – flammable gas	None established	Total inventory of up to 63,000 SCF or 335 lbs if a hydrogen cooled steam turbine generator is used.	In generator cooling loop and "tube trailer"	Pressure safety tank, crash posts, and pressure relief valves	Generator cooling
Sodium Hydroxide, 50% solution	High toxicity; hazard class – corrosive	PEL: 2 mg/m^3	8,500 gallons	Carbon steel tank	Isolated from incompatible chemicals and stored with secondary containment	Water treatment processes; condensate polishing
Sodium Hypochlorite, 12.5% solution	High toxicity; hazard class – poison-B, corrosive	Workplace Environmental Exposure Limit – STEL: 2 mg/m_3 PEL: 0.5 ppm TWA STEL: 1 ppm as Chlorine TLV: 1 ppm (TWA) STEL: 3 ppm as Chlorine	17,000 gallons	Two 8,500-gallon plastic tanks	Secondary containment	Raw water biocide; potable water biocide; cooling water biocide
Sulfuric Acid, 29.5% solution	High toxicity; hazard class – corrosive, water reactive	PEL: 1 mg/m_3	2,000 gallons	Contained in batteries	Isolated from incompatible chemicals, and stored with secondary containment	Battery electrolyte

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Sulfuric Acid, 93% solution	High toxicity; hazard class – corrosive, water reactive	PEL: 1 mg/m$_3$	16,000 gallons	Two 8,000-gallon lined, carbon steel tanks	Isolated from incompatible chemicals, and stored with secondary containment	Cooling tower, anti-scaling (pH control); wastewater neutralization
Carbon Dioxide	Low toxicity; hazard class – non flammable gas	TLV: 5,000 ppm (9,000 mg/m$_3$) TWA	15 tons maximum onsite inventory	Carbon steel tank	Carbon steel tank with crash posts	Fire suppression
Lubricating Oil	Low toxicity; hazard class – NA	None established	10, 550 gallons	Carbon steel tanks, and in equipment and piping; additional maintenance inventory to be stored in 55-gallon steel drums	Secondary containment for tank and for maintenance inventory	Equipment lubrication
Mineral Insulating Oil	Low toxicity; hazard class – NA	None established	32,000 gallons	Carbon steel transformers	Stored/used in transformers which have secondary containment	Large capacity transformers

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Diesel fuel	Low toxicity; hazard class – combustible liquid	PEL: none established TLV: 100 mg/m_3	21,000 gallons	Carbon steel tanks	Stored in two 10,000-gallon tanks with secondary containment, and two day tanks, one for each diesel fire pump.	Emergency generators and fire pumps
Nitrogen	Low toxicity; hazard class – non-flammable gas	None established	7,500 pounds	Carbon steel tank	Carbon steel tank with crash posts	Blanketing and layup of steam plant
Hydraulic fluid	Low to moderate toxicity; hazard class – Class IIIB combustible liquid	TWA (oil mist): 5 mg/m_3 STEL: 10 mg/m_3	610 gallons	Carbon steel tanks and sumps, in equipment, and a maintenance inventory stored in 55-gallon steel drums	Maintenance inventory stored within secondary containment	Steam turbine controls system

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO Tri-Act 1800, or equal Cyclohexlyamine (5-10%) Monoethanolamine (10-30%) Methoxyproplyamine (10-30%)	High toxicity; hazard class – corrosive, Class II combustible liquid	Cyclohexlyamine – TVL: 10 ppm (41 mg/m_3) Monoethanolamine – TLV: 3 ppm (7.5 mg/m_3) TWA: 3 ppm (7.5 mg/m_3) STEL: 6 ppm (15 mg/m_3) Methoxyproplyamine – TLV: 5 ppm TWA STEL: 15 ppm	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Condensate pH management
Water treatment chemical NALCO Elmin-Ox Carbohydrazide (5-10%), or equal	Moderate toxicity; hazard class – sensitizer	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Condensate and feedwater O_2 management
Water treatment chemical NALCO 3D Trasar 3DT185, or equal Phosphoric Acid (60-100%)	High toxicity; hazard class – corrosive	PEL: 1 mg/m_3 (TWA) TLV: 1 mg/m_3 (TWA) STEL: 3 mg/m_3	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water corrosion control

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity**[2] **and Hazard Class**[3]	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO 3D Trasar 3DT177 or equal Phosphoric Acid (30%)	Moderate toxicity; hazard class – irritant	PEL: 1 mg/m_3 (TWA) TLV: 1 mg/m_3 (TWA) STEL: 3 mg/m_3	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water corrosion control
Water treatment chemical NALCO 3D Trasar 3DT190 or equal	Low toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water scale control
Water treatment chemical NALCO Acti-Brom® 7342, or equal Sodium bromide	Low toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water oxidizing biocide

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO pHreedom® 5200M, or equal Sodium salt of phosphonomethylated diamine	Low to moderate toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Brine concentrator preheater scale control
Water treatment chemical NALCO PCL-1346, or equal	Low toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water silica scale control
Water treatment chemical NALCO Permacare® PC-7408, or equal Sodium bisulfite	Low toxicity; hazard class – irritant	TLV: 5 mg/m_3 TWA	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	RO system – chlorine scavenger

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO BT-3000, or equal Sodium hydroxide Sodium tripolyphosphate	High toxicity; hazard class – corrosive	Sodium hydroxide – PEL: 2 mg/m_3 Sodium Tripolyphosphate – none established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Boiler drum pH control
Water treatment chemical NALCO 8338, or equal Sodium nitrite Sodium tolytriazole Sodium hydroxide	Moderate toxicity; hazard class – toxic	Sodium nitrite – none established Sodium tolytriazole – none established Sodium hydroxide – PEL: 2 mg/m_3	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Closed loop cooling system corrosion inhibitor
Welding gas Acetylene	Moderate toxicity; hazards class – toxic	None established	800 SCF	Two 200 SCF steel cylinders	Inventory management and isolated from incompatible chemicals	Welding gas
Welding gas Oxygen	Low toxicity; hazard class – oxidizer	None established	800 SCF	Two 200 SCF steel cylinders	Inventory management and isolated from incompatible chemicals	Welding gas

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Welding gas Argon	Low toxicity; hazard class – nonflammable gas	None established	800 SCF	Two 200 SCF steel cylinders	Inventory management and isolated from incompatible chemicals	Welding gas
Activated Carbon	Non-toxic (when unsaturated), low to moderate toxicity when saturated depending upon the absorbed material; Hazard class – combustible solid	TWA (total particulate): 15 mg/m_3 TLV (graphite, all forms except graphite fibers): 2 mg/m_3 TWA	4,000 lbs	Two 2,000-lb canisters	No excess inventory onsite, prompt disposal when spent	Production of potable water
Herbicide Roundup® or equivalent	Low toxicity; hazard class – irritant	None established	1 gallon	Brought onsite by a licensed contractor and used immediately	Inventory management and isolated from incompatible chemicals	Weed management

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Soil stabilizer Active ingredient: acrylic or vinyl acetate polymer or equivalent	Non toxic; hazard class – none	None established	55 gallons	Either a 55-gallon drum or a 400-gallon tote, used immediately	Inventory management and isolated from incompatible chemicals	Dust control
Aluminum Sulfate (50wt%), or Ferric Chloride (50 wt%), or Ferric Sulfate (50 wt%)	Moderate toxicity; hazard class – corrosive	PEL: 2 mg(AL)/m_3	6,000 gallons	Plastic tank	Inventory management and isolated from incompatible chemicals	Water treatment system flocculating agent
Sodium Sulfide/Sodium Hydrosulfide	Moderate toxicity; hazard class – corrosive	TWA: 10ppm (14 mg/m_3) STEL: 15ppm (21 mg/m_3)	No onsite storage	Brought to site by a licensed contractor, used immediately	No excess inventory stored onsite, prompt disposal when spent	Water treatment; precipitate heavy metals
Aqueous Ammonia (19% NH_3 by weight)	High toxicity; hazard class – corrosive liquid	TWA: 25 ppm STEL: 35 ppm PEL: 50 ppm	No onsite storage	Brought to site by a licensed contractor, used immediately	No excess inventory stored onsite, prompt disposal when spent	Boiler drum, steam and feedwater condition (pH control)
NALCO Permacare® PC-33 or equal	Low toxicity; hazard class – corrosive liquid	None established	110 gallons	55-gallon plastic drums	Use plastic drums, inventory management and isolate from incompatible chemicals.	RO membrane high pH cleaners

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
NALCO Permacare® PC-77 or equal	Low toxicity; hazard class – irritant	None established (contains no hazardous ingredients)	110 gallons	55-gallon plastic drums	Use plastic drums, inventory management and isolate from incompatible chemicals	RO membrane high pH cleaners
NALCO Permacare® PC-191 or equal	Low toxicity; hazard class – irritant	None established (contains no hazardous ingredients)	400 gallons	Plastic totes	Use plastic drums, inventory management and isolate from incompatible chemicals	RO Antiscalant
NALCO Permacare® PC-11 or equal	High toxicity; hazard class – corrosive liquid	None established	400 gallons	Plastic totes	Inventory management, isolated from incompatible chemicals and secondary containment	Membrane cleaner and preservative
Propylene Glycol (antifreeze)	Low toxicity; hazard class – none	None established	25 gallons	Plastic totes	Inventory management, isolated from incompatible chemicals	Closed cooling system anticorrosive – compatible with different types of metals

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**

[1] Proprietary names are listed to provide indicative chemical product but is not intended to limit supplier, brand or product.

[2] Low toxicity is used to describe materials with an NFPA Health rating of 0 or 1. Moderate toxicity is used describe materials with an NFPA rating of 2. High toxicity is used to describe materials with an NFPA rating of 3.

[3] "None" denotes materials that do not meet the criteria for any hazard class defined in the 1997 Uniform Fire Code.

PEL – permissible exposure limit

SCF – standard cubic feet

STEL – short-term exposure limit

TLV – threshold limit value

TWA – time weighted average

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CHAPTER 5 – CONSULTATION AND COORDINATION

This chapter describes the consultation and coordination activities Western and its cooperating agencies have carried out with interested agencies, organizations, tribes, and individuals while preparing the Draft EIS and Proposed YFO RMP Amendment. The NEPA and CEQ regulations require the public's involvement in the decision-making process, as well as allowing for full environmental disclosure. Guidance for implementing public involvement is outlined in Title 43 CFR, Part 1610.2.

During the early phases of the scoping process, Western determined that an EIS would be required to comply with NEPA prior to taking action on QSE's interconnection request to Western and the ROW application to the BLM. An EIS is the most detailed and complex of NEPA documents, and it includes requirements for significant public coordination and involvement throughout its preparation and review. NEPA and CEQ require Western to identify any potential environmental impacts associated with the Applicant's Proposed Project so the lead Federal agency can consider them when making its final decision.

5.1 CONSULTATION WITH AGENCIES AND INDIAN TRIBES

5.1.1 Cooperating Agencies

Cooperating agency status provides a formal framework for governmental agencies to engage in active collaboration with a Federal agency to implement the requirements of the NEPA (42 USC 4321 et seq.). Cooperating agencies may include those Federal, State, or local agencies that have jurisdiction by law, or have special expertise or information that will assist in development of the analysis (40 CFR Section 1501.6). Jurisdiction by law means agency authority to approve, veto, or finance all or part of the proposal (40 CFR Section 1508.15). The BLM must approve or deny the ROW application to construct, operate, maintain, and decommission the Project, which would be entirely located on BLM-administered land; therefore, the BLM YFO is serving as a cooperating agency. The BLM will make a decision relative to the Project, based on the analysis disclosed in this EIS.

In addition to the BLM YFO, Western invited the following agencies to consider becoming a cooperating agency:

- DOI, Bureau of Reclamation
- DOI, USFWS
- DOI, USFWS, Kofa National Wildlife Refuge
- DOD, Luke Air Force Base
- DOD, Marine Corps Air Station, Yuma
- USACE
- USAG–YPG
- ADEQ
- ADOT
- ADWR
- AZGFD
- Town of Parker, Arizona
- Town of Quartzsite, Arizona

The USAG–YPG, USACE, AZGFD, and ADEQ, have formally requested to be cooperating agencies for this Project. Each of these agencies has agreed to participate as a cooperating agency and review material for the EIS pertaining to their legal and regulatory responsibilities.

The USAG–YPG has consulted with QSE, Western, and the BLM regarding the potential effects of the Project on military training activities on nearby USAG–YPG land. The USACE has provided review of the Draft EIS and Proposed YFO RMP Amendment with an emphasis on potential impacts from Project construction and operation on jurisdictional waters of the U.S. The AZGFD has contributed special expertise and has reviewed data and impact assessments relative to biological resources (wildlife, vegetation, and special status species). The ADEQ has provided review of the Draft EIS and Proposed YFO RMP Amendment, with emphasis on air and water quality impacts, given their authority for specific permits related to these resources.

The U.S. Bureau of Reclamation (April 14, 2010) and ADWR (May 17, 2010) formally declined the invitation. As of May 2011, Western has not received a response from other invitees.

5.1.2 Section 7 of the Endangered Species Act

The USFWS has jurisdiction over threatened and endangered species listed under the ESA (16 USC Section 1531 et seq.). Consultation with the USFWS under Section 7 of the ESA is required if any Federal action affects a federally-listed species or designated critical habitat. A request was submitted to the USFWS requesting information regarding any species listed under the ESA that are known to occur within the Project area. In a response dated February 17, 2011, the USFWS stated that no species listed under the ESA are likely present in the Project area nor is any critical habitat present. Biological surveys were conducted in the spring and fall of 2009 and spring of 2010. No federally listed threatened, endangered, or candidate species were observed nor is any designated critical habitat present within the Project area.

5.1.3 Consultation and Coordination with Indian Tribes

The American Indian Religious Freedom Act, NEPA, and Section 101(d)(6)(B) of the NHPA requires consultation with Native American tribes who attach religious and/or cultural significance to historic properties. In addition, Section 106 regulations state that the agency official shall acknowledge that Native American tribes possess special expertise in assessing NRHP eligibility of historic properties that may possess religious and cultural significance to them (36 CFR 800.4(c)(1)). There is a legal distinction between Native American tribes who are federally recognized and those who are not. Federal recognition signifies that the United States government acknowledges the political sovereignty and identity of a tribe and from that recognition flows the obligation to conduct dealings with that tribe's leadership on a "government-to-government" basis. As a result, this consultation is the responsibility of the Federal agency overseeing the undertaking; in this case, Western.

Per the Memorandum of Understanding between Western and the BLM, Western was designated to serve as the lead agency for compliance with Section 106 of the NHPA. In this role, Western assumed the lead responsibility for carrying out legal compliance and consultation requirements with the SHPO and Indian tribes. The BLM participated in tribal consultation meetings;

reviewed all cultural reports, consultation materials, and related documentation prepared by Western; and coordinated with Western throughout the Section 106 processes to ensure that these efforts were consistent with the requirements of BLM Manual 8110, *Identifying and Evaluating Cultural Resources*; and BLM Manual 8120, *Tribal Consultation Under Cultural Resources*.

Western initiated tribal consultation in September 2009 to ensure that tribes were provided an opportunity to identify concerns about historic properties, advise on the identification and evaluation of historic properties (including those of traditional religious and cultural importance), articulate views on the Project's effects on such properties, and to participate in the resolution of possible adverse effects. Tribes who received letters are:

- Ak-Chin Indian Community
- Chemehuevi Indian Tribe
- Cocopah Indian Tribe
- Colorado River Indian Tribes
- Fort Mojave Indian Tribe
- Fort Yuma-Quechan Tribe
- Gila River Indian Community
- Hopi Tribe
- Hualapai Tribe
- Pueblo of Zuni
- Salt River Pima-Maricopa Indian Community
- Tohono O'odham Nation
- Twenty-Nine Palms Band of Mission Indians
- Yavapai-Apache Nation
- Yavapai-Prescott Indian Tribe

Following the initiation of the tribal consultation process, Western and the BLM held meetings with the tribes to share information about the Project and results of surveys, and request feedback from the tribes regarding places of traditional importance. Dates for these activities are listed below.

- On September 22, 2009, members of the Cocopah, Hualapai, and Colorado River Indian Tribes attended a consultation meeting and site visit with representatives from Western and the BLM.

- On October 28, 2009, a consultation meeting was held with the Fort Yuma-Quechan Tribe regarding the Project.

- On March 1, 2010, a consultation meeting was held with the Tohono O'odham Nation.

- On August 13, 2010, Western and BLM held a tribal consultation meeting that included members of the following tribes: Chemehuevi, Fort Yuma-Quechan, Yavapai-Prescott, Fort Mojave, and Colorado River Indian tribes.

- On September 17, 2010, the Four Southern Tribes, which includes the Tohono O'odham Nation and the Ak-Chin, Gila River, and Salt River Pima-Maricopa Indian communities, were presented with information on the Project.

- On October 19, 2010, Western and BLM held a tribal consultation meeting with, and presented a Project update to, the Fort Yuma-Quechan Tribe staff and Cultural Committee.

Western's consultations with tribes having traditional cultural associations with the Project area identified seven locations of traditional importance outside the Project area, including places of religious significance near the Colorado River, as warranting visual simulations to characterize the potential visual impacts of the Project (see Table 3-37 and Section 4.16 for discussions on visual simulations). Western conducted meetings with the tribes to share information on the visual impacts analysis, to ensure that their views are taken into account in identifying and resolving any adverse effects.

In December 2009, Western distributed a draft Programmatic Agreement to address potential adverse effects on properties listed in or eligible for the NRHP to the tribes, the BLM, Arizona SHPO, and the Advisory Council on Historic Preservation. Based on refinements of the Project description and the developing results of the cultural resource inventory and assessment, which indicated that conflicts with preservation of cultural resources would be less complex than originally estimated, Western determined that a Programmatic Agreement was not warranted. The draft Programmatic Agreement was formally withdrawn in March 2010. Western invited the tribes to participate as consulting parties to a Memorandum of Agreement, should one be needed to resolve any adverse effects identified following evaluation of the survey results.

Also in March 2010, Western sent letters to the tribes to again solicit information regarding cultural resources that the tribes thought should be considered, and invited the tribes to become cooperating agencies for the preparation of the EIS. At this time, no tribes have responded that they would like to be included as cooperating agency.

In December, 2010, the SHPO and BLM concurred with Western's recommended determination of "no adverse effect," thus concluding the NHPA Section 106 process. Therefore, given the results of resource identification and evaluation, and the "no adverse effect" determination from the SHPO, there was not a need to resolve adverse effects through the use of a Programmatic Agreement or Memorandum of Agreement, or to further consult with the Advisory Council of Historic Preservation.

In early 2011, the BLM determined that it would need to amend the YFO RMP, specifically the boundaries of the VRM Class designations if the proposed Project were to be approved for a ROW grant. In March, 2011, the BLM published a Notice of Intent in the Federal Register announcing its consideration of a plan amendment. In accordance with BLM policy in implementing NEPA and FLPMA, Section 202(c)(9), the BLM is obligated to coordinate all aspects of planning with Indian tribes. Therefore, in April, 2011, the YFO formally corresponded with the consulted Indian tribes to inform them of the proposed plan amendment, with a request for any related comments, as Tribes had expressed concerns during the EIS process about potential effects on visual resources. The Tohono O'odham, Fort Yuma-Quechan, Cocopah, and Yavapai Prescott tribes have expressed objections to amending the land use plan. The tribes have expressed a general concern about protecting scenic qualities and visual landscapes important to certain Tribes. Tribal consultation activities under NEPA and FLPMA related to the plan amendment are ongoing.

As explained in Section 3.1, the plan amendment being considered concurrently with the Proposed Project simply allows the Proposed Project to be built, and therefore it does not change the methods or conclusions in this EIS with respect to visual and/or cultural resource impacts. For that reason, the proposed plan amendment is simply a component of the QSE Project, which has already been the subject of tribal consultations in conjunction with the Section 106 process and is the undertaking for purposes of Section 106 compliance. As explained above, the Section 106 process has been concluded for the Proposed Project, and a separate 106 process is not required for the proposed plan amendment.

5.2 PUBLIC INVOLVEMENT PROCESS

Public involvement in the EIS process includes the steps necessary to identify and address public concerns and needs. The public involvement process assists agencies in: (1) broadening the information base for decision-making, (2) informing the public about the Applicant's Proposed Project, alternatives, and potential long-term impacts that could result from implementation of the Applicant's Proposed Project or alternatives, and (3) ensuring that public needs are understood by the agencies. Public participation in the EIS process is required by the NEPA at four specific points: (1) issue scoping, (2) review of the Draft EIS and Proposed YFO RMP Amendment, (3) review of the Final EIS Proposed YFO RMP Amendment, and (4) receipt of the ROD.

5.2.1 Scoping

Details about the scoping process and issues identified are described in Section 1.9 in this EIS. The public was notified of the Project and upcoming scoping meetings through the Notice of Intent published in the Federal Register on January 14, 2010, thus commencing the 30-day scoping period to disclose potential issues and concerns associated with the Applicant's Proposed Project. The scoping period opened on January 14, 2010, and closed on February 13, 2010. Three scoping meetings were held from January 26, 2010 through January 28, 2010, in Yuma, Parker, and Quartzsite, Arizona. A total of 42 people attended the three meetings. Western collected stakeholder comments at public meetings as well as comments sent via fax or mail. Information obtained by the agencies during public scoping was combined with issues identified by Western and the cooperating agencies, and forms the scope of this EIS.

On March 30, 2011, the BLM issued a separate notice of its consideration of amendment of the YFO RMP (76 FR 2011-7413). The comment period for the BLM's notice closed on April 29, 2011.

5.2.2 Draft EIS and Proposed YFO RMP Amendment Review

The 90-day comment period for public review of the Draft EIS and Proposed YFO RMP Amendment will begin with the publication of the Notice of Availability in the Federal Register. Western will distribute press releases announcing the dates, locations, and times of the public meetings to local and regional print and broadcast media. The Draft EIS will be posted on Western's and the BLM's Yuma Field Office websites at:

- Western: http://www.wapa.gov/transmission/quartzsitesolar.htm
- BLM YFO: http://www.blm.gov/az/st/en/prog/energy/solar/quartzsite_solar_energy.html

In addition, the EIS will be distributed to agencies and individuals who request copies.

5.2.3 Final EIS and Proposed YFO RMP Amendment

After the public comment period for the Draft EIS and Proposed YFO RMP Amendment, a Final EIS and YFO RMP Amendment will be prepared. This document will include descriptions of public comments and indicates how they were addressed in the Final EIS. A Notice of Availability will be published in the Federal Register announcing completion of the Final EIS and YFO RMP Amendment. Per 40 CFR 1506.10, a 30-day protest period is required between the publication of the Final EIS and issuance of the ROD. In addition, the land use plan amendment process will include a 60-day Governor's consistency review, as required by the BLM land use planning regulations. The 30-day period and the 60-day governor's consistency review will run concurrently.

5.3 RECIPIENTS OF THIS EIS

Pursuant to CEQ regulations (40 CFR § 1502.19), Western is circulating this Draft EIS and Proposed YFO RMP Amendment to (1) agencies having jurisdiction by law or special expertise with respect to any environmental impact involved and any appropriate Federal, State, or local agency authorized to develop and enforce environmental standards; (2) the Applicant; and (3) any agencies, organizations, or individuals requesting a copy of the document.

The mailing list for this Project was developed from the stakeholders list compiled prior to and during the scoping process, and then supplemented throughout the EIS process. A complete list of all recipients of the Draft EIS and Proposed YFO RMP Amendment can be found in the Administrative Record.

Those receiving the Draft EIS and Proposed YFO RMP Amendment have 90 days in which to provide comments. Comments should be as specific as possible. According to CEQ (40 CFR § 1503.4), Western must respond in writing to every comment. These comments, and responses to each comment, will be published as part of the Final EIS and YFO RMP Amendment.

5.4 LIST OF PREPARERS

Preparation of this EIS and plan amendment was an interdisciplinary team effort. Specialists from Western and cooperating agencies have reviewed and approved the analysis contained within this Draft EIS, as well as provided document preparation oversight. The following section lists the individuals involved in the preparation of this Draft EIS and Proposed YFO RMP Amendment.

5.4.1 Western Area Power Administration

- Chris Lyles – Project Manager
- Liana Reilly – NEPA Document Manager

- William Werner – Regional Environmental Office Contact
- Stephen Tromly – Cultural Resources

5.4.2 Bureau of Land Management

5.4.2.1 BLM Washington DC Office

- John McCarty – Chief Landscape Architect

5.4.2.2 BLM Arizona State Office

- Jim Kenna – State Director
- Rebecca Heick – Branch Chief/Minerals & Lands
- Eddie Arreola – Project Manager/RECO Supervisory Project Manager
- Connie Stone – Cultural Resources/RECO Archaeologist
- Kevin Grove – Biological Resources/RECO Wildlife Biologist
- Jackie Neckels – NEPA/RECO Planning and Environmental Coordinator
- Jim Renthal – Air, Water and Soil/Natural Resource Specialist
- Bill Wells – Hydrology/Hydrologist
- Dennis Godfrey – Public Affairs
- Don Applegate – Recreation and Visual Resources/Recreation Program Lead

5.4.2.3 BLM Yuma Field Office

- James (Todd) Shoaff – Yuma Field Office Field Manager
- Karen Reichhardt – Assistant Field Manager
- Vanessa Briceño – Project Manager
- Tom Jones – Cultural Resources/Archaeologist
- Jeff Young – Biological Resources/Wildlife Biologist
- Dave Daniels – NEPA/Planning and Environmental Coordinator
- Ron Morfin – Visual and Recreation Resources/Wilderness and Recreation Specialist

5.4.3 Project Proponent and their Contractors

- Tom Georgis, SolarReserve – Senior Vice-President, Development
- Andrew Wang, SolarReserve – Director, Development
- Scott Kaminski, SolarReserve – Senior Project Engineer
- Charles Diep, SolarReserve – Director of Engineering Services
- Cheryl Leutjen, SolarReserve (consultant)
- Bob Anders, WorleyParsons (consultant)
- Debbie Builder, WorleyParsons (consultant)

5.5 EIS CONTRACTOR AND SUBCONTRACTORS

Name	Degree(s)	Professional Discipline/Expertise	Years of Experience
Kevin Duncan, AICP	BS	Senior Planner, Land Use, Recreation	9
Sandra Fairchild	BS	NEPA Oversight, Sr. Project Manager, Water Resources	26
Bob Farmer (ERM)	BS, MS, PhD	Subcontractor, Air Quality Services	26
Amy Jerome	BS, MBS	Project Manager, Senior NEPA Reviewer	12
Michael Kirby	BS, MS, PhD	Geology, Soils, Paleontology	20
N. Conrad Langley	MLA, BFA	Visual Resources	12
Robert Pape	BA	Biological Resources, Wetlands/Waters of the U.S.	19
Devin Petry	BA	Land Use, Environmental Coordinator	3
Alison Pruett	BS, MS	Biological Resources, Document Production	4
Ashley Rosia	BA	Public Health and Safety, Hazardous Materials	2
Matt Sauter	BS, MS	Geology, Soils, Paleontology	2
Jason Scott	BS. MS	Biological Resources	18
Marc Schwartz	BS, MLA	Director of Visual Resources	10
Mickey Siegel	BS, MCRP	Principal, Senior Management	30
Andrew Smigielski	BS, MS	Subcontractor, Senior Traffic Engineer	17
E. Linwood Smith	BA, MS, PhD	Director of Biological Resources	35
Steve Swanson	BA, MA, PhD	Cultural Resources	17
Kristin Terpening	BS, MS	Biological Resources	16

CHAPTER 6 – REFERENCES

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CHAPTER 7 – GLOSSARY

Acre-foot: A unit commonly used for measuring the volume of water; equal to the quantity of water required to cover one acre (43,560 square feet or 4,047 square meters) to a depth of 1 foot (0.30 meter) and equal to 43,560 cubic feet (1,234 cubic meters) or 325,851 gallons.

