VOLUME 1

FINAL

ENVIRONMENTAL IMPACT STATEMENT

MOAPA SOLAR ENERGY CENTER

BUREAU OF INDIAN AFFAIRS
BUREAU OF LAND MANAGEMENT
ENVIRONMENTAL PROTECTION AGENCY
NATIONAL PARK SERVICE

On Behalf of:

THE MOAPA BAND OF PAIUTE INDIANS

FEBRUARY 2014

Volume 1

FINAL

ENVIRONMENTAL IMPACT STATEMENT

(FEIS)

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On Behalf of:

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ENVIRONMENTAL PROTECTION AGENCY
NATIONAL PARK SERVICE

February 2014

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Acronymns

Acronyms Used in the EIS

ADT	Annual Average Daily Traffic
ABPP	Avian and Bat Protection Plan
AC	Alternating current
ACC	Air-cooled Condenser
ACEC	Areas of Critical Environmental Concern
Ac-ft	Acre-feet
ADEIS	Administrative Draft Environmental Impact Statement
AFY	acre feet a year
APE	Area of Potential Effect
ASBCS	AREVA Solar Boiler Control System
ASME	American Society of Mechanical Engineers
APP	Avian Protection Plan
BADCT	Best Available Demonstrated Control
BEP	Boiler External Piping
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
Blvd.	Boulevard
BMPs	Best Management Practices
BOP	Balance of Plant
C & I	Control and Instrumentation
CAA	Clean Air Act
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CLFR	Compact Linear Fresnel Reflector (CLFR)
cm	centimeter
CO	Carbon monoxide
CO2e	CO2 equivalent
CPV	Concentrating Photovoltaic
CSI	Coyote Springs Investment
CSP	Concentrating solar power
CT	Census Tract
CWA	Clean Water Act
DAQEM	Department of Air Quality and Environmental Management
DEIS	Draft Environmental Impact Statement
DEMs	Digital Elevation Models
DOT	Department of Transportation
DWMA	Desert Wildlife Management Area

EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy Management Act
FTE	Full-time Equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
HA	Hydrographic Area
HMA	Herd Management Area
hp	Horsepower
I-15	Interstate 15
IBC	International Building Code
IECC	International Energy Conservation Code
IPCC	Intergovernmental Panel on Climate Change
IPP	Intermountain Power Project
ITA	Indian Trust Assets
JD	Jurisdictional determination
KOPs	Key Observation Points
K Road	K Road Moapa Solar LLC
kV	kilovolt
LADWP	Los Angeles Department of Water & Power
LEP	Limited English Proficiency
LOS	Level of Service
LWC	Lands with Wilderness Characteristics
m	meter
MBTA	Migratory Bird Treaty Act
mm	millimeter
MOA	Memorandum of Agreement
mph	miles per hour
MMT	Million Metric Tons
MSDS	Material Safety Data Sheet
MSEC	Moapa Solar Energy Center
MSHCP	Multiple Species Habitat Conservation Plan
MVWD	Meadow Valley Water District
MW	Megawatt
MWac	Megawatts of alternating current

NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAD	North American Datum
NCCAC	Nevada Climate Change Advisory Committee
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NNHP	Nevada Natural Heritage Program
NOA	Notice of Availability
NO2	Nitrogen dioxide
NOI	Notice of Intent
NOx	Nitrogen Oxide
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSR	New Source Review
NV	Nevada
O3	Ozone
O&M	Operations and Maintenance
OEM	Original Equipment Manufacturer
OHV	Off Highway Vehicle
OSHA	Occupational Safety and Health Administration
Pb	Lead
PBO	Programmatic Biological Opinion
PCEs	Primary Constituent Elements
PCS	Plant Control System
PM	Particulate Matter
PM10	Particulate Matter 10 microns or less
PM2.5	Particulate Matter 2.5 microns or less
PLC	Programmable Logic Controller
POD	Plan of Development
PPA	Power Purchase Agreement
PPE	Personal protective equipment
psi	Pound(s) per square inch
PV	Photovoltaic
PVC	Polyvinyl Chloride

RCRA	Resource Conservation Recovery Act
Reservation	Moapa River Reservation
RO	Reverse Osmosis
ROD	Record of Decision
ROW	Right(s) of Way
RPA	Remotely Piloted Aircraft Systems
RPS	Renewable Portfolio Standard
SCADA	Supervisory control and data acquisition
SCS	Solar Collector System
SHPO	State Historic Preservation Office
SIP	State implement plan
SMAs	Special Management