Action: In the context of the National Environmental Policy Act (NEPA), describes activities proposed to meet a specific purpose and need and that may have effects on the environment, which are potentially subject to Federal control and responsibility. Federal actions generally fall into the categories of adoption of official policy, formal plans, and programs or approval of specific projects. For this document, the term action applies to this specific project.

Affected environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Air quality: A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Allotment: A unit of land suitable and available for livestock grazing that is managed as one grazing unit.

Alluvial / Alluvium: A general term for clay, silt, sand, gravel, or similar consolidated material deposited during comparatively recent geologic time by a stream or other body of running water in the bed of the stream, river, or floodplain, or as a cone or fan at the base of a mountain slope.

Alternative: Any one of a number of options for a project.

Ambient: The surrounding natural conditions (or environment) in a given place and time, most commonly applied to air quality and noise.

American Indian tribe (or tribe): Any American Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Animal Unit Month: Grazing of a 1,000 pound cow with suckling calf for 1 month (or equivalent metabolic weight of other kinds of livestock).

Applicant- committed environmental protection measure: Actions that would eliminate or minimize adverse impacts from construction and maintenance of the Quartzsite Solar Energy Project to sensitive resources.

Aquifer: A water-bearing rock unit (unconsolidated or bedrock) that will yield water in a usable quantity to a well or spring.

Archaeological site: A discrete location that provides physical evidence of past human use.

Archaeology: The scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

Area of Critical Environmental Concern (ACEC): A Bureau of Land Management (BLM) designation pertaining to areas where specific management attention is needed to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish or wildlife resources, or other natural systems or processes, or to protect human life and safety from natural hazards.

A-Weighted Sound Levels: Decibels (referenced to 20 micro-Pascals) as measured with an A-weighting network of a standard sound level meter, abbreviated dB(A).

Backfill: The process of returning excavated material (i.e. earth) into the hole or trench from which it was removed.

Background (visual): That portion of the visual landscape lying from the outer limit of the middle-ground to infinity. Color and texture are subdued in this area, and visual sensitivity analysis here is primarily concerned with the two-dimensional shape of landforms against the sky.

Base Load: The average amount of electric power that a utility must supply in any period.

Baseline: The existing conditions against which impacts of the proposed action and its alternatives can be compared.

Basin: A depressed area having no surface outlet (topographic basin); a physiographic feature or subsurface structure that is capable of collecting, storing, or discharging water by reason of its shape and the characteristics of its confining material (water); a depression in the earth's surface, the lowest part often filled by a lake or pond (lake basin); a part of a river or canal widened (drainage, river, stream basin).

Best Management Practices (BMPs): A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes and help to protect the environmental resources by avoiding or minimizing impacts of an action.

Blowdown: Wastewater from the cooling tower – this water will have been recycled as many times as possible and will have reached the maximum allowable (and safe) limits of certain dissolved solids.

Borrow: Earth material, such as sand or gravel, which has been taken from one location to be used at another location.

Borrow Pit: An excavated area from which borrow has been obtained.

Clean Air Act of 1990: Federal legislation governing air pollution. The Clean Air Act established National Ambient Air Quality Standards for carbon monoxide, nitrogen oxide, ozone, particulate matter, sulfur dioxide, and lead. Prevention of Significant Deterioration classifications define the allowable increased levels of air quality deterioration above legally established levels and include the following:

Class I – minimal additional deterioration in air quality (certain national parks and wilderness areas).

Class II – moderate additional deterioration in air quality (most lands).

Class III – greater deterioration for planned maximum growth (industrial areas).

Clean Water Act of 1987: National environmental law enforced by the U.S. Environmental Protection Agency that regulates water pollution.

Code of Federal Regulations: The compilation of Federal regulations adopted by Federal agencies through a rule-making process.

Cooperating Agency: Assists the lead Federal agency in developing an environmental assessment or EIS. The CEQ regulations implementing NEPA define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any Federal, State, or local government jurisdiction with such qualification may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality (CEQ): An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effort on environmental studies, and advises the President on environmental matters.

Cultural resources: Remains of human activity, occupation, or endeavor as reflected in districts, sites, buildings, objects, artifacts, ruins, works of art, architecture, and natural features important in human events.

Cumulative impact: The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. Cumulative impacts are evaluated as part of the EIS, and may include consideration of additive or interactive effects regardless of what agency or person undertakes the other actions.

Decibel: A unit for expressing the relative intensity of sounds on a logarithmic scale from zero for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the dBA, a frequency-weighted noise unit, is widely used. The dBA scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness.

Discharge: Outflow of surface water from a stream or canal (water). Discharge from an industrial facility that may contain pollutants harmful to fish or animals if it is released into nearby water bodies usually requires a permit issued by the U.S. Environmental Protection Agency and is monitored.

Distance zone: A visibility threshold distance where visual perception changes. They usually are defined as foreground, middleground, and background.

Drainage: The natural channel through which water flows some time of the year; natural and artificial means for affecting discharge of water as by a system of surface and subsurface passages.

Drawdown: The lowering of the water level in a well as a result of withdrawal; the reduction in groundwater level at a point caused by the withdrawal of water from an aquifer.

Dry-cooling / Dry-cooled: A process to achieve heat rejection by using atmospheric air only.

Easement: A right afforded a person, agency, or organization to make limited use of another's real property for access or other purposes.

Effect (or impact): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An effect may be direct, indirect, or cumulative. The terms effect and impact are synonymous under the NEPA. A direct effect is caused by an action and occurs at the same time and same place (40 CFR 1508.8(a)). An indirect effect is caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Emission: Effluent discharged into the atmosphere, usually specified by mass per unit time, and considered when analyzing air quality.

Endangered Species: Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 ESA; Any species in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act of 1973: The Endangered Species Act requires Federal agencies to seek to conserve threatened and endangered species, use applicable authorities in furtherance of the purposes of the Endangered Species Act, avoid jeopardizing the continued existence of any species that is listed or proposed for listing as threatened and endangered and avoid destroying or adversely modifying its designated or proposed critical habitat. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service are responsible for administration of this act.

Environment: The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Impact Statement (EIS): A document prepared to analyze the impacts of a proposed action on the environment, and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.

Environmental justice: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, State, local, and tribal programs and policies (see EO 12898).

Ephemeral wash or stream: A stream that flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and that has a channel bottom that is always above the local water table.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as “gravitation creep.”

Eutectic: A single chemical composition that solidifies at a lower temperature than any other composition.

Federal Register: Published by the Office of the Federal Register, National Archives and Records Administration, the Federal Register is the official daily publication for rules, proposed rules, and notices of Federal agencies and organizations, as well as executive orders and other presidential documents.

Floodplain: That portion of a river or stream valley, adjacent to a river channel, that is built of sediments and is inundated with water when the stream overflows its banks.

Fluid Minerals: A BLM regulatory and legal term used to denote petroleum and natural gas resources.

Footprint: The area on the ground occupied by the facility.

Foreground: The visible area from a viewpoint or use area out to a distance of 0.5 mile. The ability to perceive detail in a landscape is greatest in this zone.

Fossil: Any remains, trace, or imprint of a plant or animal that has been preserved by natural processes in the earth’s crust since some past geologic time.

Generation tie-line (gen-tie): The transmission line that delivers generated electricity from the solar power plant to the electric grid.

Geographic information system (GIS): A system of computer hardware, software, data, people and applications that capture, store, edit, analyze, and graphically display a potentially wide array of geospatial information.

Global warming: An increase in the average temperature of the earth’s atmosphere and oceans. The term also is used to describe the theory that increasing temperatures are the result of a strengthening greenhouse effect caused primarily by manmade increases in carbon dioxide and other greenhouse gases.

Groundwater: Subsurface water that fills available openings in rock or soil materials to the extent that they are considered saturated.

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, group of species, or large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Heliostat: A mirror that reflects solar rays onto a central receiver. A heliostat automatically adjusts its position to track daily or seasonal changes in the sun's position. The arrangement of heliostats around a central receiver is also called a solar collector field or array.

Hybrid-cooled/Hybrid-cooling: A means of power plant cooling that uses a combination of two or more different methods, usually wet and dry cooling.

Hydrology: The study of the movement, distribution, and quality of water throughout the earth, addressing both the hydrologic cycle and water resources.

Impact (or effect): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An impact may be direct, indirect, or cumulative. The terms effect and impact are synonymous under NEPA.

Indirect effect (or impact): Secondary effects that occur in locations other than the initial action or later in time, but that are caused by the proposed action.

Infrastructure: The facilities, services, and equipment needed for a community or facility to function, such as roads, sewers, water lines, and electric lines.

Insolation: The solar power density incident on a surface of stated area and orientation, usually expressed as Watts per square meter or Btu per square foot per hour.

Invasive species: Describes a large number of nonnative plant species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Irretrievable: Applies primarily to the lost production of renewable natural resources during the life of the project.

Irreversible: Applies primarily to the use of nonrenewable resources, such as minerals, cultural resources, wetlands, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Key Observation Point: An observer position on a travel route used to determine visible area.

Kilowatt (kW): A standard unit of electrical power equal to 1,000 watts, or to the energy consumption at a rate of 1,000 joules per second.

Kilowatt-Hour (kWh): 1,000 thousand watts acting over a period of 1 hour. The kWh is a unit of energy. 1 kWh=3600 kJ.

Labor force: All persons 16 years of age or over who are either employed or unemployed and actively looking for a job.

Land use plan: A plan or document developed by a government entity that outlines specific functions, uses, or management-related activities of an area, and may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use.

Landform: A term used to describe the many land surfaces that exist as a result of geologic activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Landscape: An area composed of interacting ecosystems that are repeated because of geology, landform, soils, climate, biota, and human influences throughout the area. Landscapes are generally of a size, shape, and pattern, which are determined by interacting ecosystems.

Laydown: An area where construction material and equipment are staged during the construction process.

LEQ: The equivalent sound level, or the time-integrated continuous sound level, that represents the same sound energy as the varying sound levels over a specified monitoring period.

Linkages (wildlife): A continuous swath of land in the natural landscape that provides suitable habitat for short-and/or long-term movements of wildlife and plants between population cores.

Megawatt (MW): A unit for measuring power equal to 1,000 kilowatts, or 1 million watts. The productive capacity of electrical generators is measured in megawatts.

Mineral resources: Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Minimal (impact): Unless otherwise specified, "minimal" will mean non-deleterious impacts that are measurable on the short term.

Mitigation: The abatement or reduction of an impact on the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, (5) replacing or providing substitute resources to the environment, or (6) gathering data (e.g., archaeological or paleontological) prior to disturbance.

Molten salt: A heat transfer medium found inside the central receiver; can be heated up to 1,200°F. Molten salt is primarily used due to the fact that it can remain heated for a long period of time, even after the sun has set.

Multi-Use: Land use where a combination of use types can be found in close proximity together: commercial, residential, public, industrial, etc.

National Ambient Air Quality Standards: The allowable concentrations of air pollutants in the air specified by the Federal government. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public welfare) from any unknown or expected adverse effects of air pollutants.

National Environmental Policy Act of 1969 (NEPA): An Act that establishes policy, sets goals, and provides means for carrying out the environmental protection policy of the Nation. In accordance with NEPA, all Federal agencies must prepare a written statement on the environmental impacts of a proposed action. The provisions to ensure that Federal agencies act according to the letter and spirit of NEPA are in the CEQ regulations for implementing NEPA (43 CFR 1500-1508).

National Pollutant Discharge Elimination System: As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial, municipal and other facilities must obtain permits if their discharges go directly to surface waters of the United States. These permits are referred to as NPDES permits and are administered by the EPA.

National Register of Historic Places: A listing, maintained by the Secretary of the Interior, of districts, sites, buildings, structures, and objects worthy of preservation. To be eligible a property must normally be at least 50 years old, unless it has exceptional significance, and have national, State, or local significance in American history, architecture, archaeology, engineering, or culture; and possess integrity of location, design, setting, material, workmanship, feeling, and association; and (a) be associated with events that have made a significant contribution to the broad patterns of history, (b) be associated with the lives of persons significant in our past, or (c) embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction; or (d) have yielded, or may be likely to yield, information important to prehistory or history.

Native American Graves Protection and Repatriation Act: A Federal law passed in 1990 that provides a process for museums and Federal agencies to return certain Native American cultural items --human remains, funerary objects, sacred objects, or objects of cultural patrimony --to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations.

Negligible (impact): Unless otherwise specified, "negligible" will mean impacts of such a small scale such as to be non-measurable.

Noise Emission: The industry standard format of sound power level, which is the total acoustic power radiated from a given sound source as relates to a reference power level of 10 picowatts. Sound power level differs from sound pressure level, which quantifies the fluctuations in air pressure caused by acoustic energy.

Noise Level Measurements: Unless otherwise indicated, the use of A-weighted and "slow" response of a noise monitoring instrument complying with at least Type 2 requirements as defined by the latest revision of American National Standard Institute (ANSI) S1.4 Specification for Sound Level Meters.

Nonattainment area: An air quality control region (or portion thereof) in which the U.S. Environmental Protection Agency has determined that ambient air concentrations exceed national ambient air quality standards for one or more criteria pollutants.

Noxious weed: Nonnative plant species that negatively impact crops, native plant communities, and/or management of natural or agricultural systems. Noxious weeds are officially designated by a number of states (including Nevada) and Federal agencies.

Particulates: Minute, separate particles, such as dust or other air pollutants.

Perennial stream: A stream or that part of a stream that flows continuously during the calendar year as a result of groundwater discharge or surface runoff.

Perennial yield: The amount of usable water from a groundwater aquifer that can be withdrawn economically and consumed each year for an indefinite period of time. It cannot exceed the natural recharge to that aquifer and ultimately is limited to maximum amount of discharge that can be used for beneficial use.

Public land: Land or interest in land owned by the United States and administered through the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands on the Outer Continental Shelf, and land held in trust for the benefit of American Indians, Aleuts, and Eskimos.

Range: A large, open area of land over which livestock can wander and graze.

Rare: A plant or animal of limited distribution and/or abundance. May be locally abundant in a limited area or few in number over a wide area.

Recharge: Replenishment of a groundwater reservoir (aquifer) by the addition of water, through either natural or artificial means.

Reclamation: Restoration of land disturbed by natural or human activity (e.g., mining, pipeline construction) to original contour, use, or condition. Also describes the return of land to alternative uses that may, under certain circumstances, be different from those prior to disturbance.

Recontouring: Return a surface to or near to its original form through some type of action such as grading.

Record of Decision: A document separate from, but associated with, an EIS that publicly and officially discloses the responsible official’s decision on a proposed action.

Region of Influence: Area which is impacted by activities related to the project. Varies by species and activity.

Revegetation: The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.

Reverse osmosis: A separation process that uses pressure to force a solvent through a membrane that retains the solute on one side and allows the pure solvent to pass to the other side. More formally, it is the process of forcing a solvent from a region of high solute concentration through a membrane to a region of low solute concentration by applying a pressure in excess of the osmotic pressure.

Right-of-way: Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, such as a road or utility.

Riparian: Situated on or pertaining to the bank of a river, stream, or other body of water. Riparian is normally used to refer to plants of all types that grow along streams, rivers, or at spring and seep sites.

Rural: Sparsely settled places away from the influence of large cities and towns. Such areas are distinct from more intensively settled urban and suburban areas, and also from unsettled lands such as outback or wilderness. People tend to live in villages, on farms, and in other isolated houses on large plots of land.

Scoping: The process open to the public early in the preparation of an EIS for determining the scope of issues related to a proposed action and identifying significant issues to be addressed in an EIS.

Sediment: Particulate matter that can be transported by fluid flow, and which eventually is deposited; Material suspended in or settling to the bottom of a liquid. Sediment input comes from natural sources, such as soil erosion and rock weathering, construction activities, or anthropogenic sources, such as forestry or agricultural practices.

Sediment Load: The amount of sediment (sand, silt, and fine particles) carried by a stream or river.

Sedimentation: The result when soil or mineral is transported by moving water, wind, gravity, or glaciers and deposited in streams or other bodies of water or on land. Also, letting solids settle out of wastewater by gravity during treatment.

Sensitive receptor: In terms of noise, people or animals that may hear a noise or be sensitive to increased noise levels within their range of hearing.

Sensitive Receptor Location: A location of regulatory compliance where particular sensitivities to noise exist, such as residential areas, institutions, hospitals, parks, or other environmentally sensitive areas.

Sensitivity: The state of being readily affected by the actions of external influence.

Solar energy: Electromagnetic energy transmitted from the sun (solar radiation). The amount that reaches the earth is equal to one billionth of total solar energy generated, or the equivalent of about 420 trillion kilowatt-hours.

Solar power tower: A solar energy conversion system that uses a large field of independently adjustable mirrors (heliostats) to focus solar rays on a near single point atop a fixed tower (receiver). The concentrated energy may be used to directly heat the working fluid of a Rankine cycle engine or to heat an intermediary thermal storage medium (such as a molten salt).

Solar Thermal Electric Systems: Solar energy conversion technologies that convert solar energy to electricity by heating a working fluid to power a turbine that drives a generator. Examples of these systems include central receiver systems, parabolic dish, and solar trough.

Special status species: Wildlife and plant species either federally listed or proposed for listing as endangered or threatened; State listed; or priority species of concern to Federal agencies or tribes.

Species: A group of individuals of common ancestry that closely resemble each other structurally and physiologically, and in nature interbreed producing fertile offspring.

Surface water: All bodies of water on the surface of the earth and open to the atmosphere such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Surfactant: Any substance that when dissolved in water or an aqueous solution reduces its surface tension or the interfacial tension between it and another liquid.

Terrain: Used to describe the geophysiographic characteristics of land in terms of elevation, slope, and orientation.

Thermal storage: Storage of heated material for later heating or generation of steam for power production, potentially at night.

Threatened Species: Any species of plant or animal that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Animal or plant species that are listed under the Federal Endangered Species Act of 1973, as amended (federally listed), or under similar State laws (State listed).

Total dissolved solids: A term that describes the quantity of dissolved material in a sample of water.

Traditional cultural places: Named places (landscape features) that comprise the cultural landscape that provides the context for evaluating specific traditional cultural properties.

Transmissivity: The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

Tribe: Any Indian tribe, band, group, or community having a governing body recognized by the Secretary of Interior.

Vegetation community or association: Species of plants that commonly live together in the same region or ecotone.

Visibility: The distance to which an observer can distinguish objects from their background. The determinants of visibility include the characteristics of the target object (shape, size, color, pattern), the angle and intensity of sunlight, the observer's eyesight, and any screening present between the viewer and the object (i.e., vegetation, landform, even pollution such as regional haze).

Visual resource management classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes, each of which has an objective that prescribes the amount of change allowed in the characteristic landscape.

Waters of the United States: All water bodies that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including adjacent wetlands and tributaries; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.

Watershed: All land and water within the confines of a drainage.

Well field: Area containing one or more wells that produce usable amounts of water or oil.

Wetlands: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Examples of wetlands include marshes, shallow swamps, lakeshores, wet meadows, estuaries, and riparian areas.

Wilderness: An area formally designated by Congress as part of the National Wilderness Preservation System.

CHAPTER 8 – INDEX

Appendix A

Resource Management Plan Amendment Analysis

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Explanation of Proposed Plan Amendment to the Yuma Field Office Resource Management Plan

INTRODUCTION

Quartzsite Solar Energy LLC (QSE), a wholly owned subsidiary of SolarReserve LLC, has submitted an application to the Bureau of Land Management (BLM) requesting a right-of-way (ROW) to construct, maintain, operate, and decommission the Quartzsite Solar Energy Project (QSEP or Applicant's Proposed Project), a solar energy facility capable of producing approximately 450 gigawatt-hours of renewable energy annually, with a nominal net generating capacity of 100 megawatts (MW) in La Paz County, Arizona. In addition, QSE has also applied to Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), to interconnect the QSEP to Western's transmission system at the Bouse–Kofa 161-kilovolt transmission line. As explained in Chapter 2 of this EIS, QSE's proprietary concentrating solar thermal technology uses a field of heliostats (elevated mirrors guided by a tracking system) to focus sunlight onto a 653-foot solar collection receiver erected in the center of the solar field. Each heliostat tracks the sun throughout the day and reflects the solar energy to the central receiver. The Project features thermal energy storage that allows solar energy to be captured throughout the day and retained in a liquid salt heat transfer fluid.

In connection with its consideration of the QSEP ROW application, the BLM Yuma Field Office (YFO) is considering amending the YFO Resource Management Plan (RMP). As explained in Section 1.5.3.2 of the Draft EIS, the QSEP is not in conformance with the YFO RMP, Visual Resource Management (VRM) Class III objective, and therefore, an RMP amendment is required by the BLM in order to grant the ROW necessary to construct and operate the Project.

This Appendix: (1) explains BLM's VRM System, (2) identifies the three RMP-amendment alternatives that were analyzed in conjunction with QSE's ROW application for the QSEP, and (3) describes the other plan amendment alternatives that were identified, but not carried forward for further analysis.

The direct, indirect and cumulative effects of the Proposed RMP amendment and alternatives identified below are the same as those for the QSEP, which are already explained in the relevant sections of Chapter 3 and 4 of the Draft EIS, because: (i) the proposed plan amendment only changes the VRM designation for the Project area, and (ii) the change in VRM designation simply allows the QSEP to be built so impacts associated with the proposed amendment are really the impacts associated with construction, operation, maintenance and decommissioning of the QSEP, which are presented in Chapters 3 and 4 of this Draft EIS.

BLM'S VRM SYSTEM

The Federal Land Policy and Management Act of 1976, as amended, (FLPMA) requires that the BLM consider the scenic values of public land as a resource that merits management and protection, as determined through the land use planning process. In response to this mandate, the BLM developed the VRM System, which establishes a visual assessment methodology to inventory and manage scenic values on lands under the BLM's jurisdiction. The BLM manual

M-8400 (Visual Resource Management), Handbook H-8410 (Visual Resource Inventory), Handbook H-8431 (Visual Resource Contrast Rating), and Instruction Memorandum 2009-167 (Application of the VRM Program to Renewable Energy) set forth the policies and procedures for determining visual resource values, establishing management objectives, and evaluating proposed actions for conformance with established objectives for BLM administered public lands, with the overall goal being that visual resource values are considered as part of the resource management process and that surface disturbing resource uses and management activities are consistent with established VRM objectives.

The three primary elements of the BLM's VRM Policy are: (1) determining resource values, (2) establishing management objectives, and (3) evaluating the conformance of proposed actions with those objectives.

- ***Determining Resource Values:*** The primary means of establishing visual resource values is through a Visual Resource Inventory (VRI) that results in the assignment of one of four VRI Classes (I to IV) to represent the relative visual value of an area. VRI Class I has the highest value and VRI Class IV has the lowest. VRI Class I is reserved for special congressional designations or administrative decisions such as Wilderness Areas, visually sensitive Areas of Critical Environmental Concern (ACECs), or Wild and Scenic Rivers, etc. VRI Classes II through IV are determined through an inventory of scenic values that considers scenic quality, sensitivity level rating units, and distance zones (DZ). Rating units for each of the three factors are mapped individually, evaluated, and then combined through an over-layering analysis to determine the applicable VRI Class for a given area. VRI classes are informational in nature and provide a baseline for existing conditions. They do not establish management direction and should not be used as a basis for constraining or encouraging surface disturbing activities. They provide the baseline data for existing conditions (Handbook H-8410).
- ***Establishing Management Objectives***: VRM Classes are assigned to all BLM administered land considering the following: (1) inventoried scenic values (i.e., the VRI classes), (2) other land use and resource allocations within a given field office or management unit, and (3) public needs and national priorities for public lands. VRM assignments are land use plan decisions that guide future land management actions. The objectives of the four VRM Classes are as follows:

VRM Class	**Objective**
Class I	To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
Class III	To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
Class IV	To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

VRI Classes are not intended to automatically become VRM Class designations. VRM Classes may be different than the VRI Classes assigned during the the inventory, as the former should reflect a balance between the protection of visual values and other uses of BLM land to meet public demand or national priorities. For example, an area with a VRI Class II designation may be assigned a VRM Class IV designation, based on its overriding value for mineral resource extraction or its designation as a utility corridor. The current VRM Class designation for the QSEP project area per the YFO RMP is VRM Class III.

- ***Evaluating the Conformance***: Finally, proposed plans of development, like the QSEP, are evaluated for conformance with the VRM Class objectives through the use of the Visual Resource Contrast Rating process set forth within BLM Handbook H-8431-1, as described below. (Handbook H-8431).

PROJECT CONFORMANCE WITH VRM OBJECTIVES

Per BLM VRM policy (BLM Handbook H-8431-1), an assessment of all major proposed surface-disturbing activities or developments, such as the QSEP, must be conducted using a visual contrast rating process to determine whether the proposed activities will meet the management objectives established for a given area. The visual contrast rating process looks at the level of change to the characteristic landscape associated with the proposed project, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture. Using information regarding the design of the proposed action and the relevant VRM objectives, the contrast rating process involves selecting Key Observation Points (KOPs), which are typically the most critical viewpoints (e.g., commonly traveled routes and/or observation points) and then preparing visual simulations from those KOPs that allow the BLM to assess contrast for the proposed action from each KOP. Contrast is documented and disclosed to the public using BLM Worksheet 8400-4 – Visual Contrast Rating Worksheet.

As explained in Section 4-16, with respect to the QSEP, an assessment of contrast from one of the KOPs indicated that the Project would not comply with the current VRM Class III designation for the Project area. Specifically, visual contrast would be strong from State Route 95 (SR 95) and therefore the Project, as proposed, would not comply with the existing VRM Class III objective for the project area in the YFO RMP, which is: "*To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate*." See section 4.16 for the results of the contrast assessment and Appendix F for the simulation that illustrates the QSEP from SR 95. As a result of this contrast rating, the BLM is considering an amendment to the YFO RMP in regard to visual resources. Specifically, the plan amendment would change lands currently managed as VRM III to VRM Class IV, as described below.

PROPOSED PLAN AMENDMENT

The BLM's proposed plan amendment is to change the current VRM class designation from Class III to Class IV in the portion of the YFO RMP where the QSEP would be located. The management objective for Class IV designated land *"is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate* *the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements*" (BLM Handbook H-8410-1).

If the proposed plan amendment were adopted, the QSEP would adhere to VRM Class IV objectives and therefore would be in conformance with the YFO RMP. Existing conditions (associated with the plan amendment study area), VRI for the plan amendment area, and plan amendment alternatives, including those not carried for further review, are discussed below.

Existing Conditions

The plan amendment study area is located within the La Posa Plains (elevation approximately 930 feet), which is generally defined by Interstate 10 on the south, the Dome Rock Mountains (elevation approximately 3,000 feet) to the west, the Plomosa Mountains (elevation approximately 2,225 feet) to the east and the boundary of the BLM Lake Havasu and Yuma Field offices to the north (see Figure A-1 – YFO Visual Resource Management). The geographical extent of the plan amendment study area is based on the viewshed within the La Posa Plains north of Quartzsite, Arizona. The plain comprises gently-sloping alluvial fans at the base of the mountains, which gradually trend towards the Colorado River.

The La Posa Plains is typical of the basin and range physiographic province, which encompasses the southwestern portion of Arizona. Vegetation within the Plain comprises even stands of creosote and saltbush. Ocotillo, saguaro, and other upland Sonoran desert vegetation are limited to the canyons and higher elevations of the mountains surrounding the La Posa Plains. The regional landscape character within the plan amendment study has been locally modified by a variety of surface disturbing land uses/activities, including mining, residential development (near the town of Quartzsite), utilities (transmission lines along SR 95), and roads (e.g., undesignated two-track roads and paved highways).

Visual Resource Inventory

As previously described, the VRI comprises three primary components: scenic quality, sensitivity level rating units, and DZs, per BLM VRM policy. These three factors are combined using a geographic information system to define VRI classes, which represent the scenic values of BLM-managed land. Following are descriptions of the VRI for the plan amendment study area, based on information provided by the YFO. Figures A-1 and A-2 depict the VRI class and the VRI within the plan amendment study area, respectively.

Scenic Quality

Scenic quality is a measure of the aesthetic value of a given landscape and is based on the following seven landscape factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. Based on the diversity of landscape factors, the VRM System classifies landscapes as either A, B, or C class landscapes. Class A landscapes are typically mountain ranges with a high diversity of plants, prominent rock outcrops, and topographic features. Class B landscapes are associated with intermediate mountains and rolling terrain and bajadas occupied by saguaro stands and other Sonoran Desert upland vegetation. Class C scenic quality is typically associated with common landscapes within a particular region and has a lower diversity of landscape features (i.e., creosote flats).

The YFO has determined that the La Posa Plains is a Class C landscape, based on subtle landforms and a lower diversity of vegetation. Landscapes that comprise the Plomosa and Dome Rock Mountains have been inventoried as having both A and B class scenic quality. Class A designations are confined to portions of the mountains that have steep rock outcrops and angular and jagged lines. Class B designations are associated with the rolling to steep landforms that comprise the Plomosa and Dome Rock mountains. Vegetation diversity is higher in the mountains as compared to the La Posa Plain, and includes notable Sonoran Desert species such as ocotillo, saguaro, ironwood, blue paloverde, and velvet mesquite (see Figure A-2 for scenic quality designations within the plan amendment study area).

Sensitivity Levels

Sensitivity levels are a measure of public concern for the maintenance of scenic quality. Public lands are assigned high, medium, or low sensitivity by analyzing the various factors of public concern, including type of user, amount of use, public interest, adjacent land uses, special areas, and other factors that indicate sensitivity. Sensitivity within the plan amendment study area was determined by the YFO as high. Specifically, the public has indicated that this area within the YFO is important from a recreation standpoint (YFO Plan Amendment Scoping Meetings), and is managed as such. Also, the Plomosa Back Country Byway is a BLM-designated scenic route that merits a high sensitivity. In addition, the YFO has indicated that the La Posa Plains is important from a cultural resource standpoint (see Figure A-2 for sensitivity level designations within the plan amendment study area).

Distance Zones

Per BLM guidance, landscapes are subdivided into three DZs, based on relative visibility from travel routes or other public viewing locations. The three zones are foreground-middleground, background, and seldom seen. The foreground-middleground zone includes areas seen from highways, rivers, or other viewing locations that are less than 3 to 5 miles away. Areas viewed beyond the foreground-middleground zone, but usually less than 15 miles away, are in the background zone. Areas not seen as foreground-middleground or background (i.e., hidden from view) are in the seldom seen zone.

Distance zones within the plan amendment study area were based on the following viewing locations: SR 95, Plomosa Back Country Byway (including the Fisherman Intaglio Cultural Resource Site), the Plomosa Mountains, Interstate 10, and the Town of Quartzsite. Based on an assessment of these viewing locations, the plan amendment study area is within the foreground-middle ground DZ.

Visual Resource Inventory Classes

VRI classes represent the scenic values of the landscape based on scenic quality, sensitivity, and DZs. VRI classes range from Class I to Class IV. Lands that have a Class I designation have high scenic value, whereas Class IV designated lands have a lower scenic value. It is important to note that VRI classes reflect inventoried visual conditions. VRM classes, also I–IV, reflect how the BLM chooses to manage land based on resource concerns beyond visual.

Based on the scenic quality (Class C), sensitivity levels (high), and distance zones (foreground-middle ground) inventoried within the plan amendment study area, the majority of the plan amendment study area is designated as VRI Class III per the YFO RMP. Portions of the Dome Rock and Plomosa Mountains were designated as VRI Class II, primarily because of the higher quality landscapes (Class A and Class B). Figure A-1 depicts designated VRI classes within the plan amendment study area.

Other Resources and Pertinent BLM Policy Considered within the Plan Amendment Study Area

The following resources and policies occur within, or are pertinent to, the plan amendment study area and were considered for alternative development.

- Sand Dune Habitat – Sand dune habitats are maintained and managed through the Dunes Wildlife Habitat Management Area (WHA). This habitat supports native wildlife and plant species that include but are not limited to Mojave Fringe-toed Lizard (*Uma scoparia*), scaly sand plant (*Pholisma arenarium*), flat-tailed horned lizard (*Phrynosoma mcallii*), and sand food (*Pholisma arenarium*).

- Plomosa Mountains – Per the BLM YFO, the Plomosa Mountains are managed for rock hounding and other dispersed types of recreation. The Lake Havasu Field Office manages the Plomosa Mountains as a Special Recreation Management Area.

- Lands with Wilderness Characteristics – The wilderness characteristics inventory for the proposed Project and land use plan amendment was updated March 2011, pursuant to Section 201 of FLPMA. The Project/plan amendment study area does not contain any land with wilderness characteristics.

- Existing Utility Corridors and Other Land Uses – Existing utilities occur within the central portion of the plan amendment area paralleling SR 95. The Copperstone Mine is located in the northwestern portion of the plan amendment area. Smaller sand and gravel operations occur throughout the state and private land parcels immediately adjacent to BLM-administered lands within the study area.

- Renewable Energy Policy – Secretarial Order 3285A1, signed on March 11, 2009 and amended on February 22, 2010, established the development of renewable energy as a priority of the Department of the Interior. For other mandates related to renewable energy development see section See Section 1.4.2 of the Draft EIS.

Alternatives Analysis

The following sections provide descriptions of the alternatives considered for the plan amendment, including a no action alternative.

RMP Alternative 1: Proposed Plan Amendment and Project Approval

RMP Alternative 1 consists of changing lands that are managed as VRM Class III to VRM Class IV approximately 2 miles north of Plomosa Backcountry Byway, to the east of SR 95 in proximity to the proposed QSEP. Approximately 6,800 acres of VRM Class III would be designated as VRM Class IV (leaving 505,600 acres of VRM Class III designated land within the entire YFO). This alternative responds to the national policy regarding renewable energy in regard to the QSEP proposed action, and also maintains the most acreage of VRM Class III between the Plomosa Mountains (VRM Class II) and the Proposed QSEP. Figure A-3 depicts the geographical extent of RMP Alternative 1.

RMP Alternative 1 addresses BLM's purpose and need to respond to QSE's ROW application as it represents the smallest (in terms of acreage) VRM Class designation change needed to address the non-conformance identified in Section 1.5.3.2. If RMP Alternative 1 were selected, the QSEP would comply with VRM Class IV objectives and would therefore conform with the YFO RMP in regard to VRM. RMP Alternative 1 also maintains a buffer of Class III land between the Plomosa Mountains (VRM Class II) and the QSEP, thereby maintaining more restrictive VRM objectives and mitigation requirements that would reduce effect of future development on visual resources in the La Posa Plain over time. The impact on visual resources associated with RMP Alternative 1 is the same as those described for the QSEP in Section 4-16 of the Draft EIS.

RMP Alternative 2: Plan Amendment with No Project Approval

Under RMP Alternative 2 (Plan Amendment with No Project Approval), no impacts associated with the QSEP would occur, but the Project area would be available, as a result of the plan amendment, for the development of a project similar to the QSEP in the future. If another solar energy development project were developed using the same technology as the QSEP, similar impacts to visual resources as those described in Section 4-16 would occur. However, no such future solar project (or other project that would require a VRM Class IV designation) on BLM-managed land is reasonably foreseeable at this time. Figure A-3 depicts the geographical extent of RMP Alternative 2.

RMP Alternative 3: No Action Alternative

RMP Alternative 3 is the No Action alternative. Under this alternative, current VRM Class III designations would remain within the plan amendment study area. As a result, no ROW would be issued for the QSEP, because the Project would not be in conformance with the VRM objectives of the YFO RMP. Since there would be no change to the RMP and no ROW issued, no direct, indirect or cumulative effects are anticipated with this alternative. Figure A-3 depicts the existing conditions associated with RMP Alternative 3.

RMP Amendment Alternatives Considered, But Eliminated From Further Analysis

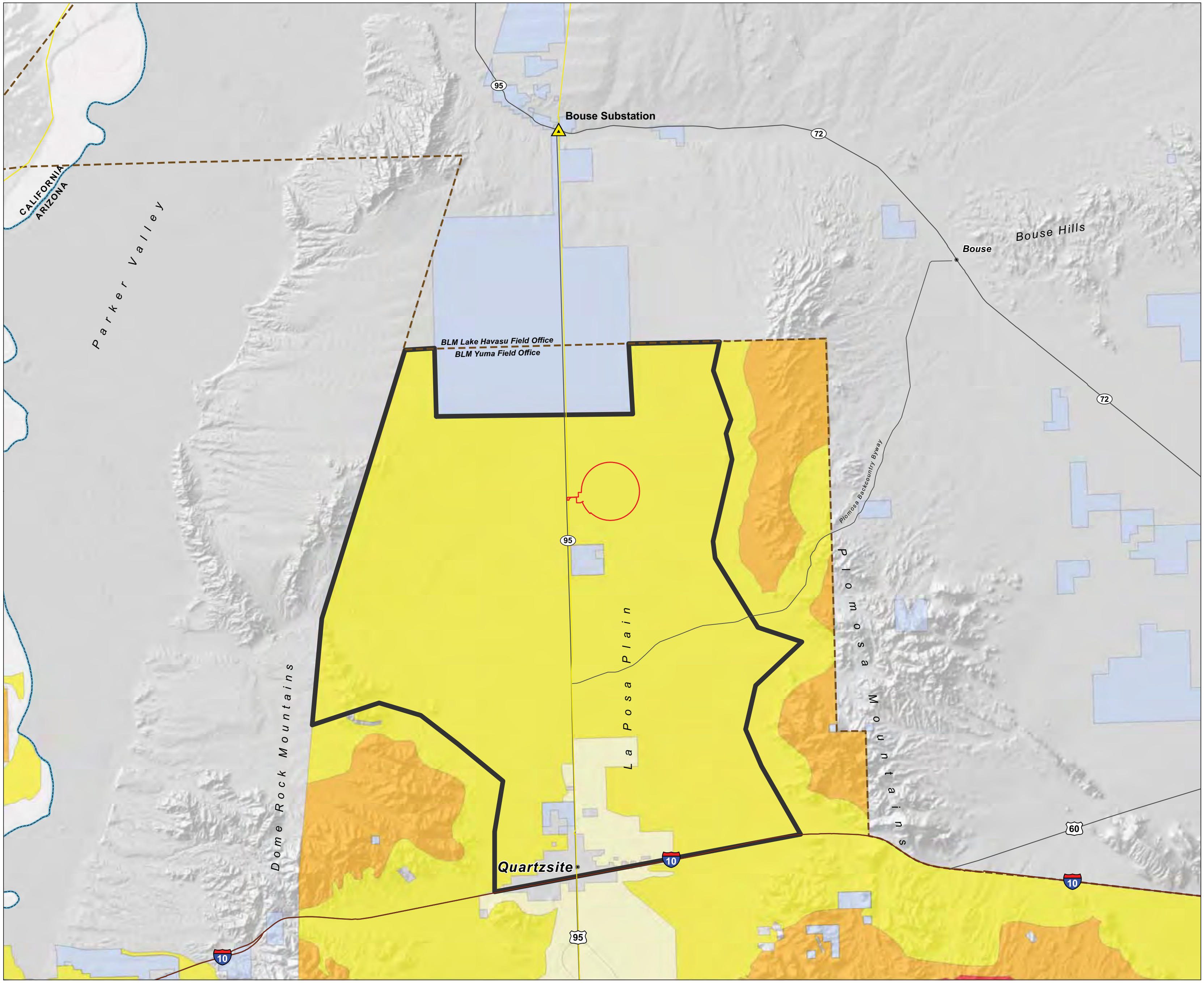
In addition to the plan amendment alternatives described above, the BLM also considered a range of other plan amendment alternatives that took into consideration the Project description provided by QSE and issues and concerns derived from comments received during the plan amendment scoping period. All of these additional alternatives looked at changing the VRM designation for portions of the YFO RMP greater than the area required to address the VRM nonconformance identified in Section 1.5.3.2. These additional alternatives include:

- Designating lands that are managed as VRM Class III to VRM Class IV, approximately 2 miles north of Plomosa Backcountry Byway on both sides of SR 95. Approximately 22,375 acres of VRM Class III would be converted to VRM Class IV (leaving 490,025 acres of VRM Class III land within the entire BLM Yuma District). This potential alternative recognizes the surface disturbance associated with the Copperstone Mine and the existing utility corridor along SR 95. VRM Class III land would be maintained between the Plomosa Mountains (VRM Class II) and proposed VRM Class IV land associated with this alternative.

- Designating BLM lands that are currently managed as VRM Class III to VRM Class IV, approximately 2 miles north of Plomosa Back Country Byway on the east side of SR 95. Approximately 10,820 acres of VRM Class III would be shifted to VRM Class IV (leaving 501,580 acres of VRM Class III designated land within the entire YFO). This potential alternative recognizes the disturbance associated with the existing utility corridor along SR 95 and responds to the national policy regarding renewable energy. Additionally, this alternative maintains VRM Class III land between the Plomosa Mountains (VRM Class II) and proposed VRM Class IV land associated with this alternative.

- Designating lands that are managed as VRM Class III to VRM Class IV within the entire plan amendment study area (roughly from Interstate 10 to the Lake Havasu Field Office Boundary). Approximately 102,930 acres of VRM Class III would be designated as VRM Class IV (leaving 409,470 acres of VRM Class III designated land within the entire YFO).

In each instance, these additional alternatives were eliminated from further analysis by the BLM because they did not respond to the BLM's specific purpose and need to respond to QSE's FLPMA Title V ROW application for the QSEP, as each involves changing VRM class designations in areas that are not implicated by the QSEP. Furthermore, the alternatives to the QSEP that might have required changes to VRM designations in different areas than those covered by the proposed plan amendment above were not carried forward for further review, as explained in Section 2.3, and therefore were not considered as part of the YFO RMP plan amendment either.



Proposed Amendment to the Yuma Field Office Resource Management Plan

Yuma Field Office Visual Resource Management/ Visual Resource Inventory Classes

Alternative 3

Figure A-1

LEGEND

Project Features

- Project Footprint
- Plan Amendment Study Area

VRM/VRI Classes

- I
- II
- III
- IV

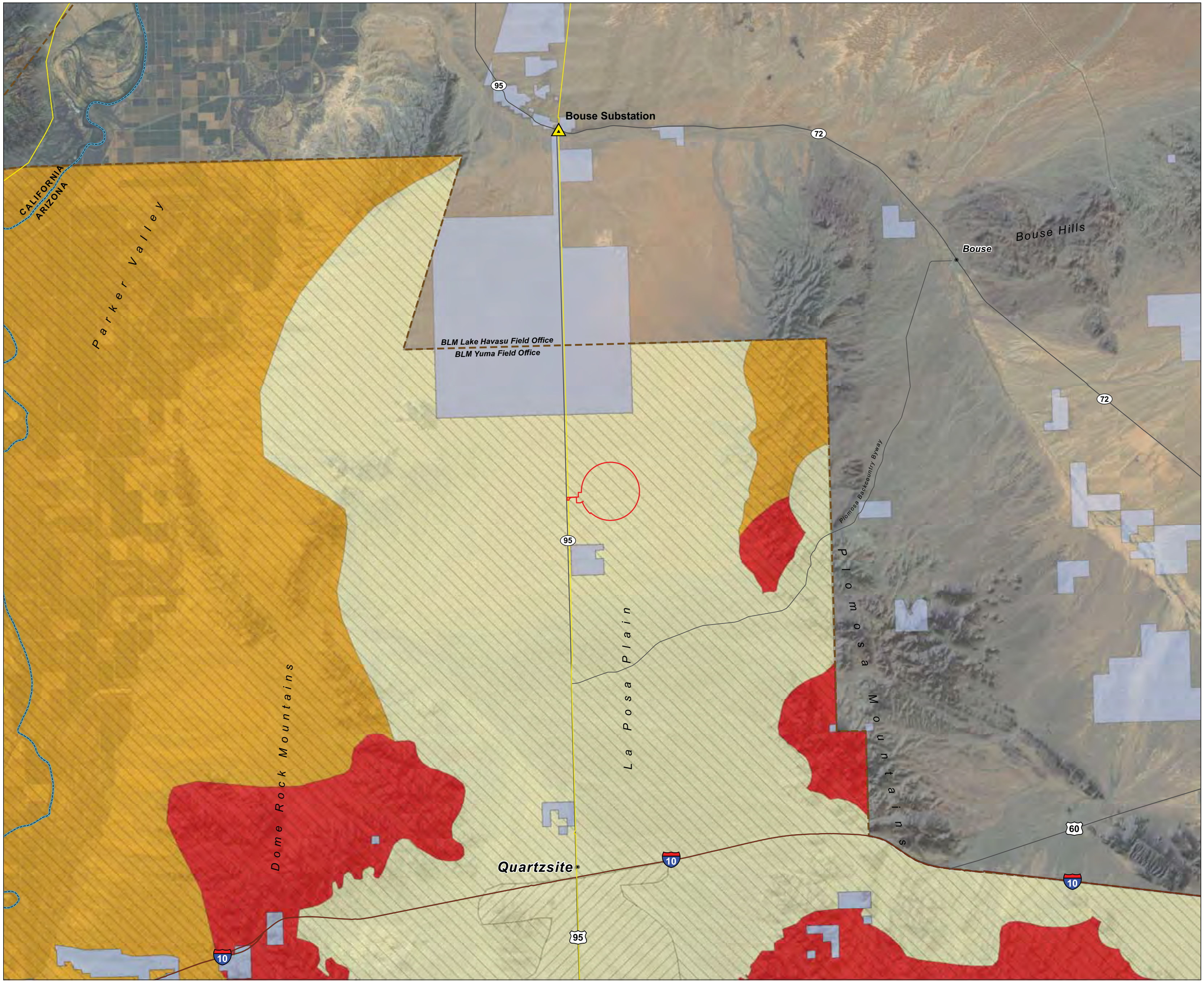
Reference Features

- State Land
- BLM Field Office Boundary
- State Boundary
- City/Town
- Interstate
- Highway/Major Road
- Colorado River

0 1.5 3 6
Miles

July 2011

Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.



Proposed Amendment to the Yuma Field Office Resource Management Plan

Sensitivity Levels, Scenic Quality and Distance Zones

Figure A-2

LEGEND

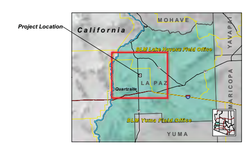
Project Features
- Project Footprint
- Plan Amendment Study Area

Sensitivity Levels
- High
- Medium
- Low

Scenic Quality Rating*
- A
- B
- C

Reference Features
- State Land
- BLM Field Office Boundary
- State Boundary
- City/Town
- Interstate
- Highway/Major Road
- Colorado River

** All landscapes were identified in the Foreground/ Middle Ground distance zone.*



0 1.5 3 6
Miles

July 2011

Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.

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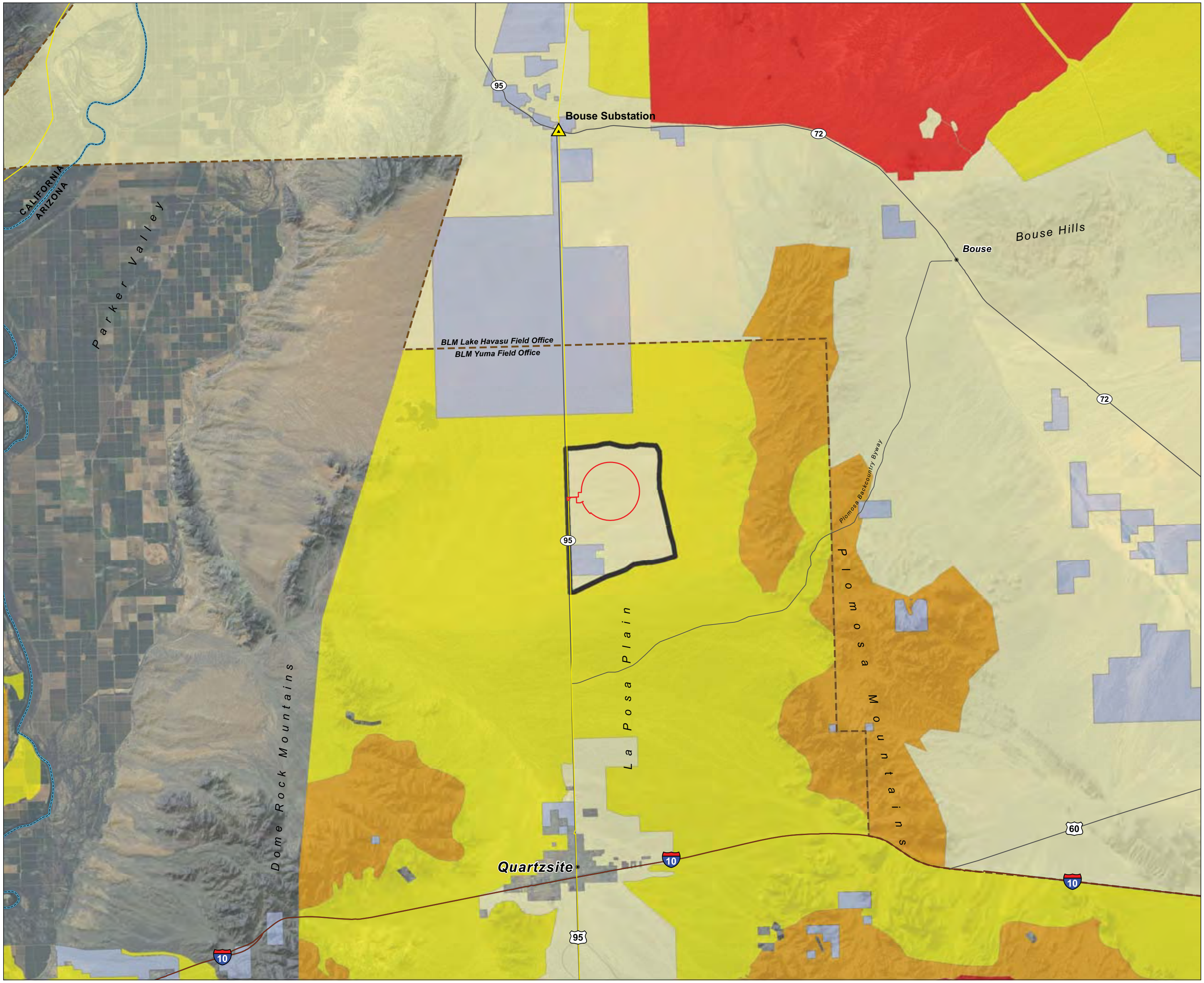

Proposed Amendment to the Yuma Field Office Resource Management Plan

Alternatives 1 & 2

Figure A-3

LEGEND

Project Features

- Alternatives 1 & 2
- Project Footprint*

VRM Classes

- I
- II
- III
- IV

Existing Utilities

- Substation
- 161kV Transmission Line

Reference Features

- State Land
- BLM Field Office Boundary
- State Boundary
- City/Town
- Interstate
- Highway/Major Road
- Colorado River

** Alternative 2 is comprised of the same VRM class IV area as compared to Alternative 1. However, the QSEP ROW would not be granted.*

0 1.5 3 6
Miles

July 2011

Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Platts, 2009; EPG, 2009.

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Appendix B

Western's Construction Standards: Standard 13

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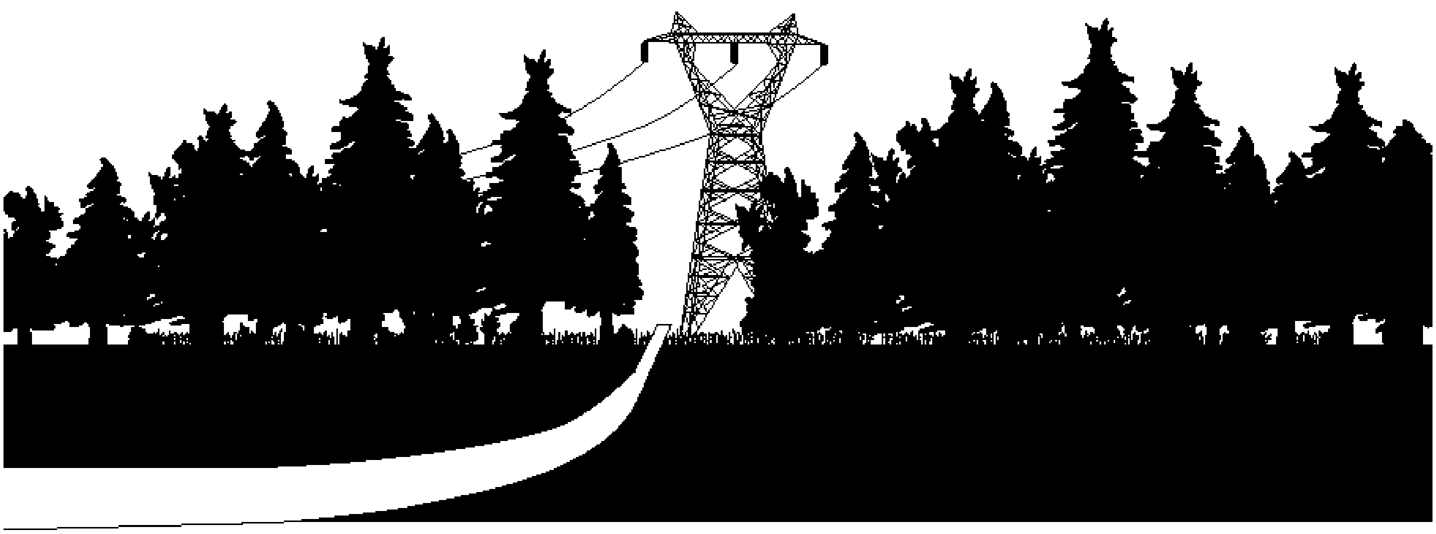
CONSTRUCTION STANDARDS

STANDARD 13

ENVIRONMENTAL QUALITY PROTECTION



July 2009

SAFETY
A HABIT TO LIVE BY

STANDARD 13 - ENVIRONMENTAL QUALITY PROTECTION

TABLE OF CONTENTS

Page Number

STANDARD 13 - ENVIRONMENTAL QUALITY PROTECTION

SECTION 13.1--CONTRACTOR FURNISHED DATA

1. RECYCLED MATERIALS QUANTITY REPORT: Submit quantities of recycled materials listed in Section 13.6, "Recycled Materials Quantities", to the COR prior to submittal of final invoice.

2. RECOVERED AND BIOBASED MATERIAL PRODUCTS REPORT: Provide the COR the following information for purchases of items listed in Section 13.7, "Use of Recovered and Biobased Material Products".

   (1) Quantity and cost of listed items <u>with</u> recovered or biobased material content and quantity and cost of listed items <u>without</u> recovered or biobased material content prior to submittal of final invoice.

   (2) Written justification of listed items if recovered material or biobased material products are not available: 1) competitively within a reasonable time frame; 2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or 3) at a reasonable price.

3. RECLAIMED REFRIGERANT RECEIPT: A receipt from the reclaimer stating that the refrigerant was reclaimed, the amount and type of refrigerant, and the date shall be submitted to the COR prior to submittal of final invoice in accordance with Section 13.8.5, “Refrigerants and Receipts”.

4. WASTE MATERIAL QUANTITY REPORT: Submit quantities of total project waste material disposal as listed below to the COR prior to submittal of final invoice in accordance with Section 13.8.8, “Waste Material Quantity Report”.

   (1) Unregulated Wastes (i.e., trash): Volume in cubic yards or weight in pounds.

   (2) Hazardous or Universal Wastes: Weight in pounds.

   (3) PCB Wastes: Weight in pounds.

   (4) Other regulated wastes (e.g., lead-based paint or asbestos): Weight in pounds (specify type of waste in report).

5. SPILL PREVENTION NOTIFICATION AND CLEANUP PLAN (Plan): Submit the Plan as described in Section 13.10.2, "Spill Prevention Notification and Cleanup Plan”, to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

6. TANKER OIL SPILL PREVENTION AND RESPONSE PLAN: Submit the Plan as described in Section 13.10.3, "Tanker Oil Spill Prevention and Response Plan”, to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

7. PESTICIDE USE PLAN: Submit a plan as described in Section 13.11.3, “Pesticide Use Plan”, to the COR for review and comment 14 days prior to the date of intended pesticide application. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Within seven days after application, submit a written report in accordance with Standard 2 – Sitework, Section 2.1.1_5, “Soil-Applied Herbicide”.

8. TREATED WOOD UTILITY POLES AND CROSSARMS RECYCLING - CONSUMER INFORMATION SHEET RECEIPT: Submit treated wood utility poles and crossarms - consumer information sheet receipts to the COR prior to submittal of final invoice (see 13.12, “Treated Wood Utility Poles and Crossarms Recycling or Disposal”).

9. PREVENTION OF AIR POLLUTION: Submit a copy of permits, if required, as described in 13.13, “Prevention of Air Pollution” to the COR 14 days prior to the start of work.

10. ASBESTOS LICENSES OR CERTIFICATIONS: Submit a copy of licenses, certifications, Demolition and Renovation Notifications and Permits for asbestos work as described in 13.14, ”Handling and Management of Asbestos Containing Material” to the COR 14 days prior to work. Submit copies of certificates of disposal and/or receipts for waste to the COR prior to submittal of final invoice.

11. LEAD PAINT NOTICES: Submit a copy of lead paint notices with contractor and recipient signatures as described in 13.15, “Material with Lead-based Paint” to the COR prior to submittal of final invoice. Submit copies of certificates of disposal and/or receipts for waste to the COR prior to submittal of final invoice.

12. WATER POLLUTION PERMITS: Submit copies of any water pollution permits as described in 13.16, “Prevention of Water Pollution” to the COR 14 days prior to start of work.

13. PCB TEST REPORT: Submit a PCB test report as described in 13.17, “Testing, Draining, Removal, and Disposal of Oil-filled Electrical Equipment”, prior to draining, removal, or disposal of oil or oil-filled equipment that is designated for disposal.

14. OIL AND OIL-FILLED ELECTRICAL EQUIPMENT RECEIPT: Obtain and submit a receipt for oil and oil-filled equipment transported and disposed, recycled, or reprocessed as described in 13.17, “Testing, Draining, Removal, and Disposal of Oil-filled Electrical Equipment”, to the COR prior to submittal of final invoice.

15. OSHA PCB TRAINING RECORDS: Submit employee training documentation records to the COR 14 days prior to the start of work as described in 13.18.1.

16. CLEANUP WORK MANAGEMENT PLAN: Submit a Cleanup Work Management Plan as described in 13.18, “Removal of Oil-contaminated Material” to the COR for review and comment 14 days prior to the start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

17. POST CLEANUP REPORT: Submit a Post-Cleanup Report as described in 13.18, “Removal of Oil-contaminated Material” to the COR prior to submittal of final invoice.

SECTION 13.2--ENVIRONMENTAL REQUIREMENTS

Comply with Federal, State, and local environmental laws and regulations. The sections in this Standard further specify the requirements.

SECTION 13.3--LANDSCAPE PRESERVATION

1. GENERAL: Preserve landscape features in accordance with the contract clause titled “Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements.”

2. CONSTRUCTION ROADS: Location, alignment, and grade of construction roads shall be subject to the COR's approval. When no longer required, surfaces of construction roads shall be scarified to

facilitate natural revegetation, provide for proper drainage, and prevent erosion. If re-vegetation is required, use seed mixtures as recommended by Natural Resources Conservation Service or other land managing agency as appropriate.

3. CONSTRUCTION FACILITIES: Shop, office, and yard areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent and prevent impact on sensitive riparian areas and flood plains. Storage and construction buildings, including concrete footings and slabs, shall be removed from the site prior to contract completion. The area shall be re-graded as required so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion or transport of sediment and pollutants. If re-vegetation is required, use seed mixtures as recommended by Natural Resources Conservation Service or other land managing agency as appropriate.

SECTION 13.4--PRESERVATION OF CULTURAL AND PALEONTOLOGICAL RESOURCES

1. GENERAL: Do not remove or alter cultural artifacts or paleontological resources (fossils). Cultural artifacts may be of scientific or cultural importance and includes, but is not limited to bones, pottery, glass, projectile points (arrowheads), other stone or metal tools, historic buildings, and features. Paleontological resources can be of scientific importance and include mineralized animals and plants or trace fossils such as footprints. Both cultural and paleontological resources are protected by Federal Regulations during Federal construction projects. Contractor shall restrict all ground disturbing activities to areas that have been surveyed by Western for cultural or paleontological resources and as specified in accordance with Standard 1 – General Requirements, Sections 1.3.1 Rights-of-way and 1.3.2 Access to the Work and Haul Routes.

2. KNOWN CULTURAL OR PALEONTOLOGICAL SITES: Following issuance of notice to proceed, Western will provide drawings or maps showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground in a manner approved by the COR. Instruct employees, subcontractors, and others that vehicular or equipment access to these areas is prohibited. If access is absolutely necessary, first obtain approval from the COR. Western will remove the markings during or following final cleanup. For some project work, Western will require an archaeological, paleontological or tribal monitor at or near cultural or paleontological site locations. The contractor, contractor's employees, and subcontractors shall work with the monitor to insure that sensitive areas are avoided. Where monitors are required, the monitor shall meet with the crew each morning to go over the day's work. The monitor will also conduct awareness training for all contractors prior to any work in the field. Untrained personnel shall not be allowed in the construction area. For sensitive areas requiring a monitor, the contractor may not access those areas without a monitor being present.

3. UNKNOWN CULTURAL OR PALEONTOLOGICAL SITES: On rare occasions cultural or paleontological sites may be discovered during excavation or other earth-moving activities.

   (1) Reporting: If evidence of a cultural or paleontological site is discovered, cease work in the area immediately and notify the COR of the location and nature of the findings. If a monitor is present, the monitor should also be notified. Stop all activities within a 200-foot radius of the discovery and do not proceed with work within that radius until directed to do so by the COR.

   (2) Care of Evidence: Protect the area. Do not remove, handle, alter, or damage artifacts or fossils uncovered during construction.

SECTION 13.5--NOXIOUS WEED CONTROL

Comply with Federal, State, and local noxious weed control regulations. Provide a "clean vehicle policy" while entering and leaving construction areas to prevent transport of noxious weed plants and/or seed. Transport only construction vehicles that are free of mud and vegetation debris to staging areas and the project right-of-way.

SECTION 13.6--RECYCLED MATERIALS QUANTITIES

1. GENERAL: Record quantities of material by category that is salvaged, recycled, reused, or reprocessed, including:

   (1) Transformers, Breakers: Weight without oil.

   (2) Aluminum Conductor – Steel Reinforced (ACSR): Weight in pounds or tons.

   (3) Steel: Weight in pounds or tons.

   (4) Aluminum: Weight in pounds or tons.

   (5) Copper: Weight in pounds or tons.

   (6) Other Metals: Weight in pounds or tons.

   (7) Oil: Gallons (separate by type - less than 2 ppm PCB, 2 to 50 ppm PCB, and 50 or greater ppm PCB).

   (8) Gravel, Asphalt, Or Concrete: Weight in pounds or tons.

   (9) Batteries: Weight in pounds.

   (10) Treated Wood Utility Poles and Crossarms: Weight in pounds.

   (11) Wood construction material: Weight in pounds.

   (12) Cardboard: Weight in pounds.

   (13) Porcelain Insulators: Weight in pounds.

2. RECYCLED MATERIAL QUANTITY REPORT: Submit quantities of recycled material by category to the COR prior to submittal of final invoice.

SECTION 13.7--USE OF RECOVERED MATERIAL AND BIOBASED MATERIAL PRODUCTS

1. RECOVERED MATERIAL PRODUCTS: If the products listed below or other products listed at http://www.epa.gov/epawaste/conserve/tools/cpg/products/index.htm are obtained as part of this project, purchase the items with the highest recovered material content possible unless recovered material products are not available: 1) competitively within a reasonable time frame; 2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or 3) at a reasonable price.

   Construction Products:

   - Building Insulation Products

- Carpet
- Carpet cushion
- Cement and concrete containing coal fly ash, ground granulated blast furnace slag, cenospheres, or silica fume
- Consolidated and reprocessed latex paint
- Floor Tiles
- Flowable fill
- Laminated Paperboard
- Modular threshold ramps
- Nonpressure pipe
- Patio Blocks
- Railroad grade crossing surfaces
- Roofing materials
- Shower and restroom dividers/partitions
- Structural Fiberboard

2. BIOBASED MATERIAL PRODUCTS: If the products listed at http://www.biobased.oce.usda.gov are obtained as part of this project, purchase the items with the highest biobased content possible and no less than the percent indicated for each product unless biobased material products are not available: 1) competitively within a reasonable time frame, 2) meeting reasonable performance standards as defined in the Standards or Project Specifications, or 3) at a reasonable price.
NOTE: Western exempts purchase of bio-based transformers rated above 1 MVA until May 13, 2011 for performance reasons.

3. RECOVERED MATERIAL AND BIOBASED MATERIAL PRODUCTS REPORT: Provide the COR the following information for purchases of those items listed above:

   Quantity and cost of listed items with recovered or biobased material content and quantity and cost of listed items without recovered or biobased material content prior to submittal of final invoice.

   Written justification of listed items if recovered material or biobased material products are not available: 1) competitively within a reasonable time frame; 2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or 3) at a reasonable price.

SECTION 13.8--DISPOSAL OF WASTE MATERIAL

1. GENERAL: Dispose or recycle waste material in accordance with applicable Federal, State and local regulations and ordinances. In addition to the requirements of the Contract Clause “Cleaning Up”, remove all waste material from the construction site. No waste shall be left on Western property, right-of-way, or easement. Burning or burying of waste material is not permitted.

2. HAZARDOUS, UNIVERSAL, AND NON-HAZARDOUS WASTES: Manage hazardous, universal, and non-hazardous wastes in accordance with State and Federal regulations.

3. USED OIL: Used oil generated from the Contractor activities shall be managed in accordance with used oil regulations.

4. RECYCLABLE MATERIAL: Reduce wastes, including excess Western material, by recycling, reusing, or reprocessing. Examples of recycling, reusing, or reprocessing includes, but is not limited to, reprocessing of solvents; recycling cardboard; and salvaging scrap metals.

5. REFRIGERANTS AND RECEIPTS: Refrigerants from air conditioners, water coolers, refrigerators, ice machines and vehicles shall be reclaimed with certified equipment operated by certified technicians if the item is to be disposed. Refrigerants shall be reclaimed and not vented to the

atmosphere. A receipt from the reclaimer stating that the refrigerant was reclaimed, the amount and type of refrigerant, and the date shall be submitted to the COR prior to submittal of final invoice.

6. HALONS: Equipment containing halons that must be tested, maintained, serviced, repaired, or disposed must be handled according to EPA requirements and by technicians trained according to those requirements.

7. SULFUR HEXAFLUORIDE (SF6): SF6 shall be reclaimed and not vented to the atmosphere.

8. WASTE MATERIAL QUANTITY REPORT: Submit quantities of total project waste material disposal as listed below to the COR prior to submittal of final invoice.

   (1) Unregulated Wastes (i.e., trash): Volume in cubic yards or weight in pounds.

   (2) Hazardous or Universal Wastes: Weight in pounds.

   (3) PCB Wastes: Weight in pounds.

   (4) Other regulated wastes (e.g., lead-based paint or asbestos): Weight in pounds (specify type of waste in report).

SECTION 13.9--CONTRACTOR'S LIABILITY FOR REGULATED MATERIAL INCIDENTS

1. GENERAL: The Contractor is solely liable for all expenses related to spills, mishandling, or incidents of regulated material attributable to his actions or the actions of his subcontractors. This includes all response, investigation, cleanup, disposal, permitting, reporting, and requirements from applicable environmental regulation agencies.

2. SUPERVISION: The actions of the Contractor employees, agents, and subcontractors shall be properly managed at all times on Western property or while transporting Western's (or previously owned by Western) regulated material and equipment.

SECTION 13.10--POLLUTANT SPILL PREVENTION, NOTIFICATION, AND CLEANUP

1. GENERAL: Provide measures to prevent spills of pollutants and respond appropriately if a spill occurs. A pollutant includes any hazardous or non-hazardous substance that when spilled, will contaminate soil, surface water, or ground water. This includes any solvent, fuel, oil, paint, pesticide, engine coolants, and similar substances.

2. SPILL PREVENTION NOTIFICATION AND CLEANUP PLAN (Plan): Provide the Plan to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Include the following in the Plan:

   (1) Spill Prevention measures. Describe the work practices or precautions that will be used at the job site to prevent spills. These may include engineered or manufactured techniques such as installation of berms around fuel and oil tanks; Storage of fuels, paints, and other substances in spill proof containers; and management techniques such as requiring workers to handle material in certain ways.

   (2) Notification. Most States and the Environmental Protection Agency require by regulation, that anyone who spills certain types of pollutants in certain quantities notify them of the spill within a specific time period. Some of these agencies require written follow up reports and cleanup

reports. Include in the Plan, the types of spills for which notification would be made, the agencies notified, the information the agency requires during the notification, and the telephone numbers for notification.

(3) Employee Awareness Training. Describe employee awareness training procedures that will be implemented to ensure personnel are knowledgeable about the contents of the Plan and the need for notification.

(4) Commitment of Manpower, Equipment and Material. Identify the arrangements made to respond to spills, including the commitment of manpower, equipment and material.

(5) If applicable, address all requirements of 40CFR112 pertaining to Spill Prevention, Control and Countermeasures Plans.

3. TANKER OIL SPILL PREVENTION AND RESPONSE PLAN: Provide a Tanker Oil Spill Prevention and Response Plan as required by the Department of Transportation if oil tankers with volume of 3,500 gallons or more are used as part of the project. Submit the Tanker Oil Spill Prevention and Response Plan to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

SECTION 13.11--PESTICIDES

1. GENERAL: The term “pesticide” includes herbicides, insecticides, rodenticides and fungicides. Pesticides shall only be used in accordance with their labeling and applied by appropriately certified applicators.

2. ENVIRONMENTAL PROTECTION AGENCY REGISTRATION: Use EPA registered pesticides that are approved for the intended use.

3. PESTICIDE USE PLAN: Provide a pesticide use plan that contains: 1) a description of the pesticide to be used, 2) where it is to be applied, 3) the application rate, 4) a copy of the label, and 5) a copy of required applicator certifications. Submit the pesticide use plan to the COR for review and comment 14 days prior to the date of intended application. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Within seven days after application, submit a written final report to the COR, including the pesticide applicators report, in accordance with Standard 2 – Sitework, Section 2.1.1_5. “Soil-Applied Herbicide, (4) Final Report”.

SECTION 13.12--TREATED WOOD UTILITY POLES AND CROSSARMS RECYCLING OR DISPOSAL

Whenever practicable, treated wood utility poles and crossarms removed during the project shall be recycled or transferred to the public for some uses. Treated wood utility poles and crossarms transferred to a recycler, landfill, or the public shall be accompanied by a written consumer information sheet for treated wood as provided by Western. Obtain a receipt, part of the consumer information sheet, from the recipient indicating that they have received, read, and understand the consumer information sheet. Treated wood products transferred to right-of-way landowners shall be moved off the right-of-way. Treated wood product scrap, poles, and crossarms that cannot be donated or reused shall be properly disposed in a landfill that accepts treated wood and has signed Western’s consumer information sheet receipt. Submit treated wood utility poles and crossarms consumer information receipts to the COR prior to submittal of final invoice.

SECTION 13.13--PREVENTION OF AIR POLLUTION

1. GENERAL: Ensure that construction activities and the operation of equipment are undertaken to reduce the emission of air pollutants. Submit a copy of permits for construction activities, if required (e.g., “non-attainment” areas, state implementation plans, or Class I air-sheds), from Federal, State, or local agencies to the COR 14 days prior to the start of work.

2. MACHINERY AIR EMISSIONS: The Contractor and subcontractor machinery shall have, and shall use the air emissions control devices required by Federal, State or Local Regulation or ordinance.

3. DUST ABATEMENT: Dust shall be controlled. Oil shall not be used as a dust suppressant. Dust suppressants shall be approved by the COR prior to use.

SECTION 13.14--HANDLING AND MANAGEMENT OF ASBESTOS CONTAINING MATERIAL

1. GENERAL: Obtain the appropriate Federal, State, Tribal or local licenses or certifications prior to disturbing any regulated asbestos-containing material. If a building or portion of a building will be demolished or renovated, obtain an Asbestos Notice of and Permit for Demolition and Renovation from the State or Tribal Department of Environmental Quality, Division of Air Quality (or equivalent). The building(s) shall be inspected by a State-Certified or Tribal accepted Asbestos Building Inspector. The inspector shall certify the presence and condition of asbestos, or non-presence of asbestos, on site as directed on the State or Tribal Demolition and Renovation Notice/Permit. The inspections shall be performed and notifications shall be submitted whether asbestos is present or not. Submit a copy of licenses, certifications, Demolition and Renovation Notifications and Permits for asbestos work to the COR 14 days prior to work. Ensure: 1) worker and public safety requirements are fully implemented and 2) proper handling, transportation, and disposal of asbestos containing material.

2. TRANSPORTATION OF ASBESTOS WASTE: Comply with Department of Transportation, Environmental Protection Agency, and State and Local requirements when transporting asbestos wastes.

3. CERTIFICATES OF DISPOSAL AND RECEIPTS: Obtain certificates of disposal for waste if the waste is a hazardous waste or receipts if the waste is a non-hazardous waste. Submit copies to the COR prior to submittal of final invoice.

SECTION 13.15--MATERIAL WITH LEAD-BASED PAINT

1. GENERAL: Comply with all applicable Federal, State and local regulations concerning work with lead-based paint, disposal of material painted with lead-based paint, and management of these materials. OSHA and General Industry Standards apply to worker safety and right-to-know issues. Federal EPA and State agencies regulate waste disposal and air quality issues.

2. TRANSFER OF PROPERTY: If lead-based paint containing equipment or material is to be given away or sold for reuse, scrap, or reclaiming, the contractor shall provide a written notice to the recipient of the material stating that the material contains lead-based paint and the Hazardous Waste regulations may apply to the waste or the paint in some circumstances. The new owner must also be notified that they may be responsible for compliance with OSHA requirements if the material is to be cut, sanded, abraded, or stripped of paint. Submit a copy of lead paint notices with contractor and recipient signatures to the COR prior to submittal of final invoice.

3. CERTIFICATES OF DISPOSAL AND RECEIPTS: Obtain certificates of disposal for waste if the waste is a hazardous waste or receipts if the waste is a non-hazardous waste. Submit copies to the COR prior to submittal of final invoice.

SECTION 13.16--PREVENTION OF WATER POLLUTION

1. GENERAL: Ensure that surface and ground water is protected from pollution caused by construction activities and comply with applicable regulations and requirements. Ensure that streams, waterways and other courses are not obstructed or impaired unless the appropriate Federal, State or local permits have been obtained.

2. PERMITS: Ensure that:

   (1) A National Pollutant Discharge Elimination System (NPDES) permit is obtained from the US Environmental Protection Agency or State as appropriate if the disturbed construction area equals 1 acre or more. Disturbed areas include staging, parking, fueling, stockpiling, and any other construction related activities. Refer to www.epa.gov/npdes/stormwater for directions and forms.

   (2) A dewatering permit is obtained from the appropriate agency if required for construction dewatering activities.

   (3) Copies of permits and plans, approved by the appropriate regulating agencies, are submitted to the COR 14 days prior to start of work.

3. EXCAVATED MATERIAL AND OTHER CONTAMINANT SOURCES: Control runoff from excavated areas and piles of excavated material, construction material or wastes (to include truck washing and concrete wastes), and chemical products such as oil, grease, solvents, fuels, pesticides, and pole treatment compounds. Excavated material or other construction material shall not be stockpiled or deposited near or on streambanks, lake shorelines, ditches, irrigation canals, or other areas where run-off could impact the environment.

4. MANAGEMENT OF WASTE CONCRETE OR WASHING OF CONCRETE TRUCKS: Do not permit the washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water. Concrete wastes shall be disposed in accordance with all Federal, State, and local regulations. Concrete wastes shall not be disposed of on any Western property, right-of-way, or easement; or on any streets, roads, or property without the owner’s consent.

5. STREAM CROSSINGS: Crossing of any stream or other waterway shall be done in compliance with Federal, State, and local regulations. Crossing of some waterways may be prohibited by landowners, Federal or State agencies or require permits.

SECTION 13.17--TESTING, DRAINING, REMOVAL, AND DISPOSAL OF OIL-FILLED ELECTRICAL EQUIPMENT

1. SAMPLING AND TESTING OF INSULATING OIL FOR PCB CONTENT: Sample and analyze the oil of electrical equipment (which includes storage tanks) for PCB’s. Use analytical methods approved by EPA and applicable State regulations. Decontaminate sampling equipment according to documented good laboratory practices (these can be contractor developed or EPA standards). Use only laboratories approved by Western. The COR will furnish a list of approved laboratories.

2. PCB TEST REPORT: Provide PCB test reports that contain the information below for disposing of oil-filled electrical equipment. Submit the PCB test report prior to draining, removal, or disposal of oil or oil-filled equipment that is designated for disposal.

   - Name and address of the laboratory
   - Description of the electrical equipment (e.g. transformer, breaker)

- Serial number for the electrical equipment.
- Date sampled
- Date tested
- PCB contents in parts per million (ppm)
- Unique identification number of container into which the oil was drained (i.e., number of drum, tank, tanker, etc.)

3. OIL CONTAINING PCB: Comply with the Federal regulations pertaining to PCBs found at Title 40, Part 761 of the U.S. Code of Federal Regulations (40 CFR 761).

4. REMOVAL AND DISPOSAL OF INSULATING OIL AND OIL-FILLED ELECTRICAL EQUIPMENT: Once the PCB content of the oil has been identified from laboratory results, the oil shall be transported and disposed, recycled, or reprocessed according to 40 CFR 761 (if applicable), Resource Conservation and Recovery Act (RCRA) "used oil", and other applicable regulations. Used oil may be transported only by EPA-registered used oil transporters. The oil must be stored in containers that are labeled "Used Oil." Use only transporters and disposal sites approved by Western.

5. OIL AND OIL-FILLED ELECTRICAL EQUIPMENT RECEIPT: Obtain and submit a receipt for oil and oil-filled equipment transported and disposed, recycled, or reprocessed to the COR prior to submittal of final invoice.

SECTION 13.18--REMOVAL OF OIL-CONTAMINATED MATERIAL

1. GENERAL: Removing oil-contaminated material includes excavating, stockpiling, testing, transporting, cleaning, and disposing of these material. Personnel working with PCBs shall be trained in accordance with OSHA requirements. Submit employee training documentation records to the COR 14 days prior to the start of work.

2. CLEANUP WORK MANAGEMENT PLAN: Provide a Cleanup Work Management Plan that has been approved by applicable Federal, State, or Local environmental regulation agencies. Submit the plan to the COR for review and comment 14 days prior to the start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. The plan shall address on-site excavation of contaminated soil and debris and include the following:

   - Identification of contaminants and areas to be excavated
   - Method of excavation
   - Level of personnel/subcontractor training
   - Safety and health provisions
   - Sampling requirements including quality control, laboratory to be used
   - Management of excavated soils and debris
   - Disposal methods, including transportation to disposal

3. EXCAVATION AND CLEANUP: Comply with the requirements of Title 40, Part 761 of the U.S. Code of Federal Regulations (40 CFR 761).

4. TEMPORARY STOCKPILING: Excavated material, stockpiled on site during construction, shall be stored on heavy plastic and covered to prevent wind and rain erosion at a location designated by the COR.

5. SAMPLING AND TESTING: Sample contaminated debris and areas of excavation to ensure that contamination is removed. Use personnel with experience in sampling and, in particular, with

experience in PCB cleanup if PCBs are involved. Use analytical methods approved by EPA and applicable State regulations.

6. TRANSPORTATION AND DISPOSAL OF CONTAMINATED MATERIAL: The Contractor shall be responsible and liable for the proper loading, transportation, and disposal of contaminated material according to Federal, State, and local requirements. Use only transporters and disposal sites approved by Western.

7. POST CLEANUP REPORT: Provide a Post-Cleanup Report that describes the cleanup of contaminated soils and debris. Submit the report to the COR prior to submittal of final invoice. The report shall contain the following information:

   - Site map showing the areas cleaned
   - Description of the operations involved in excavating, storing, sampling, and testing, and disposal
   - Sampling and analysis results including 1) Name and address of the laboratory, 2) sample locations, 3) sample dates, 4) analysis dates, 5) contents of contaminant (e.g. PCB or total petroleum hydrocarbons) in parts per million (ppm)
   - Certification by the Contractor that the cleanup requirements were met
   - Copies of any manifests, bills of lading, and disposal certificates
   - Copies of correspondence with regulatory agencies that support completion of the cleanup

SECTION 13.19—CONSERVATION OF NATURAL RESOURCES

1. GENERAL: Federal law prohibits the "take" of endangered, threatened, proposed or candidate wildlife and plants, and destruction or adverse modification of designated Critical Habitat. Federal law also prohibits the "take" of birds protected by the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. "Take" means to pursue, hunt, shoot, wound, kill, trap, capture or collect a protected animal or any part thereof, or attempt to do any of those things without a permit from U.S. Fish and Wildlife Service. The Contractor will take precautions to avoid harming other wildlife species. Contractor shall restrict all ground disturbing activities to areas that have been surveyed by Western for natural resources and as specified in accordance with Standard 1 – General Requirements, Sections 1.3.1 Rights-of-way and 1.3.2 Access to the Work and Haul Routes.

2. KNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT: Following issuance of the notice to proceed, and prior to the start of construction, Western will provide training to all contractor and subcontractor personnel and others involved in the construction activity if there is a known occurrence of protected species or habitat in the construction area. Untrained personnel shall not be allowed in the construction area. Western will provide drawings or maps showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These sensitive areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground by Western. If access is absolutely necessary, the contractor shall first obtain written permission from the COR, noting that a Western and/or other Federal or state government or tribal agency biologist may be required to accompany personnel and equipment. Ground markings shall be maintained through the duration of the contract. Western will remove the markings during or following final inspection of the project.

3. UNKNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT: If evidence of a protected species is found in the project area, the contractor shall immediately notify the COR and provide the location and nature of the findings. The contractor shall stop all activity within 200 feet of the protected species or habitat and not proceed until directed to do so by the COR.

Appendix C

U.S. Fish and Wildlife Service Letter

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United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2011-TA-0078

February 17, 2011

Mr. John Holt
Department of Energy
Western Area Power Administration
P.O. Box 6457
Phoenix, Arizona 85005-6457

RE: Request for a List of Threatened and Endangered Species for the Quartzite Solar Energy Project, La Paz County, Arizona

Dear Mr. Holt:

Thank you for your recent request for information on threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may occur in your project area. Because your proposed action is a major construction activity as defined in 50 CFR 402.02, we provide this site specific species list. The Arizona Ecological Service Field Office has reviewed your project location and has determined that no species listed under the Act are likely present in your proposed project area. Furthermore, the proposed project area is not inclusive of critical habitat designations under the Act.

Please note this document does not authorize avian mortality for species that are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712). If you believe migratory birds will be affected by this activity, we recommend you contact our Migratory Bird Permit Office P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882, or FW2_birdpermits@fws.gov. For more information regarding the MBTA, please visit the following web sites: http://fws.gov/permits/mdpermits/birdbasics.html and http://www.fws.gov/migratorybirds/.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your project area. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process.

For additional communications regarding this project, please refer to consultation number 22410-2011-TA-0078. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Marc Wicke (x271) or Debra Bills (x239).

Sincerely,

Debra T. Bills

for Steven L. Spangle
Field Supervisor

cc: Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

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Appendix D

Air Quality Emissions Data

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EMISSION ANALYSIS FOR THE QUARTZSITE SOLAR ENERGY PROJECT

1.0 DRY-COOLED ALTERNATIVE

1.1 Construction Phase Air Emission Inventory

The emission inventory presented in this section addresses estimated construction activity emissions associated with development of the Applicant's Proposed Project - a dry-cooled solar facility.

1.1.1 Earthmoving Operations and Construction-Phase Vehicle Emissions

The maximum construction emission conditions were evaluated for the Project 12-month period with the highest planned number of vehicles and hours of operation for equipment on-site (Months 10 – 21). In addition the inventory considers the off-site travel of vehicles for salt and construction material deliveries, and commuter travel. The vehicle miles traveled per trip for these workers and deliveries are based on travel distances from Phoenix for on-road equipment delivery, and for commuters traveling from the vicinity of Quartzsite, as well as from Blythe, California and as far away as Yuma.

1.1.2 Aggregate Plant Operations and Emission Estimates

An onsite aggregate processing plant may be deployed relatively early in order to support the Project's need for aggregates (e.g. road compaction, dust minimization, material for batch plant). Alternatively, aggregates may be procured from a commercial source. Activities at the plant (onsite or offsite) would consist of quarrying, crushing, and screening for aggregates, pea gravel, and coarse rock and sand. Equipment and emission sources associated with the aggregate processing plant would generally consist of:

- A 350-tons per hour primary crusher, a primary screening system, and a baghouse controlling both pieces of equipment
- A 200-tons per hour secondary crusher and a secondary screening system

A tertiary screener would provide additional processing for the primary screened material. Operation of the aggregate plant would occupy approximately 9 months of the 30 month overall schedule. A conservative estimate of maximum hourly throughput may be based on a three month time window and on a 10-hour day, 5-day per week schedule: 350,000 tons / (10 x 90) = 388 tons/hour (approximately 410 tons per hour [maximum] for permitting purpose).

1.1.3 Concrete Batch Plant Operations and Emissions

A temporary concrete batch plant consisting of three portable units would be set up near the perimeter of the site to supply the necessary ready-mix concrete for the plant. Each of the units would be rated at 300 cubic yards/hour. Concrete requirements include foundations for the solar collecting tower structure, the storage tanks, several building/structures and all the heliostats. Total concrete requirement for the Project is estimated to be 90,000 cubic yards or approximately 360,000 tons on a dry basis. Should the Project opt to receive pre-mixed concrete from off-site sources, this would be in lieu of deliveries of sand, aggregate and cement, so that delivery vehicle activity is nearly the same. However, the on-site emissions from the batch plant would be avoided.

For monolithic concrete such as the foundation of the solar collecting tower and the tower structure itself, continuous supply and pouring of concrete will be necessary. For purposes of estimating emissions for the on-site concrete batch plant option, it is conservatively assumed the on-site batching units will be operated up to 24 hours per day, 7 days per week. It is likely that one or two batching units will be removed from the Project area as soon as the production demand rate subsides.

Particulate matter less than 10 microns (PM_{10}), consisting primarily of cement dust and some aggregate and sand dust, is the primary pollutant from the cement plant. Point sources associated with the batch plant are the dust collectors for each batching unit. Fugitive sources include the transfer of sand and aggregate, and wind erosion from sand and aggregate storage piles. The amount of fugitive emissions generated during the transfer of sand and aggregate depends primarily on the surface moisture content of these materials.

Although the optional on-site batch plants would be capable of higher theoretical rates, the actual process rate will be constrained by the loading capacity of the concrete transfer trucks. It is estimated that no more than ten batches (12 cubic yard batch, six (6) minutes cycle each) can be charged by each unit per hour. The maximum hourly loading rates for cement and supplement loadings are based on the maximum capacity of the respective hoppers (approximately 65.5 cubic yards or 50 cubic meters) for each system.

1.1.4 Construction Phase Emission Summary

Due to the highly conservative assumptions involved, the actual construction phase emissions are expected to be significantly below the levels shown in Table 1-1.

Table 1-1 Maximum Annual Criteria Pollutant Emission Estimates for the Construction Phase

Emission Source Category[1]	Maximum Construction 12-Month Emissions (tons/yr)[1]				
	PM_{10}	$PM_{2.5}$	NO_x	CO	VOC
Plant and Linear Element Construction Activities (110 MW Plant)					
Earthmoving/Construction Operations - Plant [2]	45.5	9.5	–	–	–
Earthmoving/Construction Operations – Transmission Corridor [2]	7.3	1.5	–	–	–
Aggregate Processing Plant [3]	1.3	–	–	–	–
Concrete Batch Plant [3]	4.8	–	–	–	–

Table 1-1 Maximum Annual Criteria Pollutant Emission Estimates for the Construction Phase					
Emission Source Category[1]	**Maximum Construction 12-Month Emissions (tons/yr)**[1]				
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**
On-Site Vehicle/Construction Equip. Exhaust [4]	2.9	2.7	43.3	25.2	11.1
TOTAL ON-SITE EMISSIONS (Months 10-21, Peak Activity)	61.8	13.7	43.3	25.2	11.1
Indirect, Off-Site Vehicle Exhaust [5]	1.1	0.8	28.5	25.8	4.6
Worker commuting vehicles [6]	1.56	0.3	0.96	9.6	7.9

[1] Roster of equipment and activity on site based on the highest estimate 12-month period (Months 10-21) over the Project construction schedule. .

[2] Earthmoving activity estimates assume 50 acres of Project area and 8 acres of linear transmission corridors will be under active construction in a single day. Emission factors used for general heavy industry construction activity from URBEMIS Version 9.2.4 of 20 lbs PM_{10}/acre-day.

[3] Aggregate and concrete batch plant emission factors for fugitive and controlled point sources from EPA Document AP-42, Chapter 11. The inclusion of an on-site batch plant is a construction phase option that is included in the Proposed Action.

[4] Equipment categories include wheeled and tracked mobile construction equipment. Construction vehicle and equipment emission factors from South Coast Air Quality Management District for the CY 2012 equipment populations (South Coast Air Quality Management District 2008 as amended).

[5] Equipment categories include off-site mobile sources, supply deliveries, and vehicle travel for construction activities surrounding the site. On-road vehicle emission factors from South Coast Air Quality Management District for the CY 2012 equipment population (South Coast Air Quality Management District – 2007 emission factor database).

[6] Commuter vehicle emissions derived from URBEMIS Version 9.2.4. Rural Project area assumed 50 acres per day active construction, average 250 mile commute, seasonal temperatures adjusted for La Paz County.

1.1.5 Salt Commissioning Sources and Emission Inventory Methods

The salt commissioning activities will take place during the latter stages of the construction phase and will involve the melting, heating, and conditioning of approximately 70 million pounds of sodium nitrate and potassium nitrate salts. The process consists of salt melting and salt conditioning. Overall, the salt commissioning process is expected to take approximately 90 days and is planned to begin in month 18 of the construction schedule. The salt melting and conditioning heaters will utilize gaseous fuel (natural gas or propane).

The salt melting and heating processes will produce limited emissions of criteria and hazardous air pollutants resulting from the combustion of gaseous fuels in two temporary gas-fired convection heaters. The salt melter and conditioning heater units will have rated heat release capacities of 55 million and 20 million British thermal units per hour (MMBtu/hr), respectively. Propane was chosen for the analysis, as this would not require a fuel pipeline interconnect. Other alternative fuels are pipeline natural gas or liquefied natural gas. However, there is no pipeline connection proposed for the Project location and there is one potential liquefied natural gas truck terminal within a reasonable distance. The key process parameters that affect the air pollutant emissions from salt commissioning equipment are listed in Table 1-2.

Table 1-2 Operating Parameters for the Quartzsite Solar Energy Project Gas-fired Heater Equipment				
Unit	**Heat Input Rating (MMBTU/hr)**	**Horsepower or Other Rating**	**Hours of Operation at 100% Load**[1]	**Principal Emission Control**[2]
110 MW Plant				
Salt Melter Process Heater [3]	55	----	2,188	Low-nitrogen oxides (NO_X) Burners and Flue Gas Recirculation
Salt Conditioning Heater [3]	20	---	2,188	Low-NO_X Burners and Flue Gas Recirculation
Hot Salt Storage Tank Conditioning Vent [4]	NA	Approx 2,000 actual cubic feet per minute	2,188	Wet Scrubber[5]

[1] Annual hours of operation reflect anticipated hours anticipated during the salt commissioning phase and would occur once during the plant life.

[2] The principal means of add-on or design-based air pollution control to be utilized for the equipment, which will meet or exceed underlying regulatory requirements.

[3] Heat Input Rating and Annual Operating Hours for the Salt Melter and Salt Conditioning Heaters are the equivalent hours of full-load operation that equates to the anticipated salt commissioning phase. Actual operating hours per year may be higher because some portion of the gas-fired operation is expected to be at part-load conditions.

[4] Molten salt commissioning off-gas venting emissions occur due to reaction of trace amounts of magnesium nitrate in the salt mixture and are based on Project estimates for maximum design case.

[5] In the event that ultra-low magnesium impurity salts are not available, the release of NO_2 from the salt conditioning process will be controlled by a multi-stage chemical wet scrubber.

Criteria pollutant emissions have been estimated using the highest emission rates among the gaseous fuels considered. The NO_x emissions for the two heaters are estimated assuming the heaters are equipped with both ultra-low NO_x burners and flue gas recirculation. Proper combustion design and control practices will limit carbon monoxide (CO) and volatile organic compound (VOC) emissions. Use of low-sulfur propane, specified to contain no more than 15 grains sulfur per 100 standard cubic feet will control sulfur dioxide (SO_2) emissions. The estimated criteria pollutant emissions for this construction phase commissioning activity are summarized in Table 1-3.

Negligible fugitive particulate emissions will be generated during the handling of the solid salts because the solid salts will be handled in an indoor environment. Furthermore, the salts are strongly hydrophilic (high tendency to absorb moisture) so salt particles will tend to coalesce and not become airborne.

Salt conditioning will result in the release of nitrogen dioxides (NO_2) from the oxidation of magnesium nitrate impurity in the salt solution; this emission source is separate from the combustion emissions and from the heating process described above. The NO_2 estimates for the salt conditioning process assume all the magnesium nitrate impurity as guaranteed by the supplier for each salt oxidize completely and release entirely from the liquid solution. To further reduce the potential emission from this process, the Project is in the process of identifying sources and methods to further reduce or eliminate the magnesium impurity in the salt.

In the event that ultra-low magnesium impurity salts are not available, the release of NO_2 from the salt conditioning process will be controlled by a multi-stage chemical wet scrubber. The Project may also consider other control options such as the use of selective catalytic reduction. The emission estimates and analysis are currently conducted on the basis of the multi-stage chemical wet scrubber for controlling NO_2 emissions.

Table 1-3 Non-Recurring Criteria Pollutant Emission Estimates for Salt System Commissioning Operations

Source or Activity	Maximum Gas-fired Emissions with Controls[1] (tons/project)						
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**HAPs**
55 MMBtu Salt Melter	0.64	1.2	6.17	0.82	0.57	0.57	0.038
20 MMBtu Salt Conditioning Heater	0.093	0.18	0.89	0.12	0.083	0.083	0.00075
Salt Commissioning Off-Gassing [2] (Using wet scrubber technology)	8.95	--	--	--	--	--	--
Total Non-Recurring Salt Commissioning Emissions [3] (Tons for Entire Commissioning Period)	9.68	1.38	7.06	0.94	0.65	0.65	0.039

[1] Criteria pollutant emission factors obtained for EPA Document AP-42, Section 1.5 (July 2008). Hazardous Air Pollutant (HAP) Emissions are based on South Coast Air Quality Management District Toxic Air Contaminant emission factor database.

[2] Molten salt commissioning venting emissions occur due to reaction of trace amounts of magnesium nitrate in the salt mixture and are based on project estimates for maximum design case. These emissions may be eliminated if the project can utilize ultra-low magnesium impurity salts.

[3] The total non-recurring emission reflect the entirety of the salt commissioning activity, assumed to occupy approximately 90 days and up to 2,188 total operating hours.

1.1.6 Greenhouse Gas Emissions for Construction Phase

Estimation of construction phase greenhouse gas (GHG) emissions considered the direct tailpipe emissions from construction equipment, on-site vehicles, and commuter vehicles. The combustion of diesel and gasoline fuels will result in formation and release of CO_2, methane (CH_4) and N_2O. Project GHG emission estimates are presented for information purposes. As there are no established significance criteria, this analysis makes no conclusions regarding GHG emissions.

For GHG calculations from internal combustion, emissions factors have been published by the EPA/Climate Registry (2008) and by the California Climate Action Registry (2009). For the planned construction period with the highest population and activity of construction equipment (Months 10 – 21), Table 1-4 lists the mass emission rates for each GHG constituent in metric tons (MT).

The GHGs other than CO_2 have a higher Global Warming Potential due to their molecular structure. This factor is accounted for when converting the raw ton/yr emission rates of the gases to the metric tons of carbon dioxide equivalent per year (CO_{2eq}/yr). For combustion-related species CH_4 and N_2O the Global Warming Potentials are 21 and 310, respectively, relative to CO_2. The resulting carbon equivalent GHG intensity for each constituent is reflected in the metric tons of carbon equivalent (CO_{2eq}/yr) shown in Table 1-4.

Table 1-4 Greenhouse Gas Emissions for the Construction Phase

Source or Activity	GHG Emission Rates – Peak Activity 12-Month Period[1]						
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	
	Metric tons / yr			As metric tons CO_{2eq} / yr			Total metric tons CO_{2eq} / yr
On-Site Vehicle/Construction Equipment Exhaust [2]	4,153	3.9	0.11	4,153	81.9	33.4	4,268
55 MMBtu Salt Melter [3]	9,480	0.15	0.02	9,480	3.15	6.2	9,489
20 MMBtu Salt Conditioning Heater [3]	63.0	0.02	0.002	63.0	0.42	0.62	64
ON-SITE CONSTRUCTION GHG EMISSIONS				13,696	86	40	13,822
Indirect, Off-Site Vehicle Exhaust [4]	3,003	0.17	0.077	3,003	3.6	23.8	3,308
Worker Commuting Vehicles [5]	9,180	0.27	0.14	9,180	5.7	42.1	9,228
OFF-SITE CONSTRUCTION GHG EMISSIONS				12,183	9.3	66	12,258

[1] The period with highest overall construction vehicle population and miles traveled is anticipated to be month 10-21.

[2] Category includes earthmoving equipment, stationary on-site equipment, and non-road construction vehicles. Emissions of GHG derived from emission factors published by the EPA/Climate Registry (2008) and California Climate Action Registry (2009).

[3] For gaseous fuel use, heater GHG emission factors from CARB Mandatory Reporting of GHG Emission (17 CCR Sec 95100-95133).

[4] Category construction related vehicles that may be on-road or off-road (e.g., contractor vehicles and delivery vehicles). Emissions of GHG derived from emission factors published by the EPA/Climate Registry (2008) and California Climate Action Registry (2009).

[4] Commuter vehicles GHG emission from URBEMIS Version 9.2.4 for the CO_2 and ratios for CH_4 and N_2O emissions were derived from California Climate Action Registry (2009) analysis for commuter vehicles for the operational phase of the Project.

1.2 Dry-Cooled Alternative - Operational Phase Air Emission Sources

During the operational phase of the Project there will be no routine air pollutant emissions associated with generation of electricity. The key parameters for each emission source category for the operational phase are summarized in Table 1-5.

Table 1-5 Operating Parameters Operational Phase Emission Source Equipment				
Unit	**Process Flow (gpm)**	**Horsepower**	**Annual Hours of Operation**[1]	**Principal Emission Control**[2]
100 MW Plant				
Plant Cooling Tower – Dry Cooling Option	Not Applicable		5,000	Negligible Emissions
Diesel Engine-Driven Emergency Generators (2)	---	4,023 per engine	50 per engine	EPA Tier 2 Certification
Diesel Engine-Driven Fire Water Pumps (2)	---	600 per engine	50 per engine	EPA Tier 3 Certification

[1] Annual hours of operation reflect anticipated during representative operating year for the plant.

[2] The principal means of add-on or design-based air pollution control to be utilized for the equipment which will meet or exceed underlying regulatory requirements.

1.2.1 Emergency Diesel Generator and Fire Water Pump Engines

The primary function of the emergency generators will be to provide relatively instantaneous backup power needed to redirect the heliostat field flux off the solar receiver during loss of liquid salt flow emergencies. The emergency generators are approximately 4,000 brake-horsepower (bhp) each and will be test run at least monthly to meet supplier guarantee, the NFPA and insurance carrier requirements on maintenance and testing.

Emissions estimates of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_2 from the new diesel-powered emergency generators and emergency fire pumps were based 50 hours of annual operation, and use of engines meeting the EPA Tier II and Tier III emission standards, respectively. This limited schedule is more stringent than would be required by federal rules. New (post-2006 model year) compression-ignition engines of this type are limited by federal new source performance standards (40 CFR Part 60, Subpart IIII) to 100 hours per year run time for normal readiness testing and maintenance.

1.2.2 Plant Operation Vehicle Traffic and Worker Commute

During normal operations several types of maintenance vehicles will travel through the Project area. These primarily consist of administration/maintenance worker vehicles, heliostat washing trucks, and material delivery trucks. While not involving as many workers as the construction phase, indirect emissions from commuter vehicles are also addressed in this analysis. The operating schedule assumed for the air emissions analysis is that operational vehicles are used 7 days/week, while maintenance, delivery, and administration staff vehicles are in use on-site 5 days/week. Similar to the construction phase emission estimates for working commuting vehicles, the on-road emissions from daily worker commute were estimated using the URBEMIS Version 9.2.4 program, with the default vehicle population profile, and travel mileages and ambient temperatures adjusted to reflect conditions for the Project locale.

1.2.3 Operational Phase Emission Inventory

Operational phase annual emission rate estimates are based on the maximum annual operating schedules for the Project equipment. The summary of annual emissions of criteria pollutants for the operational phase is shown in Table 1-6.

Table 1-6 Operational Phase Criteria Pollutant Emission Estimates

Source or Activity	**Maximum Annual Emissions with Controls[1] (lbs/project)**						
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**HAPs**
Plant Cooling Tower – Dry Cooling Option [2]	---	---	---	---	Negl.	Negl.	---
Diesel Engine-Driven Emergency Generators (2 units) [3]	2,348	2.3	190	46	13.8	13.8	21.6
Diesel Engine-Driven Fire Water Pumps (2 units) [3]	198	0.3	38.4	3.1	7.3	7.3	6.3
Plant Operational, Maintenance, Heliostat Washing Vehicles and Deliveries [4]	3,045	9	3,298	330	10,691	1,251	---
Worker Commute Vehicles [5]	312	5	2,873	73	426	128	---
Total Annual Operational Phase Emissions:							
Dry Cooling Option	5,903	17	6,399	452	11,138	1,400	28

[1] Controlled emissions based on the design and operating parameters in Table 4.10. The total annual emissions reflect a representative year of full plant operations. Generating plant to operate 5,000 hr/yr and 2,500 hr/yr for hybrid cooling. Emergency engines operate less than 50 hr/yr for readiness and testing/maintenance

[2] There are negligible emissions from dry cooling. The process involves ambient airflow across the dry surfaces of fin-tube heat exchanger banks.

[3] Emergency engines operate for less than one hour, on average, per week, for readiness testing and maintenance.

[4] Criteria pollutant emission factors obtained from candidate vendor estimates that are compliant with Tier II and Tier III internal combustion engine standards, and using ultra-low sulfur (<15 ppm sulfur) distillate no. 2 fuel. HAP emissions are based on 2001 Ventura County Air Pollution Control District emission factors.

[5] Worker commute vehicle calculations assume 5 day/week for operation and admin staff and 7 day/week for operation workers. Emissions and fuel economy data taken for 2005 or newer vehicles from EPA data.

For the dry-cooling option, air emissions are negligible and this option does not contribute to the Project emission inventory.

The emergency diesel engine emissions are based on 60 minutes of maintenance testing once every two weeks, and a total annual operation of 50 hours. The diesel driven fire pumps emissions are based on 30 minutes of weekly testing, and a total annual operation of 50 hours.

1.2.4 Operational Phase Greenhouse Gas Emissions

During plant operation, there will be no fuel combustion associated with the generation of electricity. This is a substantial advantage for the Project, as the carbon footprint per unit of generation is small. The operational phase stationary sources of GHGs, specifically CO_2, CH_4, and N_2O are the emergency generator engines and fire water pump engines. This analysis has also included direct and indirect mobile GHG emissions sources, including on-site maintenance and operational vehicles and worker commute travel. The di-electric insulating gas used in the electrical switchyard equipment is sulfur hexafluoride, which is also a GHG constituent. However, the small volume of incidental leakage of this gas represents a negligible GHG contribution for the Project. Project GHG emission estimates are presented for information purposes. As there are no established significance criteria, this analysis makes no conclusions regarding GHG emissions. Table 1-7 lists estimated GHG emissions for the operational phase.

Table 1-7 Greenhouse Gas Emissions for the Operational Phase

Source or Activity	GHG Emission Rates – Highest Anticipated Normal Operations 12-Month Period[1]						
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	
	MT / yr			As MT CO_2e / yr			Total MT CO_2e / yr
Diesel Engine-Driven Emergency Generators (2 units) [2]	216	0.17	0.034	216	3.6	10.5	230
Diesel Engine-Driven Fire Water Pumps (2 units) [2]	31.8	0.0013	0.00026	31.8	0.027	0.081	31.9
Plant Operational, Maintenance, Heliostat Washing Vehicles and Deliveries [3]	298	0.009	0.005	298	0.19	1.55	300
Worker Commute Vehicles [4]	338	0.01	0.005	338	0.21	1.55	340
Maximum Annual Operational Phase GHG Emissions	884	0.19	0.044	884	4.03	13.7	902

[1] Emissions of GHG derives for full-schedule operation of stationary and mobile sources associated with Project operations.

[2, 3] Fuel combustion GHG emission factors published by EPA/Climate Registry (2008) and California Climate Action Registry (2009).

[2] Category includes operation-related vehicles that may be on-road or off-road (e.g., maintenance, administration, heliostat washing vehicles and delivery vehicles).

[4] Commuter vehicles GHG emissions from URBEMIS Version 9.2.4 for the CO_2 and ratios for CH_4 and N_2O emissions derived from California Climate Action Registry (2009) analysis for commuter vehicles for the operational phase of the Project.

1.3 Summary of Project Air Emissions and Conformity Assessment

An overall summary of the Project air emissions during the construction and operational phases on the basis of highest 12-month period emission rates is provided in Table 1-8. These emission rates reflect the period of the highest planned construction activity (Months 10 – 21), and a representative, peak-operation year during the operational phase. Even with the conservative operating assumptions described for this equipment, the annual emissions are below both Prevention of Significant Deterioration and Title V major source thresholds (EPA 2008, 2010). As discussed in the following section, none of these emission rates present the likelihood of a significant impact with respect to air quality.

Table 1-8 Summary of Maximum Annual Project Criteria Emissions and Comparison with Conformity Thresholds

Source or Activity	Annual Maximum Emissions with Controls (tons/yr)				
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**
Construction Phase Emissions					
On-Site Construction Emissions	43.3	< 1	25.2	11.1	61.8
Indirect Off-Site Emissions	28.5	< 1	25.8	4.6	1.1
Worker Commuting Vehicles	0.96	Negl.	9.6	7.9	1.6
Salt Commissioning Emissions	9.7	1.4	7.1	0.9	0.7
Total 12-Month Construction Phase	82.5	<3.4	67.7	24.5	65.2
Operational Phase Emissions					
Stationary Plant Equipment (Dry Cooling)	1.27	0.0012	0.10	0.025	0.01
On-Site Vehicle Emissions	1.52	0.0045	1.65	0.16	5.3
Employee Commuting Vehicles	0.16	0.0025	1.44	0.036	0.21
Total 12-Month Operational Phase	2.9	0.0082	3.2	0.22	5.5
Arizona Department of Environmental Quality (ADEQ) Permitting Significance DeMinimis	**40**	**40**	**100**	**40**	**15**
General Conformity Thresholds (tons/yr)	**100**	**100**	**100**	**100**	**100**
Project Conforms?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Few of these criteria can be applied to the Project because the operational phase emission rates, which are the only emissions associated with the Project over the longer term, are far below both prevention of significant deterioration and similar significance thresholds for air quality impacts. This factor is recognized by ADEQ, in that an air quality permit is not generally required for new sources with criteria pollutant emissions that would be less than state permitting deminimis thresholds. However, certain types of sources, such as rotating machinery, may require a permit regardless of annual emission rate.

Consequently, it is reasonable to conclude that none of the significance criteria that pertain to the magnitude of criteria pollutant emissions, or to the modeled ambient concentration, increment consumption, or deposition effects, represent applicable significance criteria for the Project. Unlike conventional utility generation projects the proposed Project does not rely on combustion of fuels to produce electricity. The long-range significance criteria that usually arise for fuel combustion at generating facilities, namely visibility impacts, and pollutant concentration increases in Class I and Class II protected areas would not pertain to the Project.

The Project will not pose the possibility of causing or contributing to a violation of air quality standards, or result in a change in pollutant concentrations in a non-attainment area. Since the Project area is in a relatively undeveloped area of the state, it is outside the boundaries of the non-attainment areas associated with metropolitan Phoenix and surrounding developed areas. In accordance with the second step of the conformity determination process, the Project would not cause or contribute to any adverse change in air quality in a non-attainment or maintenance area. On this basis, the Project is formally exempt from a federal General Conformity determination.

However, a reasonable indicator of Significance for the Project is comparison of maximum 12-month period emissions for the Project to the annual emission rate trigger thresholds for General Conformity Analysis. Because these thresholds are applicable to major sources of air pollution to be located in non-attainment areas, they provide a very conservative analysis tool to assess the Significance of the Project that will be located in an attainment/unclassifiable area.

The Clean Air Act General Conformity Requirements for the NEPA process provide the following conformity review steps:

1. Determine whether criteria pollutants or their precursors would be emitted from the Project;
2. Determine whether emissions of criteria pollutants or precursors would occur in a non-attainment or maintenance area;
3. Determine whether the Project is exempt from conformity determination; and,
4. Estimate emissions and compare to the threshold emissions, and the emissions inventory in the non-attainment or maintenance area.

As presented in the section, there are emissions of criteria pollutants and precursors associated with the construction and operation of the Project. The ADEQ has designated all of La Paz County as being either in attainment or unclassifiable, with respect to the NAAQS.

As a conservative measure of Project significance or in the unlikely event that the La Paz County locale is designated a non-attainment or maintenance area, Table 1-8 summarizes the emission estimates for the construction and operational phases of the Project, each on a maximum emission rate, 12-month basis. As discussed in the preceding sections, direct Project emissions during the operational phase relate to periodic operation of the emergency equipment and Project cooling towers. Indirect emission sources include employee vehicle commute and third-party trips to the facility. The magnitude of these emissions are far below both the General Conformity, and the ADEQ air permitting de minimis thresholds, and thus do not present a likelihood of significant impacts. The facility will need to have an ADEQ Class II (Minor Source) air permit due to the categories of sources present, regardless of estimated actual emissions.

The construction phase emission inventory reflects the greatest potential for localized effects on air quality. However, even based on the conservative assumptions in this analysis, maximum 12-month emissions for the Project construction do not exceed the thresholds for a General Conformity analysis. Therefore, the magnitude of the emissions would not present a likelihood of significant impacts. In addition, construction emissions are transient in nature, and will move through the Project area during construction. Project construction will occur at less-intense levels during most of the construction timeframe, compared to the 12-month period addressed in this analysis. Consequently, air quality impacts that could occur due to construction would not affect the same location for a significant period of time.

2.0 Alternative 1- Hybrid-Cooled

It is reasonable to conclude that construction emissions will be nearly identical, within the conservative set of assumptions, for either of the Project cooling alternatives for the generation cycle (either dry cooling or a hybrid cooling system).

2.1 Operational Phase Sources

The key parameters for each emission source category for the operational phase are summarized Table 1-9. Of the two cooling options, only the hybrid cooling system would represent an air emission source. As discussed below, each option will have different air emission characteristics.

Table 1-9 Operating Parameters Operational Phase Emission Source Equipment

Unit	Process Flow (gpm)	Horsepower	Annual Hours of Operation[1]	Principal Emission Control[2]
100 MW Plant				
Plant Cooling Tower – Hybrid Option	36,691		2,500	Reduced flow and drift eliminators rated at 0.0005%
Diesel Engine-Driven Emergency Generators (2)	---	4,023 per engine	50 per engine	EPA Tier 2 Certification
Diesel Engine-Driven Fire Water Pumps (2)	---	600 per engine	50 per engine	EPA Tier 3 Certification

1 Annual hours of operation reflect anticipated during representative operation year for the plant.

2 The principal means of add-on or design-based air pollution control to be utilized for the equipment, which will meet or exceed underlying regulatory requirements.

2.1.1 Generation Cycle Cooling

The hybrid cooling system option consists of an air cooled condenser as well as a small water-cooled condenser. The water-cooled condenser will reject heat of condensation through a conventional cooling tower that cools the circulating water used in the power block to condense steam.

The hybrid cooling system option will be an emission source of fine particulate matter (PM_{10} and $PM_{2.5}$). Aerosol droplets that are released as plume drift from the water-cooled condenser tower will evaporate in the atmosphere, and the dissolved salts will precipitate to form fine particles. The operational phase inventory includes these cooling tower emissions for the hybrid cooling alternative. Based on current design estimates, the condenser cooling tower will have an approximate water circulation rate of 36,691 gpm for the hybrid case. The condenser cooling tower will be equipped with a mist elimination system rated at 0.0005% by weight efficiency. The PM_{10} and $PM_{2.5}$ emissions from the cooling tower were calculated based on the estimated total dissolved solids concentration in the groundwater. From historical solar data, it is estimated that the Project will not be operated for more than 5,000 hours per year. For the hybrid case, the cooling tower will not be operated for more than 50 percent of the total operating hours.

2.1.2 Emergency Diesel Generator and Fire Water Pump Engines

Effects associated with the operation of the emergency diesel generator and fire water pump engines for a hybrid-cooled solar plant, would be the same as the dry-cooled alternative.

2.1.3 Plant Operation Vehicle Traffic and Worker Commute

Effects of plant operation vehicle traffic for a hybrid-cooled solar plant would be the same as the dry-cooled alternative.

2.2 Operational Phase Emission Inventory

Operational phase annual emission rate estimates are based on the maximum annual operating schedules for the Project equipment listed in Table 1-9. The summary of annual emissions of criteria pollutants for the operational phase is shown in Table 1-10.

Table 1-10 Operational Phase Criteria Pollutant Emission Estimates: Hybrid-Cooled

Source or Activity	**Maximum Annual Emissions with Controls[1] (lbs/project)**						
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**HAPs**
Plant Cooling Tower – Hybrid Cooling System [2]	---	---	---	---	1,780	1,780	---
Diesel Engine-Driven Emergency Generators (2 units) [3]	2,348	2.3	190	46	13.8	13.8	21.6
Diesel Engine-Driven Fire Water Pumps (2 units) [3]	198	0.3	38.4	3.1	7.3	7.3	6.3
Plant Operational, Maintenance, Heliostat Washing Vehicles and Deliveries [4]	3,045	9	3,298	330	10,691	1,251	---
Worker Commute Vehicles [5]	312	5	2,873	73	426	128	---
Total Annual Operational Phase Emissions:							
Hybrid Cooling System Option	5,903	17	6,399	452	12,918	3,180	28

[1] The total annual emissions reflect a representative year of full plant operations. Generating plant to operate 5,000 hr/yr and 2,500 hr/yr for hybrid cooling. Emergency engines operate 50 hr/yr for readiness and testing/maintenance

[2] Particulate emissions based on 1,550 mg/L supply water, 5 cycles of concentration, drift rate 0.0005% of circulation rate, and cooling system operation for 50% of annual operating hours.

[3] Criteria pollutant emission factors obtained from candidate vendor estimates that are compliant with Tier II and Tier III internal combustion engine standards, and using ultra-low sulfur (<15 ppm sulfur) distillate no. 2 fuel. HAP emissions are based on 2001 Ventura County Air Pollution Control District emission factors.

Table 1-10 Operational Phase Criteria Pollutant Emission Estimates: Hybrid-Cooled	
Source or Activity	**Maximum Annual Emissions with Controls[1] (lbs/project)**
[4] Calculations include on-site road dust emissions and exhaust emissions for operation-related vehicles. Gaseous pollutant emission factors from 2007 emission factor database for calendar year 2013 vehicles. Fugitive dust on unpaved roads from EPA Document AP-42, Section 13.2.2 (11/2006). [5] Worker commute vehicle calculations assume 5 day/wk for operation and admin staff and 7 day/wk for operation workers. Emissions and fuel economy data taken for 2005 or newer vehicles from EPA data.	

For the hybrid cooling system option, aerosol drift release rate is based on the design water circulation rate in the water-cooled condenser tower of 36,691 gpm. The water-cooled condenser cooling tower will be equipped with a drift elimination system rated at 0.0005% by weight efficiency for either option. The PM_{10} and $PM_{2.5}$ emissions from the hybrid system cooling tower were calculated based on the estimated total dissolved solids concentration in the groundwater. From historical solar data, it is estimated that the Project will not be operated for more than 5,000 hours per year. For the hybrid case, the cooling tower will operate for up to 50% of the total generation plant operating hours.

The emergency diesel engine emissions are based on 60 minutes of maintenance testing once every two weeks, and a total annual operation of 50 hours. The diesel driven fire pumps emissions are based on 30 minutes of weekly testing, and a total annual operation of 50 hours.

2.3 Summary of Project Air Emissions and Conformity Assessment

The summary and conclusions of air emissions would be essentially the same as the dry-cooled option. The only difference would be the emissions for the cooling tower as shown in Table 1-11. For the hybrid-cooling alternative the generation cooling system would contribute less than one-ton of particulate emissions per year.

Table 1-11 Summary of Maximum Annual Project Criteria Emissions and Comparison with Conformity Thresholds: Hybrid-Cooled					
Source or Activity	**Annual Maximum Emissions with Controls (tons/yr)**				
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**
Construction Phase Emissions					
On-Site Construction Emissions	43.3	< 1	25.2	11.1	61.8
Indirect Off-Site Emissions	28.5	< 1	25.8	4.6	1.1
Worker Commuting Vehicles	0.96	Negl.	9.6	7.9	1.6
Salt Commissioning Emissions	9.7	1.4	7.1	0.9	0.7
Total 12-Month Construction Phase	82.5	<3.4	67.7	24.5	65.2

Table 1-11 Summary of Maximum Annual Project Criteria Emissions and Comparison with Conformity Thresholds: Hybrid-Cooled

Source or Activity	Annual Maximum Emissions with Controls (tons/yr)				
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**
Operational Phase Emissions					
Stationary Plant Equipment (Dry Cooling)	1.27	0.0012	0.10	0.025	0.90
On-Site Vehicle Emissions	1.52	0.0045	1.65	0.16	5.3
Employee Commuting Vehicles	0.16	0.0025	1.44	0.036	0.21
Total 12-Month Operational Phase	2.9	0.0082	3.2	0.22	6.4
ADEQ Permitting Significance DeMinimis	**40**	**40**	**100**	**40**	**15**
General Conformity Thresholds (tons/yr)	**100**	**100**	**100**	**100**	**100**
Project Conforms?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

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Appendix E

Mojave Fringe-toed Lizard Study Proposal

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Research Proposal: Status and ecology of the Mohave Fringe-toed Lizard (*Uma scoparia*) in the BouseDunes ecosystem, Arizona, focusing on the significance of peripheral sand-sheet habitat

Principal Investigator: Cecil Schwalbe, USGSSouthwestBiologicalScienceCenter, cecils@email.arizona.edu,cschwalbe@usgs.gov, 520-621-5508

Date: March 25, 2011

BACKGROUND

In Arizona this sand-dwelling lizard occurs only in a restricted area in La PazCounty south and east of the town of Parker. It is listed as Wildlife of Special Concern in Arizonaby the Arizona Game and Fish Department, a Species of Special Concern by California Department of Fish and Game, and as a Sensitive Species in Arizona and California by the Bureau of Land Management. Almost all ecological studies of this species have been conducted in California where most populations occur. In Arizona, the lizards are most conspicuous on aeolian dunes in the Cactus Plain, but despite very limited surveys are known to occur in the sand sheet habitats peripheral to the dunes that extend tens of kilometers to the south. However, little is known about the extent of use of these sand sheet habitats by this species or the importance of these “sand-sheet” lizards to the persistence of this species in Arizona.

The strong push for renewable energy in this country has greatly increased demand for Southwestern desert sites that are highly suitable for solar and wind energy production. The proposed area for the Quartzsite Solar Energy Project will encompass about 1400 acres, about 11 acres of which is sand dune, with most of the remainder on potential sand-sheet habitats for the Mohave Fringe-toed Lizard. The agencies have deemed the Quartzsite Project to be impacting the Dunes Wildlife Management Area and surrounding habitat although little is known of the relationship between the use of the habitat as a system by the Mohave Fringe-toed Lizard. This study plan was developed in order to develop a better understanding of the extent to which Mohave Fringe-toed Lizards occur in these sand-sheet habitats and the ecological importance of lizards in these extensive dune-periphery habitats to the regional persistence of the species.(i.e., to what extent do these “sand-sheet” lizardsreproduce and recruit into the general population?Are some of these peripheral populations possibly self-sustaining?).

Primary objectives of this study are to:

1. Determine the occupancy of sand sheet and dune habitats by *Uma scoparia*.

2. Determine the density of *Uma scoparia* in sand-sheet habitats compared to that on the dunes.

3. Determine home range sizes of lizards living on sand sheets compared to those on dunes.

4. Determine activity patterns of lizards living on sand sheets compared to those on dunes.

5. Investigate the demography (sex ratio, size class distributions) of lizards (to confirm reproduction and recruitment in sand sheet habitat) at selected sites.

6. Provide a base of knowledge from which BLM land managers can make informed management decisions for the dunes habitat management area.

METHODS

OCCUPANCY

The first step will be to acquire orthophotoquads or other remote imagery showing distribution and extent of the sand sheets in relation to dune habitat.Using remote imagery and field visits to the area will allow us to stratify habitats on the dunes and those contained within the sand sheets. Based on our knowledge of where we have seen fringe-toed lizards in that area in the past, we can start the stratification process as soon as the project is authorized and begin the lizard surveys on property within the Dunes Wildlife Management Area but outside the Quartzsite Project disturbance area during the next activity period for the lizards. We will establish a numbered grid (scale to be determined following stratification field visits) for the entire extent of the sand sheets and randomly select grids within each stratum to survey using occupancy, thus providing an area of inference of the entire gridded area. Grids will be surveyed on alternate days by each member of a two-person team for a total of at least four visits (i.e., two visits (one by each team member) on each of two trips). Efficacy of models based on covariates (such as depth of sand, vegetation cover, plant species, etc.) will be compared (MacKenzie et al. 2006).

DENSITIES

Densities of fringe-toed lizards, which are poorly known but may vary with sand qualities (Turner et al. 1984), will be estimated in sand sheet habitats using Line Distance Sampling (Buckland et al. 1993). The relatively flat sand sheet habitats are well suited for this method. Even though the number of lizards observed on a single transect may be small, the total number of transects that will be walked to cover the extensive sand sheets will provide a robust density estimate for lizards across that large area.Estimates of the proportion of lizards active on the surface [g(0)] both on dune and sand sheet habitats will be calculated using radio-telemetry. These estimates are necessary to calculate densities using line distance sampling. A removal method (such as Zippin 1958) may be used to estimated densities on the dunes if transects prove inadequate (as they did with *Uma rufopunctata* in the Mohawk Dunes in the 1990s; Turner and Schwalbe 1998).

HOME RANGE AND ACTIVITY

Home range sizes, which are little-studied but apparently small in fringe-toed lizards (Horchar 1992, Kaufman 1982, Turner and Schwalbe 1998), and activity patterns will be determined using radiotelemetry, visual surveys, and focal animal studies. Results will be used to quantify population density estimates and to understand sand-sheet habitat use by the species in the study region.

DEMOGRAPHY

A number of sites will be established within each stratum to gather demographic data in addition to the line distance density estimates, including sex ratio and size class distributions to determine the extent of reproduction according to habitat type.

PRODUCTS

Reports will provide a detailed evaluation of the importance of sand sheet environments to the Mohave Fringe-toed Lizard in study region. Annual progress reports will be provided to SolarReserve. A hard and electronic copy of the graduate student's master's thesis will be produced as the final project report, including maps of areas surveyed and demographic study sites, and an appendix containing all data collected (and not already reported in tables, figures, and text of the thesis). We will submit appropriate portions of the thesis to a peer reviewed journal such as the Journal of Herpetology or Journal of Wildlife Management.

TIME LINE

Actual Project Start Date will depend on how quickly cooperative agreements can be signed and funding moved to USGS and the University of Arizona. As soon as funding is in place here, we can begin assessing the extent of the sand sheets and dunes using remote sensing and site visits by the Principal Investigator, with the understanding that the extent of the dunes themselves is already well documented by BLM and the AGFD Heritage Data Base. I assume the graduate student will start taking classes spring semester 2012 and initiate field work with the lizards that spring, thus Years 1 and 2 of the project will run from January through December, 2012 and 2113, respectively. Field work will be conducted from April through September.

Annual progress reports: Due to SolarReserve October 15 each year. Thesis will be completed and defended by May 31, 2014. Manuscripts will be submitted for journal publication during 2014.

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Appendix F

Key Observation Point Worksheets

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Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

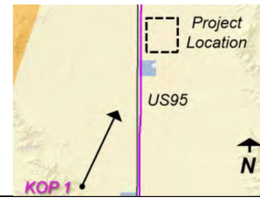
Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project
2. Key Observation Point
KOP-1 Access Road to Dome Rock Mountains
3. VRM Class
III

4. Location
Township T4N
Range R20W
Section 12

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG to MG : Flat with rolling terrain; rounded undulations BG: Rugged with numerous angular, rugged and bold mountain silhouettes, prominent	FG: Rounded and patchy, mottled BG: Amorphous	FG: None apparent BG: Weak geometric shapes
LINE	FG: Horizontal and undulating with digitate edges created by road cuts, curvilinear bands BG: Sweeping with strong horizon line and mountain silhouettes	FG: Irregular and vertical BG: some horizontal lines and edges along mountainous (bajada) terrain	FG: None apparent BG: Angular and geometric
COLOR	FG: Tans and browns with burnt sienna BG: Tans and browns with purple and blue hues caused by atmospheric/haze conditions	FG: Greens, olives, tans and browns BG: Dark greens and tans/browns	FG: None apparent BG: White, metallic, indescernable
TEX-TURE	FG: Relatively smooth; fine MG to BG: Fine to rough	FG: Medium and complex BG: Uniform and medium	FG: None apparent BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Simple geometric forms created by cut, fill, and/or roads	Simple geometric forms created by vegetation clearings	Vertical, tall, and ordered (tower) geometric, dense (array)
LINE	Weak edges created by cut, fill, and/or roads	Weak edges created by vegetation clearings for site elements or roads	Vertical, straight (tower) horizontal with subtle angles (array)
COLOR	Browns, tans, gray, burnt sienna, and red hues	Green and olive hues	Gray, tans, and reflective chroma
TEX-TURE	Smooth, regular	Patchy and random	Smooth, hard (tower) Moderate coarseness (array)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1\. DEGREE OF CONTRAST — FEATURES

ELEMENTS	LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form			X				X			X		
Line		X					X			X		
Color			X				X			X		
Texture				X			X				X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 11, 2010

KOP 1 – Access Road to Dome Rock Mountains, facing northeast

Moderate contrast would result from construction and operation of the proposed project within a naturalistic project setting designated as VRM Class III. The construction of the project would result in substantial grading and the clearing of vegetation, but the modifications to landform and vegetation would result in weak project contrast as seen from this KOP. The proposed project structures would be seen from KOP 1 at a distance of approximately 10 miles and would be seen from a slightly superior viewing position. From this viewing position, the receiver tower and associated powerblock components, heliostat arrays, support buildings, and transmission lines would be seen increasing the contrast in the structure's form, line and color (with the glow of the receiver being most prominent) Due to the horizontal nature of the heliostat array and distance from the proposed project, however, overall impacts would be decreased. Overall impacts will be moderate.

Refer to Appendix G, Figure S-1 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

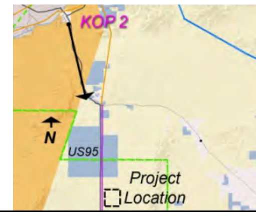
Date	**June 4, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project
2. Key Observation Point
KOP-2 La Paz County Regional Hospital
3. VRM Class
III

4. Location
Township T9N
Range R20W
Section 12

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Relatively flat to undulating (in mid-ground) BG: Jagged, bold mountain silhouettes	FG: Mottled, patchy BG: sparse, uniform	FG: Geometric, boxy, horizontal, vertical BG: none discernable
LINE	FG: Horizontal BG: Sweeping and horizontal with strong horizon line; irregular mountain silhouettes	FG: irregular BG: Irregular	FG: Straight, horizontal, vertical; thin BG: none discernable
COLOR	FG: Tans and browns BG: Red and dark browns; tans	FG: Greens, tans and browns BG: Dark greens and tans/browns	FG: Brown, metallic, tan BG: none discernable
TEX-TURE	FG: Relatively smooth , fine BG: Rugged, rough and complex	FG: Rough and patchy BG: Stippled and uniform	FG: Smooth BG: none discernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	None apparent	None apparent	Vertical, geometric
LINE	None apparent	None apparent	Vertical, straight
COLOR	None apparent	None apparent	Gray, reflective chroma
TEX-TURE	None apparent	None apparent	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form				X				X			X	
Line				X				X			X	
Color				X				X			X	
Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 2 – La Paz County Regional Hospital, facing southeast

Weak contrast would result from construction and operation of the proposed project as seen in the context of a semi-modified (due to the surrounding development and agricultural-related structures) project setting. The top of the receiver tower would be seen from KOP 2 at a distance of approximately 19 miles and would be seen from a slightly inferior viewing position with partial screening due to topography changes in the landscape between the viewer and the project, further reducing the overall perceived impacts. The tower would be partially skylined with the top portion being exposed over the edge of the La Posa Plain with the glow of the receiver being the most prominent feature from this view. Overall impacts are anticipated to be low.

Refer to Appendix G, Figure S-2 for simulation from this viewing location.

Form 8400-04
(September 1985)

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

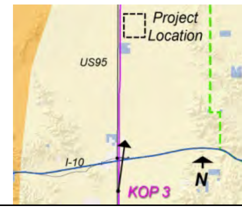
VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project
2. Key Observation Point
KOP-3 US 95, South of I-10
3. VRM Class
III

4. Location
Township T1N
Range R19W
Section 3

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Flat to subtle undulation BG: Flat with mountain silhouettes	FG: Short mounds; patchy BG: Amorphous	FG: Geometric, rectilinear BG: Complex square clusters; tall trapzoidal
LINE	FG: Horizontal and slightly undulating BG: Horizontal with mountainous profile	FG: Irregular edges BG: Horizontal banding	FG: Horizontal, vertical, and ordered with thin curving lines BG: Angular, vertical, ordered, and geometric
COLOR	FG: Tans and browns with gray BG: Red and browns with blue hues caused by atmospheric conditions	FG: Greens, olive, tan, yellow, and browns; green BG: Dark greens, and browns	FG: Brown, gray, tan, and metallic BG: Brown, gray and metallic. whites
TEX-TURE	FG: Relatively smooth BG: Smooth to rough for mountain shapes	FG: Rough, coarse BG: Smooth	FG: Smooth BG: complex and coarse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not discernable	Simple geometric forms created by vegetation clearings	Vertical, angular, and ordered (possibly focal)
LINE	Not discernable	Weak edges created by vegetation clearings for site elements or roads	Vertical, angular, and geometric
COLOR	Not discernable	Green and olive hues	Gray, tans, reflective chroma
TEX-TURE	Not discernable	Patchy	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST		LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
ELEMENTS	Form				X			X				X	
	Line				X			X				X	
	Color				X			X				X	
	Texture				X			X				X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley **Oct. 6, 2010**

KOP 3 – US 95, South of I-10, facing north

Weak contrast would result from construction and operation due to the proposed project being seen in the context of a modified naturalistic project setting designated as VRM Class III. The proposed project receiver tower would be seen from KOP 3 at a distance of approximately 16 miles and would be seen from a level viewing position with the primary view being of the proposed receiver tower. Changes in topography and natural vegetative help screen views to the project with views of landform changes not being discernable from this distance and viewing position. Overall impacts are anticipated to be low.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

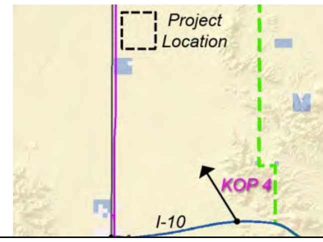
2. Key Observation Point
KOP-4 I-10 Westbound

3. VRM Class
III

4. Location

Township T4N
Range R18W
Section 22

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: flat to subtly rolling terrain/ undulating, sloping hills BG: Rugged with numerous angular, rugged mountain silhouettes, tall, steep	FG: Short to moderate height and complexity, patchy BG: Sparse	FG: Tall, thin, vertical BG: Small, boxy
LINE	FG: Horizontal and clearly defined BG: Angular with mountain silhouettes	FG: Irregular and random BG: some horizontal edges along mountainous terrain	FG: Horizontal, vertical, geometric, angular; straight BG: Angular, vertical, and geometric
COLOR	FG: Tans and browns with gray and dark brown BG: Brown colors with purple and blue hues caused by atmospheric conditions	FG: Greens, silver-green, tan, yellow, and browns BG: Dark greens and browns	FG: White, brown, and black BG: White, browns
TEX-TURE	FG: Fine BG: Rugged, rough and complex	FG: Rough and complex BG: Stippled and patchy	FG: Smooth BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Simple geometric forms created by cut, fill, and/or roads	Simple geometric forms created by vegetation clearings	Vertical, angular, tall, and ordered
LINE	Weak edges created by cut, fill, and/or roads (circular/angular)	Weak edges created by vegetation clearings for site elements or roads	Vertical, angular, and geometric
COLOR	Browns, tans, gray, burnt sienna, and red hues	Green and olive hues	Gray, flat metallic, and reflective chroma
TEX-TURE	Smooth, regular	Patchy and random	Smooth to rough (gradational)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form			X				X				X	
Line			X				X				X	
Color			X				X			X		
Texture			X				X				X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley **October 6, 2010**

KOP 4 – Facing northwest from westbound I-10

Weak/moderate contrast would result from construction and operation of the proposed project with naturalistic project setting designated as VRM Class III. The proposed project structures would be seen from KOP 4 at a distance of approximately 14 miles from a slightly superior viewing position with the dominant view being of the proposed receiver tower. Although the project itself would be within a naturalistic setting, westbound travelers along I-10 would have forward views of the town of Quartzsite with the tower and receiver being outside the normal cone of vision for travelers. The construction of the project would result in substantial grading and the clearing of vegetation with a weak contrast resulting from grading and vegetation removal. Due to the slightly elevated viewing position, the heliostat array and powerblock elements would be visible, but the array would be seen as a thin, dark line on the horizon in the context of the existing horizon line. The corona (color) from the receiver would provide the highest contrast. Overall impacts are anticipated to be low.

Refer to Appendix G, Figure S-3 for simulation from this viewing location.

Form 8400-04
(September 1985)

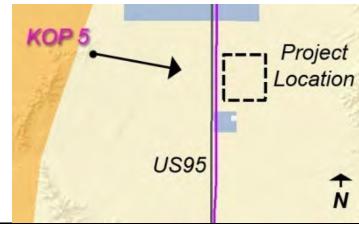
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**June 4, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
   Quartzsite Solar Energy Project
2. Key Observation Point
   KOP-5 Copper Peak
3. VRM Class
   III
4. Location
   Township T6N
   Range R20W
   Section 23
5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Flat to subtly undulating BG: Strong horizon line and bold mountain silhouettes	FG: Mottled; patchy; triangular BG: Low, horizontal	FG: Angular, vertical, geometric, cylindrical, and rectangular BG: None apparent
LINE	FG: Horizontal, striated BG: Jagged	FG: Horizontal bands BG: flowing edges; horizontal	FG: Vertical, horizontal, angular BG: None apparent
COLOR	FG: Tan, gray, and browns BG: Tan, brown, burnt and raw sienna	FG: Light and dark greens, tans, browns, grays, and olives BG: Green (various shades), olives; tan	FG: Tans and creams BG: None apparent
TEX-TURE	FG: Smooth to course (gradational) BG: fine (Plains) coarse and rugged (mountains)	FG: Course to smooth (gradational) BG: Smooth	FG: Smooth BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric forms from site grading	Geometric forms from vegetation clearings	Vertical, boxy, geometric (tower & powerblock) Horizontal, geometric; dense (array)
LINE	Straight edges created by site preparation work	Straight edges created from vegetation clearings	Vertical and straight (tower & powerblock) Horizontal, long, angular (array)
COLOR	Tan	Green to not apparent	Tans; gray with reflective chroma
TEX-TURE	Smooth	Patchy	Smooth (tower) Coarse (array)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST

	FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form		X				X				X		
Line		X				X			X			
Color			X				X			X		
Texture			X				X			X		

2. Does project design meet visual resource management objectives?
   ☒ Yes ☐ No
   (Explain on reverse side)
3. Additional mitigating measures recommended?
   ☐ Yes ☒ No
   (Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 11, 2010

KOP 5 – Copper Peak, facing east

Moderate contrast would result from construction and operation of the proposed project with naturalistic project setting designated as VRM Class III. The construction of the project would result in substantial grading and the clearing of vegetation with a moderate/weak contrast resulting from grading and vegetation removal. The proposed project structures would be seen from KOP 5 at a distance of approximately 7 miles and would be seen from a level viewing position. From this KOP, the receiver tower, powerblock, and heliostat array project elements would be unobstructed for any potential viewers with the corona from the receiver backdropped against the darker mountains. Overall impacts are anticipated to be moderate.

Refer to Appendix G, Figure S-4 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

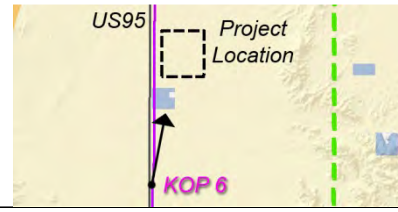
2. Key Observation Point
KOP-6 The Plomosa 14-day Camping Area

3. VRM Class
III

4. Location

Township T5N
Range R19W
Section 28

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Flat, subtly undulating BG: flat plains to rugged mountain silhouettes	FG: Globular, open; simple geometric shapes BG: Undulating, not very apparent	FG: Vertical and narrow, horizontal bands, and geometric (temporary RVs) BG: Geometric, sweeping
LINE	FG: Strong horizon BG: Layered mountainous silhouettes	FG: Undulating,, open edges BG: Horizontal bands of vegetation	FG: Vertical and angular, horizontal bands, ordered BG: Sweeping lines, minimal; rhythmic
COLOR	FG: Tans and browns with gray and burnt sienna BG: Red and brown colors with sienna hues and blue hues caused by atmospheric conditions	FG: Greens, muted olive tones, tan, yellow, and brown BG: Dark greens, and browns (not very apparent)	FG: Gray, flat, (tan/blue for RV) BG: Gray, brown, metallic
TEX-TURE	FG: Smooth BG: Rugged silhouettes	FG: Patchy; coarse and rough BG: Stippled, mottled	FG: Smooth BG: Smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not apparent	Not apparent	Vertical, cylindrical
LINE	Not apparent	Not apparent	Vertical, straight and bold
COLOR	Not apparent	Not apparent	Tan-gray; reflective chroma
TEX-TURE	Not apparent	Not apparent	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form				X				X		X		
Line				X				X		X		
Color				X				X		X		
Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 6 – The Plomosa 14-day Camping Area, facing north

Weak contrast would result from construction and operation of the proposed project with naturalistic project setting designated as VRM Class III. The grading and the clearing of vegetation associated with the project would not be visible from this location due to the changes in topography and vegetation screening. The proposed project structures would be seen from KOP 6 at a distance of approximately 6 miles and would be seen from a level viewing position with the dominant view being of the proposed receiver tower and the corona effect of the receiver. Overall impacts are anticipated to be moderate.

Refer to Appendix G, Figure S-5 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

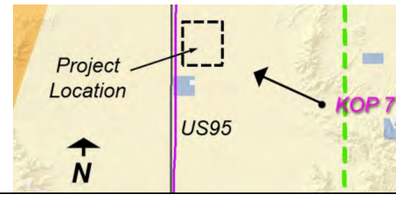
Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project
2. Key Observation Point
KOP-7 The Fisherman Intaglio cultural site
3. VRM Class
III

4. Location
Township T5N
Range R18W
Section 11

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Rolling terrain/ undulating, triangular, domed BG: rugged mountain silhouettes, scalloped, framed, complex	FG: Amorphic and patchy; mounded and triangular BG: Horizontal and amorphic with bold silhouettes	FG: Vertical, though minimal (fences) BG: None apparent
LINE	FG: Diagonal and curvilinear ; horizontal BG: Bold lines and edges (irregular)	FG: Undulating, low-lying patches; vertical, defined BG: Diffuse and horizontal edges	FG: Vertical and angular BG: Minimal
COLOR	FG: Tans and browns with gray BG: Red and browns with sienna hues; blue hues caused by atmospheric conditions	FG: Greens, olive, tan, yellow greens, yellows, and brown BG: Dark greens, and browns (not apparent)	FG: Brown BG: None apparent
TEX-TURE	FG: Medium to coarse; gradational BG: Rugged silhouettes	FG: Patchy and discontinuous BG: Stippled, dimpled	FG: Smooth BG: None apparent

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not visible	Not visible	Vertical, cylindrical
LINE	Not visible	Not visible	Vertical, straight and bold
COLOR	Not visible	Not visible	Gray, flat metallic, reflective chroma
TEX-TURE	Not visible	Not visible	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1\.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form				X				X		X		
Line				X				X			X	
Color				X				X		X		
Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) **October 6, 2010**

KOP 7 – Fisherman Intaglio, facing northwest

Weak contrast would result from construction and operation of the proposed project with naturalistic project setting designated as VRM Class III. The proposed project receiver tower would be seen from KOP 7 at a distance of approximately 7 miles and would be seen from a level viewing position with views of the proposed receiver tower and corona effect from the receiver. Changes in topography and natural vegetation will screen the view to the heliostat array and lower powerblock elements of the project. Overall impacts are anticipated to be low/moderate.

Refer to Appendix G, Figure S-6 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

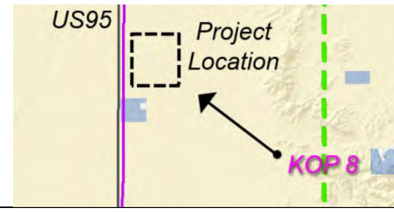
2. Key Observation Point
KOP-8 Roadside viewing location – Plomosa Backcountry Byway

3. VRM Class
III

4. Location

Township T5N
Range R18
Section 14

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Flat to rolling terrain/ undulating BG: Rugged with numerous angular, rugged and bold mountain silhouettes	FG: Low and patchy, mottled BG: Curving, low dense forms	FG: Horizontal BG: Weak geometric shapes
LINE	FG: Horizontal and undulating with butt edges created by road cuts, curvilinear bands BG: Sweeping with strong horizon line and mountain silhouettes	FG: Irregular and random, some bands in middleground BG: some horizontal lines and edges along mountain slopes; stippled	FG: Horizontal divergent bands BG: Weak angular lines
COLOR	FG: Tans and browns with gray and burnt sienna BG: Red and brown colors with purple and blue hues caused by atmospheric/haze conditions; light browns	FG: Greens, olives; tan, yellow, and browns; dark greens BG: Dark greens and tans/browns	FG: Gray, flat tone BG: White, metallic, indescernable
TEX-TURE	FG: Smooth to rough (gradational) BG: Rugged, rough and complex (layered)	FG: Rough and complex (patchy and sporadic) BG: Stippled and uniform	FG: Smooth BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Simple geometric forms created by cut, fill, and/or roads	Simple geometric forms created by vegetation clearings	Vertical, boxy, geometric (tower & powerblock) Horizontal, geometric; dense (array)
LINE	Weak edges created by cut, fill, and/or roads (circular/angular)	Weak edges created by vegetation clearings for site elements or roads	Vertical and straight (tower & powerblock) Horizontal, long, angular (array)
COLOR	Browns, tans, gray, burnt sienna, and red hues	Green and olive hues (not discernable)	Tans; gray; reflective chroma
TEX-TURE	Smooth, regular	Patchy and random	Smooth (tower) coarse (mirrors)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form			X				X			X		
Line			X				X			X		
Color			X				X		X			
Texture			X				X			X		

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 8 – Plomosa Backcountry Byway, facing northwest

Moderate contrast would result from construction and operation of the proposed project within a naturalistic project setting designated as VRM Class III. The construction of the project would result in substantial grading and the clearing of vegetation, but is unlikely that the contrast as a result of landform and vegetation modification would result in increased project contrast from this KOP due to undulations in topography and vegetation. The proposed project structures would be seen from KOP 8 at a distance of approximately 6 miles from a slightly superior viewing position. From this location, the receiver tower and associated powerblock components, heliostat array, and ancillary facilities would be seen, thus increasing the contrast in the structure's form, line, and color. Due to the horizontal nature of the heliostat array and distance from the viewer, however, the horizontality of the project would be seen in the context of the strong horizon line. Overall impacts will be moderate.

Refer to Appendix G, Figure S-13 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

2. Key Observation Point
KOP-9 SR 95 at Copperstone Mining Road

3. VRM Class
III

4. Location

Township T6N
Range R19W
Section 22

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Horizontal, flat; subtle undulation BG: Rugged with angular mountain terrain	FG: Mottled, low, amorphous BG: Indiscernible	FG: Tall, thin, boxy, vertical, and ordered BG: None apparent
LINE	FG: Strong horizontal line BG: Jagged and complex with angular mountain silhouettes	FG: Jagged, horizontal bands, diffuse BG: Not distinguishable	FG: Horizontal, vertical, angular, rhythmic and ordered; thin curving BG: None apparent
COLOR	FG: Tans and browns with red hues BG: Brown to dark brown colors with blue hues caused by atmospheric conditions	FG: Greens, olive, tan, yellow, and brown BG: Yellows, greens, and browns	FG: Brown, gray, and metallic BG: None apparent
TEX-TURE	FG: Smooth BG: Rugged, rough	FG: Sparse; coarse, random BG: Smooth to medium coarseness	FG: Smooth BG: None apparent

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric forms created by cut, fill, and/or roads	Geometric forms created by vegetation clearings	Geometric; cylindrical and boxy (tower) Low and dense (array)
LINE	Edges created by cut, fill, and/or roads	Edges created by vegetation clearings for site elements or roads	Straight, angular (powerblock) Straight, rhythmic (transmission lines)
COLOR	Browns, tans, burnt sienna, and red hues	Not visible	Grey, reflective chroma (tower) Gray and tans, flat metallic (array, lower powerblock, transmission lines)
TEX-TURE	Smooth	Patchy	Smooth (tower) Complex with moderate texture (array, lower powerblock, transmission lines)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form		X				X			X			
	Line		X				X			X			
	Color			X				X		X			
	Texture			X			X				X		

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 9 – SR 95 at Copperstone Mining Road, facing southeast

Strong contrast would result from construction and operation of the proposed project with naturalistic project setting designated as VRM Class III. The construction of the project would result in substantial grading and the clearing of vegetation with a moderate contrast as a result. The nearest proposed project structures would be seen from KOP 9 at a distance of approximately 4,700 feet with the receiver tower approximately 9,400 feet away from a level viewing position. In addition to the receiver tower and powerblock, project elements such as the heliostat array, intertie transmission poles would be dominant objects on the east side of SR 95. These project components would increase the project contrast as moderate sensitive viewers travel past the site, thus increasing impacts. Overall impacts are anticipated to be high.

Refer to Appendix G, Figure S-7 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

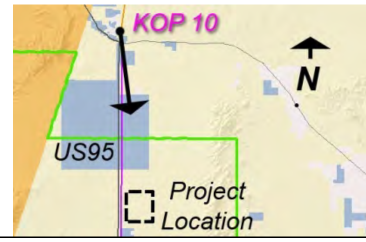
2. Key Observation Point
KOP-10 Entrance to WSA; SR 95 and SR 72 Junction

3. VRM Class
III

4. Location

Township T8N
Range R19W
Section 27

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Flat to subtle rolling undulating terrain BG: Rugged with angular, rugged mountain silhouettes	FG: Indistinct, amorphous, stippled BG: Low, mottled	FG: Vertical and angular, horizontal bands, geometric, and cylindrical BG: Geometric, divergent bands
LINE	FG: Undulating strong horizontal lines BG: Layered mountainous silhouettes	FG: Undulating, bands, and diffuse/digitate edges BG: Horizontal/curving bands of vegetation	FG: Vertical and angular, horizontal bands, ordered, geometric, rhythmic BG: Sweeping lines, bands
COLOR	FG: Tans and browns with gray BG: Browns with sienna hues and blue hues caused by atmospheric conditions	FG: Greens, olive, tan, yellow, and brown BG: Dark greens, and browns	FG: Gray, flat brown, white, black, metallic, ivory BG: Gray, brown, metallic
TEX-TURE	FG: Smooth BG: Rugged silhouettes	FG: Stippled, coarse BG: Smooth	FG: Smooth BG: Smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not apparent	Not apparent	Vertical and cylindrical (tower) ordered and horizontal (array)
LINE	Not apparent	Not apparent	Vertical, and bold (tower) Horizontal with angular elements, bold (array and lower powerblock elements, transmission lines)
COLOR	Not apparent	Not apparent	Gray, flat metallic, reflective chroma
TEX-TURE	Not apparent	Not apparent	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form				X				X		X		
Line				X				X			X	
Color				X				X		X		
Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) **October 6, 2010**

KOP 10 – Entrance to WSA at the SR 95 / SR 72 junction, facing south

Moderate contrast would result from construction and operation of the proposed project within a naturalistic project setting designated as VRM Class III. The proposed project structures would be seen from KOP 10 at a distance of approximately 10 miles from a level position relative to the viewer. Due to subtle changes in topography, it is unlikely that construction-related grading and vegetation clearing would be evident from this viewpoint. In this same respect, it is unlikely that the heliostat array or certain components of the powerblock or the administrative buildings would be visible from this KOP. The receiver tower would be visible in the middleground to background and would be skylined with the corona from the receiver being most evident. Overall impacts will be Low/moderate.

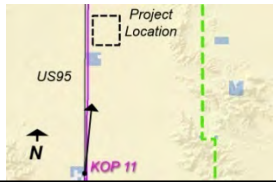
Form 8400-04
(September 1985)

Date
April 26, 2010
District **Yuma**
Resource Area **Yuma**
Activity (program) **Solar Facilities**

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name **Quartzsite Solar Energy Project**	4. Location	5. Location Sketch
2. Key Observation Point **KOP-11 North boundary of Quartzsite**	Township T4N	
3. VRM Class **III**	Range R19W	
	Section 16	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Subtle, rolling/undulating terrain BG: Rugged with numerous angular, rugged mountain silhouettes	FG: Undulating with simple geometric forms BG: Evenly distributed and undistinguishable	FG: Vertical, thin; boxy BG: Vertical, thin
LINE	FG: Horizontal and slightly undulating BG: Angular with pyramidal and mountainous silhouettes	FG: Indistinct edges BG: Clearly defined edges along mountainous terrain (bajadas)	FG: Vertical, thin curving lines; rhythmic BG: Angular, numerous vertical; short diagonals
COLOR	FG: Tans and browns with gray BG: Red and brown colors; blue hues caused by atmospheric conditions	FG: Greens, olive, tan, yellow, brown; gray-green, dark green BG: Dark greens, and browns (not apparent)	FG: Tan, browns, grays (w/ yellow) BG: Brown, gray, and metallic; note: blinking daytime light on the cell tower in the middleground)
TEX-TURE	FG: Relatively smooth BG: Rugged, rough	FG: Rough and patchy BG: Smooth, evenly distributed	FG: Smooth BG: Smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not apparent	Not apparent	Vertical, geometric
LINE	Not apparent	Not apparent	Vertical, straight, and angular
COLOR	Not apparent	Not apparent	Gray, flat metallic, reflective chroma
TEX-TURE	Not apparent	Not apparent	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST		LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
ELEMENTS	Form				X				X			X	
	Line				X				X			X	
	Color				X				X			X	
	Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date
Conrad Langley (EPG) **October 6, 2010**

KOP 11 – Quartzsite, facing north

Weak contrast would result from construction and operation of the proposed project as seen from a semi-modified (due to development of Quartzsite) project setting. Modifications to landform and vegetation would not be seen from this KOP as seen from a level viewing position due to changes to topography and vegetative screening. In this same respect, the heliostat array and intertie transmission lines and poles would not likely be seen from this viewing position. From this location, the receiver tower would be seen but repeats the form and line of other elements of the semi-modified setting. Color contrast as a result of the corona effect would be the most visible. Overall impacts are anticipated to be low.

Refer to Appendix G, Figure S-8 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

2. Key Observation Point
KOP-12 La Pera Elementary School

3. VRM Class
III

4. Location

Township T7N
Range R22W
Section 16

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Relatively flat BG: Jagged, bold mountain silhouettes, prominent	FG: Uniform geometric patterns (ag), bold, oval, dominant (trees) BG: Amorphous and mottled; sparse	FG: Geometric, ordered BG: Geometric and horizontal
LINE	FG: Horizontal BG: Sweeping and horizontal with strong horizon line; irregular mountain silhouettes	FG: Bold butt edges at where crops are planted BG: Some horizontal lines, not very apparent	FG: Vertical, ordered; rhythmic BG: Horizontal
COLOR	FG: Tans and browns with gray BG: Red and dark browns; tans	FG: Deep greens, tans, and browns BG: Dark greens and tans/browns	FG: Gray, metallic, brown, white BG: White, metallic, indescernable
TEX-TURE	FG: Relatively smooth , fine BG: Rugged, rough and complex	FG: Fine and smooth (ag) BG: Stippled and uniform	FG: Smooth, indiscernible BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No Views	No Views	Geometric, boxy
LINE	No Views	No Views	straight
COLOR	No Views	No Views	Gray, flat metallic, reflective chroma
TEX-TURE	No Views	No Views	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
ELEMENTS Form				X				X			X	
Line				X				X			X	
Color				X				X			X	
Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 12 – La Pera Elementary School, facing east

Weak contrast would result from construction and operation of the proposed project as seen from a semi-modified (as a result of agricultural development) project setting. Modifications to landform and vegetation due to the construction and operation of the project would not be seen from this KOP. The proposed receiver tower would be seen from KOP 12 at a distance of approximately 14 miles and would be seen from a slightly inferior viewing position with changes in topography screening the heliostat array and most powerblock elements. The tower receiver would be partially skylined with the top portion being exposed over the edge of the La Posa Plain with the corona from the receiver being most prominent. Overall impacts are anticipated to be low.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**June 4, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

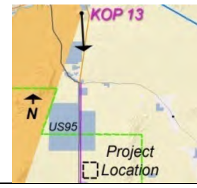
1. Project Name
Quartzsite Solar Energy Project

2. Key Observation Point
KOP-13 Communications site on Black Peak

3. VRM Class
III

4. Location
Township T9N
Range R19W
Section 14

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Rugged, rough, jagged MG to BG: Flat and horizontal	FG: Irregular, patchy MG to BG: Patchy, indistinct	FG: None MG to BG: Thin horizontal band
LINE	FG: Bold, angular, jagged MG to BG: Horizontal	FG: Indistinct MG to BG: Simple, undulating	FG: None MG to BG: Horizontal
COLOR	FG: Browns and dark browns MG to BG: Tan and beige	FG: Brown MG to BG: Greens and browns	FG: None MG to BG: Gray, metallic
TEX-TURE	FG: Rough MG to BG: Smooth	FG: Rough and patchy MG to BG: Smooth	FG: None MG to BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not discernable	Not discernable	Geometric, vertical, cylindrical
LINE	Not discernable	Not discernable	Vertical Straight (tower) horizontal and straight, bold (array)
COLOR	Not discernable	Not discernable	Flat gray; reflective chroma (receiver)
TEX-TURE	Not discernable	Not discernable	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST — FEATURES

ELEMENTS	Land/Water Body (1) Strong	Moderate	Weak	None	Vegetation (2) Strong	Moderate	Weak	None	Structures (3) Strong	Moderate	Weak	None
Form				X				X			X	
Line				X				X			X	
Color				X				X			X	
Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date
Conrad Langley (EPG) October 11, 2010

KOP 13 – Black Peak, facing south

Weak contrast would result from construction and operation of the proposed project within a naturalistic project setting designated as VRM Class III. The proposed project structures would be seen from KOP 13 at a distance of approximately 18 miles and would be seen from a superior viewing position. It is unlikely that the contrast to landform and vegetation modifications would result in project contrast from this KOP. Due to the location of the heliostat array in relation to the viewer, reflections from the heliostat mirrors may temporarily reflect glint from the sun or reflect the blue sky at certain times of day, thus increasing contrast at those times. From this viewing position, the receiver tower and corresponding powerblock elements, heliostat array, and ancillary facilities would be seen, but would be weak due to distance and atmospheric conditions. Corona from the receiver would be lessened as a result of the higher elevation. Overall impacts will be low.

Refer to Appendix G, Figure S-9 for simulation from this viewing location.

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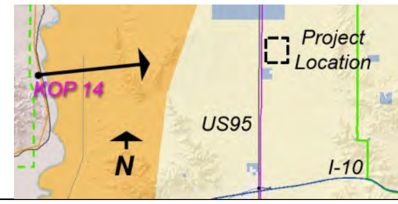
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
   Quartzsite Solar Energy Project
2. Key Observation Point
   KOP-14 Blythe Intaglios cultural site
3. VRM Class
   III
4. Location
   Township T4S
   Range R23E
   Section 26
5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Flat; small undulating hills BG: Rugged with angular mountain silhouettes, prominent	FG: Rounded, dense groupings; low dense groupings MG to BG: Geometric (ag); Amorphous and mottled	FG: Geometric, vertical, ordered BG: Geometric, boxy; rythmic
LINE	FG: Horizontal with edges created between foreground, middleground terrain (river) BG: Strong horizon line and bold mountain silhouettes	FG: Bold butt edges and bands where riparian vegetation meets natural MG to BG: Horizontal lines, butt edges	FG: Horizontal, vertical; ordered and rhythmic; thin and curving BG: Angular, horizontal, and geometric, ordered
COLOR	FG: Tans and browns with burnt sienna hues BG: Tans browns with blue hues caused by atmospheric/haze conditions	FG: Deep greens, tan, and brown; light greens and dark greens BG: Dark greens and tans/browns	FG: Gray, metallic, brown, white BG: White, indescernable
TEX-TURE	FG: Fine, smooth MG to BG: Smooth to rugged, rough and complex	FG: Coarse for larger veg; fine for smaller MG to BG: Stippled and uniform	FG: Smooth, fine MG to BG: Smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not visible	Not visible	Not discernable
LINE	Not visible	Not visible	Not discernable
COLOR	Not visible	Not visible	Gray, flat metallic; reflective chroma
TEX-TURE	Not visible	Not visible	Not discernable

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. FEATURES

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form				X				X				X
ELEMENTS: Line				X				X				X
ELEMENTS: Color				X				X			X	
ELEMENTS: Texture				X				X				X

2. Does project design meet visual resource management objectives?
   ☒ Yes ☐ No
   (Explain on reverse side)
3. Additional mitigating measures recommended?
   ☐ Yes ☒ No
   (Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 14 – Blythe Intaglios, facing east

Weak contrast would result from construction and operation of the proposed project as seen in the context of the semi-modified (due to the agricultural development of the Parker Valley) project area. The proposed project structures would most likely not been seen from KOP 14 (with the project at a distance of approximately 19 miles) with a level viewing position relative to the viewer. The Moon Mountains would block all views of the project with the only possible exception being the very top of the receiver tower and the associated corona from the receiver. Overall impacts are anticipated to be low.

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VISUAL CONTRAST RATING WORKSHEET

Date	**April 26, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

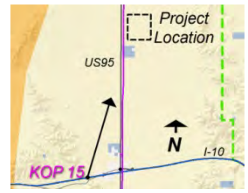
2. Key Observation Point
KOP-15 I-10 eastbound

3. VRM Class
III

4. Location

Township T4N
Range R20W
Section 30

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Flat to rolling terrain/ undulating, sloping BG: Rugged with numerous angular, rugged and bold mountain silhouettes, prominent	FG: Rounded, dense groupings and dispersed; low rounded forms BG: Low, even	FG: Horizontal, vertical; strong diagonals BG: Bold, diverse, numerous small square clusters; geometric
LINE	FG: Horizontal and undulating BG: Strong horizon line and mountain silhouettes	FG: Irregular and random; low rounded BG: Horizontal edges along mountainous (bajada) terrain	FG: Horizontal divergent bands, vertical, geometric, angular BG: Horizontal, vertical, and geometric
COLOR	FG: Tans and browns with gray BG: Red and brown colors with blue hues caused by atmospheric/haze conditions	FG: Greens, olive, tan, yellow, and brown BG: Dark greens and browns	FG: White, brown, yellow, gray, and black BG: White, brown, metallic, white, blue
TEX-TURE	FG: Smooth and fine BG: Rugged, rough and complex	FG: Rough and complex; coarse BG: Stippled and uniform; even	FG: Smooth MG to BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric forms created by cut, fill, and/or roads	Geometric forms created by vegetation clearings	Vertical, columnar, and ordered
LINE	Weak edges created by cut, fill, and/or roads (circular/angular)	Weak edges created by vegetation clearings for site elements or roads	Vertical (tower), horizontal (solar array); straight
COLOR	Browns, tans, gray, burnt sienna, and red hues	Greens and browns (not discernable)	Gray; reflective chroma
TEX-TURE	Smooth	Fine	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form			X				X				X	
Line			X				X				X	
Color				X				X			X	
Texture				X				X				X

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) **October 6, 2010**

KOP 15 – I-10 eastbound, facing northeast

Weak contrast would result from construction and operation of the proposed project as seen from a semi-modified project setting (due to the interstate highway and cultural modifications along the highway/town of Quartzsite). Form, line, color, and texture as a result of clearing of vegetation and landform will not be apparent from this viewing position due to the level viewing position and distance (approximately 13 miles). With the exception of the receiver tower and related corona, the proposed project structures would be predominantly obstructed due to topography as well as vegetative screening in the foreground. Portions of the heliostat array would be partially seen for short durations as travelers descend into the La Posa Plain from the Dome Rock Mountains. Overall impacts are anticipated to be low.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**June 4, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

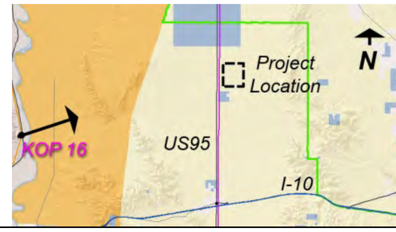
1. Project Name
Quartzsite Solar Energy Project

2. Key Observation Point
KOP-16 Cultural resource area next to Black Point

3. VRM Class
III

4. Location
Township T5S
Range R24E
Section 7

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Jagged, rocky outcrops transitioning abruptly to flat plains with snaking water feature MG to BG: flat to layered undulations	FG: Angular and low, geometric (ag); mounded and irregular (native) BG: Angular and geometric	FG: Vertical and thin; geometric BG: horizontal; boxy and modular
LINE	FG: Angular, jagged; straight, horizontal BG: Horizontal with jagged silhouettes and a strong horizon line	FG: Geometric with butt edges, ordered (ag); undulating and irregular (native) BG: Angular with butt edges, ordered (ag) rough, broken edges	FG: Vertical, horizontal; rhythmic, ordered BG: Horizontal; ordered
COLOR	FG: Tan, blue (water), burnt and raw sienna, and browns BG: Tan, burnt and raw sienna, and beige	FG: Light and dark greens; tans and browns, olive BG: Green, olive, tans; yellow-green	FG: Brown, metallic BG: Gray, brown, white
TEX-TURE	FG: Small rough patches with larger smooth areas (water and ag.) BG: Rough	FG: Smooth and fine (ag); patchy (native) MG to BG: Fine (ag); patchy (native)	FG: Smooth BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not Visible	Not Visible	Not apparent
LINE	Not Visible	Not Visible	Not apparent
COLOR	Not Visible	Not Visible	Flat gray with reflective chroma
TEX-TURE	Not Visible	Not Visible	Not apparent

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form				X				X				X
Line				X				X				X
Color				X				X			X	
Texture				X				X				X

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 16 – Black Point, facing east

Weak contrast would result from construction and operation of the proposed project as seen in the context of the semi-modified (due to the agricultural development of the Parker Valley) project area. The proposed heliostat array and powerblock structures are at a distance of approximately 19 miles and would not been seen from KOP 16. The Moon Mountains would block all views of the project with the exception being the very top of the receiver tower and the related corona from the reciever. Overall impacts are anticipated to be low.

Refer to Appendix G, Figure S-10 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**June 4, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

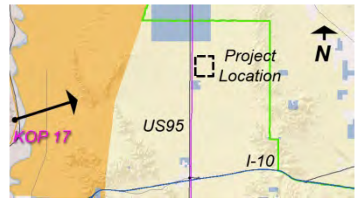
2. Key Observation Point
KOP-17 Big Maria Mountains

3. VRM Class
III

4. Location

Township T5N
Range R22W
Section 12

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Jagged, rocky outcrops transitioning abruptly to flat plains with snaking water feature MG to BG: flat to layered undulations	FG: Angular and low, geometric (ag); mounded and irregular (native) BG: Angular and geometric	FG: Vertical and thin; geometric BG: horizontal; boxy and modular
LINE	FG: Angular, jagged; straight, horizontal BG: Horizontal with jagged silhouettes and a strong horizon line	FG: Geometric with butt edges, ordered (ag); undulating and irregular (native) BG: Angular with butt edges, ordered (ag) rough, broken edges	FG: Vertical, horizontal; rhythmic, ordered BG: Horizontal; ordered
COLOR	FG: Tan, blue (water), burnt and raw sienna, and browns BG: Tan, burnt and raw sienna, and beige	FG: Light and dark greens; tans and browns, olive BG: Green, olive, tans; yellow-green	FG: Brown, metallic BG: Gray, brown, white
TEX-TURE	FG: Small rough patches with larger smooth areas (water and ag.) BG: Rough	FG: Smooth and fine (ag); patchy (native) MG to BG: Fine (ag); patchy (native)	FG: Smooth BG: Smooth, indescernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Not Visible	Not Visible	Vertical, boxy geometry
LINE	Not Visible	Not Visible	Vertical, regular
COLOR	Not Visible	Not Visible	Flat gray with reflective chroma
TEX-TURE	Not Visible	Not Visible	Not discernable

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. FEATURES

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form				X				X			X	
Line				X				X			X	
Color				X				X			X	
Texture				X				X				X

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 17 – Big Maria Mountains, facing east

Weak contrast would result from construction and operation of the proposed project as seen in the context of the semi-modified (due to the agricultural development of the Parker Valley) project area. The proposed heliostat array and shorter powerblock structures, at a distance of approximately 19 miles, would not been seen from KOP 17 with a level viewing position relative to the viewer. The Moon Mountains would block all views of the project with the exception being the very top of the receiver tower and associated corona from the receiver tower. Overall impacts are anticipated to be low.

Refer to Appendix G, Figure S-11 for simulation from this viewing location.

Form 8400-04
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	**June 4, 2010**
District	**Yuma**
Resource Area	**Yuma**
Activity (program)	**Solar Facilities**

SECTION A. PROJECT INFORMATION

1. Project Name
Quartzsite Solar Energy Project

2. Key Observation Point
KOP-18 Parker residence

3. VRM Class
III

4. Location

Township T9N
Range R20W
Section 12

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG: Relatively flat BG: Jagged, bold mountain silhouettes, prominent	FG: Mottled, patchy BG: sparse, uniform	FG: Geometric, boxy, horizontal, vertical BG: none discernable
LINE	FG: Horizontal BG: Sweeping and horizontal with strong horizon line; irregular mountain silhouettes	FG: irregular BG: Some horizontal lines, not very apparent	FG: Straight, horizontal, vertical; thin BG: none discernable
COLOR	FG: Tans and browns with gray BG: Red and dark browns; tans	FG: Greens, tans and browns BG: Dark greens and tans/browns	FG: Brown, metallic, tan BG: none discernable
TEX-TURE	FG: Relatively smooth , fine BG: Rugged, rough and complex	FG: Rough and patchy BG: Stippled and uniform	FG: Smooth BG: none discernable

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	None apparent	None apparent	Vertical, geometric
LINE	None apparent	None apparent	Vertical, straight
COLOR	None apparent	None apparent	Gray, reflective chroma
TEX-TURE	None apparent	None apparent	Smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form				X				X			X	
Line				X				X			X	
Color				X				X			X	
Texture				X				X			X	

2. Does project design meet visual resource management objectives?
☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No
(Explain on reverse side)

Evaluator's Names Date

Conrad Langley (EPG) October 6, 2010

KOP 18 – Parker residence, facing southeast

Weak contrast would result from construction and operation of the proposed project as seen in the context of a semi-modified (due to the surrounding development and agriculture-related structures) project setting. The top of the receiver tower would be seen from KOP 18 at a distance of approximately 19 miles and would be seen from a slightly inferior viewing position with partial screening, due to topography changes in the landscape between the viewer and the project, further reducing the overall perceived impacts. The tower would be partially skylined with the top portion being exposed over the edge of the La Posa Plain, with the glow of the receiver being the most prominent feature from this view. Overall impacts are anticipated to be low.

Appendix G

Visual Simulations

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Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	5:56 PM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33°42'19.53"N
Longitude:	114°16'24.47"W
Distance to Tower:	9.8 Miles

Existing Conditions from the Dome Rock Mountains

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-1

Viewpoint Location Map

Legend

Key Observation Point	**Surface Management**
Proposed Project Site	Bureau of Land Management
Interstate/U.S. Highway/State Route	Indian Reservation
Local Road	State Trust Land
Transmission Line	Private

Photograph Information

Time of photograph:	5:56 PM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33°42'19.53"N
Longitude:	114°16'24.47"W
Distance to Tower:	9.8 Miles

Simulation
from the Dome Rock Mountains
SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-1

Viewpoint Location Map

Legend

Key Observation Point		**Surface Management**	
Proposed Project Site		Bureau of Land Management	
City/Town		Indian Reservation	
Interstate/U.S. Highway/State Route		State Trust Land	
Local Road		Private	
Transmission Line			
State Boundary			

Photograph Information

Time of photograph:	9:18 AM
Date of photograph:	6-4-10
Weather condition:	Partly Cloudy
Viewing direction:	South
Latitude:	34° 8' 11.93"N
Longitude:	114° 16' 51.38"W
Distance to Tower:	21.6 Miles

Existing Conditions from the La Paz Regional Hospital

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-2

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line
- State Boundary

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	9:18 AM
Date of photograph:	6-4-10
Weather condition:	Partly Cloudy
Viewing direction:	South
Latitude:	34° 8' 11.93"N
Longitude:	114° 16' 51.38"W
Distance to Tower:	21.6 Miles

Simulation from the La Paz Regional Hospital

SolarReserve Project
Quartzsite, Arizona

July 2010

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Figure S-2

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	10:33 AM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	Northwest
Latitude:	33°40'45.62"N
Longitude:	114° 5'50.14"W
Distance to Tower:	11.9 Miles

Existing Conditions from Interstate 10-West Bound

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-3

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	10:33 AM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	Northwest
Latitude:	33°40'45.62"N
Longitude:	114° 5'50.14"W
Distance to Tower:	11.9 Miles

Simulation
from Interstate 10-West Bound
SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-3

Viewpoint Location Map

Legend

Key Observation Point

Proposed Project Site

Interstate/U.S. Highway/State Route

Local Road

Transmission Line

Surface Management

Bureau of Land Management

Indian Reservation

State Trust Land

Private

Photograph Information

Time of photograph: 2:51 PM
Date of photograph: 6-4-10
Weather condition: Clear
Viewing direction: East
Latitude: 33° 50' 47.10" N
Longitude: 114° 18' 29.88"W
Distance to Tower: 6.7 Miles

Existing Conditions from Copper Peak

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-4

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	2:51 PM
Date of photograph:	6-4-10
Weather condition:	Clear
Viewing direction:	East
Latitude:	33° 50' 47.10" N
Longitude:	114° 18' 29.88"W
Distance to Tower:	6.7 Miles

Simulation
from Copper Peak
SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-4

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:10 PM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	North
Latitude:	33°44'55.42"N
Longitude:	114°12'53.24"W
Distance to Tower:	5.8 Miles

Existing Conditions from Plomosa Camp

SolarReserve Project
Quartzsite, Arizona

July 2010

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Figure S-5

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:10 PM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	North
Latitude:	33°44'55.42"N
Longitude:	114°12'53.24"W
Distance to Tower:	5.8 Miles

Simulation from Plomosa Camp

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-5

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:44 PM
Date of photograph:	4-26-10
Weather condition:	Partly Cloudy
Viewing direction:	West
Latitude:	33°47'26.90"N
Longitude:	114° 5'39.95"W
Distance to Tower:	6.3 Miles

Existing Conditions from the Fisherman Intaglio

SolarReserve Project
Quartzsite, Arizona

July 2010

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Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:44 PM
Date of photograph:	4-26-10
Weather condition:	Partly Cloudy
Viewing direction:	West
Latitude:	33°47'26.90"N
Longitude:	114° 5'39.95"W
Distance to Tower:	6.3 Miles

Simulation
from the Fisherman Intaglio
SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-6

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	1:31 PM
Date of photograph:	4-26-10
Weather condition:	Partly Cloudy
Viewing direction:	Southeast
Latitude:	33°50'55.44"N
Longitude:	114°13'2.06"W
Distance to Tower:	1.8 Miles

Existing Conditions from State Route 95

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-7

Viewpoint Location Map

Legend

Key Observation Point	**Surface Management**
Proposed Project Site	Bureau of Land Management
Interstate/U.S. Highway/State Route	Indian Reservation
Local Road	State Trust Land
Transmission Line	Private

Photograph Information

Time of photograph:	1:31 PM
Date of photograph:	4-26-10
Weather condition:	Partly Cloudy
Viewing direction:	Southeast
Latitude:	33°50'55.44"N
Longitude:	114°13'2.06"W
Distance to Tower:	1.8 Miles

Simulation from State Route 95

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-7

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	11:25 AM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	North
Latitude:	33°41'22.52"N
Longitude:	114°13'0.39"W
Distance to Tower:	9.9 Miles

Existing Conditions from Quartzsite

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-8

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	11:25 AM
Date of photograph:	4-26-10
Weather condition:	Clear
Viewing direction:	North
Latitude:	33°41'22.52"N
Longitude:	114°13'0.39"W
Distance to Tower:	9.9 Miles

Simulation
from Quartzsite
SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-8

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line
- State Boundary

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	10:19 AM
Date of photograph:	6-4-10
Weather condition:	Partly Cloudy
Viewing direction:	South
Latitude:	34° 7' 28.70" N
Longitude:	114° 12' 41.36" W
Distance to Tower:	20.2 Miles

Existing Conditions from Black Peak

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Viewpoint Location Map

Legend

Key Observation Point

Proposed Project Site

City/Town

Interstate/U.S. Highway/State Route

Local Road

Transmission Line

State Boundary

Surface Management

Bureau of Land Management

Indian Reservation

State Trust Land

Private

Photograph Information

Time of photograph:	10:19 AM
Date of photograph:	6-4-10
Weather condition:	Partly Cloudy
Viewing direction:	South
Latitude:	34° 7' 28.70" N
Longitude:	114° 12' 41.36" W
Distance to Tower:	20.2 Miles

Simulation from Black Peak

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-9

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line
- State Boundary

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:15 PM
Date of photograph:	6-4-10
Weather condition:	Clear
Viewing direction:	East
Latitude:	33° 45' 13.88" N
Longitude:	114° 31' 8.97" W
Distance to Tower:	19.5 Miles

Existing Conditions from Black Point

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-10

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line
- State Boundary

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:15 PM
Date of photograph:	6-4-10
Weather condition:	Clear
Viewing direction:	East
Latitude:	33° 45' 13.88" N
Longitude:	114° 31' 8.97" W
Distance to Tower:	19.5 Miles

Simulation from Black Point

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-10

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line
- State Boundary

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:42 PM
Date of photograph:	6-4-10
Weather condition:	Clear
Viewing direction:	East
Latitude:	33° 45' 1.65" N
Longitude:	114° 31' 24.43" W
Distance to Tower:	19.8 Miles

Existing Conditions from Big Maria Mountains

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-11

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- City/Town
- Interstate/U.S. Highway/State Route
- Local Road
- Transmission Line
- State Boundary

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	12:42 PM
Date of photograph:	6-4-10
Weather condition:	Clear
Viewing direction:	East
Latitude:	33° 45' 1.65" N
Longitude:	114° 31' 24.43" W
Distance to Tower:	19.8 Miles

Simulation from Big Maria Mountains

SolarReserve Project
Quartzsite, Arizona

July 2010

DRAFT

Figure S-11

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S Highway/State Route
- Local Road
- Transmission Line

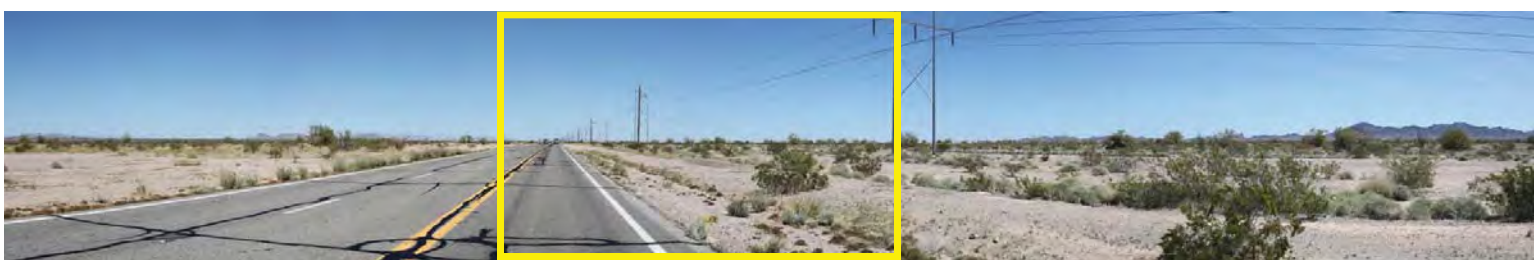
Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	11:49 AM
Date of photograph:	4-1-11
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33º48'59.31"N
Longitude:	114º13'00.26"W
Distance to Tower:	1.7 Miles

Note: refer to SR95c for composite panorama from this viewpoint.



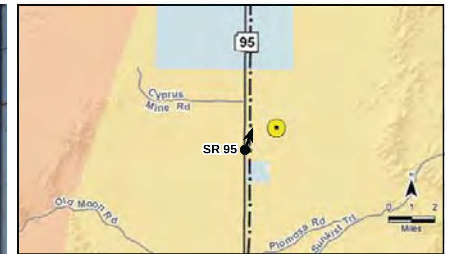
Existing Conditions from State Route 95

SolarReserve Project
Quartzsite, Arizona

April 2011

DRAFT

Figure S-12a



Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S Highway/State Route
- Local Road
- Transmission Line

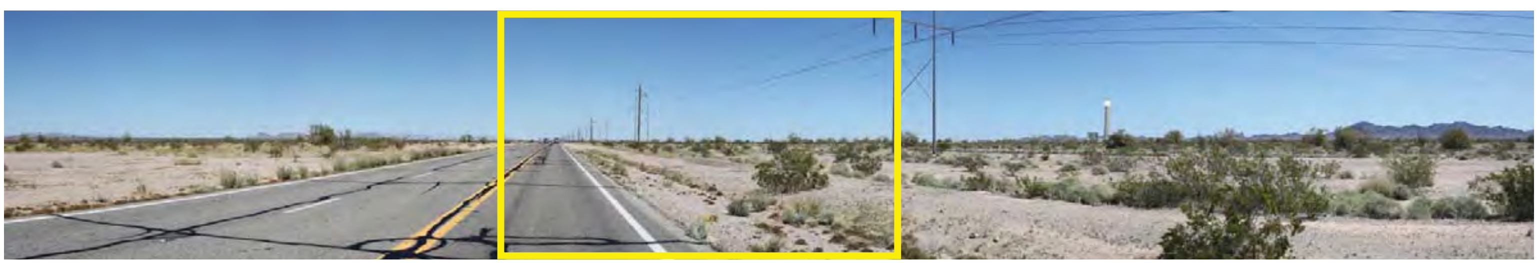
Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	11:49 AM
Date of photograph:	4-1-11
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33º48'59.31"N
Longitude:	114º13'00.26"W
Distance to Tower:	1.7 Miles

Note: refer to SR95c for composite panorama from this viewpoint.



Simulation
from State Route 95
SolarReserve Project
Quartzsite, Arizona

April 2011

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Figure S-12a

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	11:49 AM
Date of photograph:	4-1-11
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33º48'59.31"N
Longitude:	114º13'00.26"W
Distance to Tower:	1.7 Miles

Note: refer to SR95c for composite panorama from this viewpoint.

Existing Conditions
from State Route 95
SolarReserve Project
Quartzsite, Arizona

April 2011

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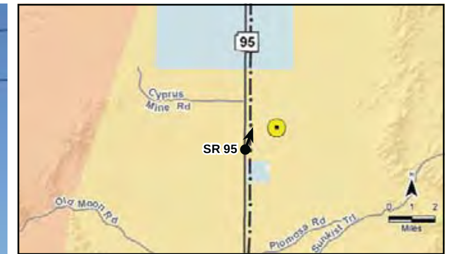
Figure S-12b



Viewpoint Location Map

Legend

Key Observation Point
Proposed Project Site
Interstate/U.S Highway/State Route
Local Road
Transmission Line

Surface Management

Bureau of Land Management
Indian Reservation
State Trust Land
Private

Photograph Information

Time of photograph:	11:49 AM
Date of photograph:	4-1-11
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33º48'59.31"N
Longitude:	114º13'00.26"W
Distance to Tower:	1.7 Miles

Note: refer to SR95c for composite panorama from this viewpoint.

Simulation from State Route 95

SolarReserve Project
Quartzsite, Arizona

April 2011

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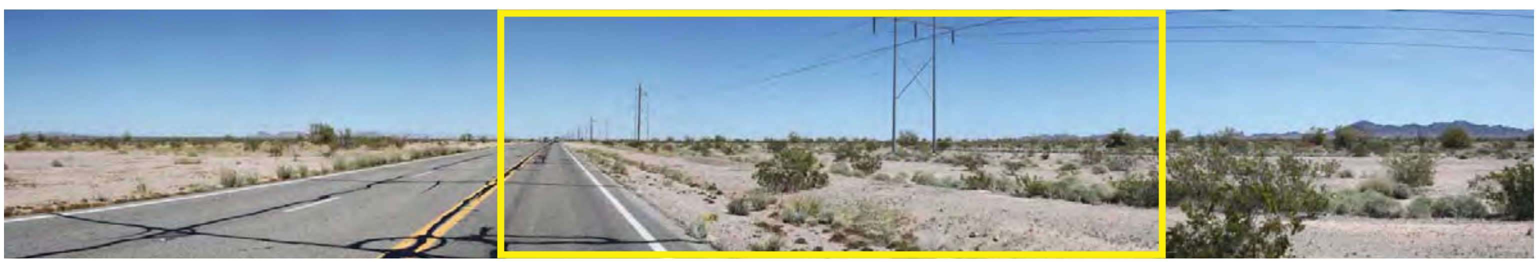
Figure S-12b

The panoramic image above was prepared using the simulations shown in Figures S12a and S12b preceding pages . This panoramic image portrays the context of the road and the proposed facilities though the perspective of the proposed solar facility is slightly skewed due to the wide field-of-view. The solar proposed facility as depicted in S12a and S12b more accurately represents how the typical viewer traveling along SR 95 would see the Project.



Existing Conditions
from State Route 95
SolarReserve Project
Quartzsite, Arizona

April 2011

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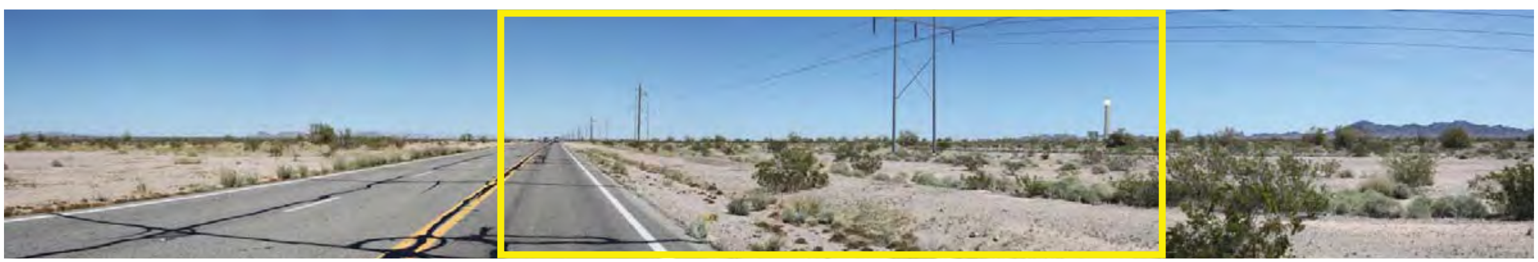
Figure S-12c

The panoramic image above was prepared using the simulations shown in Figures S12a and S12b preceding pages . This panoramic image portrays the context of the road and the proposed facilities though the perspective of the proposed solar facility is slightly skewed due to the wide field-of-view. The solar proposed facility as depicted in S12a and S12b more accurately represents how the typical viewer traveling along SR 95 would see the Project.



Simulation
from State Route 95
SolarReserve Project
Quartzsite, Arizona

April 2011

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Figure S-12c

Viewpoint Location Map

Legend

- Key Observation Point
- Proposed Project Site
- Interstate/U.S Highway/State Route
- Local Road
- Transmission Line

Surface Management

- Bureau of Land Management
- Indian Reservation
- State Trust Land
- Private

Photograph Information

Time of photograph:	9:41 AM
Date of photograph:	4-1-11
Weather condition:	Clear
Viewing direction:	Northwest
Latitude:	33º46'40.77"N
Longitude:	114º6'31.98"W
Distance to Tower:	6.1 Miles

Existing Conditions
from the Plomosa Bac Country
Byway Scenic Overloo
SolarReserve Project
Quartzsite, Arizona

April 2011

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Figure S-13

Viewpoint Location Map

Legend

Key Observation Point
Proposed Project Site
Interstate/U.S Highway/State Route
Local Road
Transmission Line

Surface Management

Bureau of Land Management
Indian Reservation
State Trust Land
Private

Photograph Information

Time of photograph:	9:41 AM
Date of photograph:	4-1-11
Weather condition:	Clear
Viewing direction:	Northwest
Latitude:	33º46'40.77"N
Longitude:	114º6'31.98"W
Distance to Tower:	6.1 Miles

Simulation
from the Plomosa Bac Country
Byway Scenic Overloo
SolarReserve Project
Quartzsite, Arizona

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Figure S-13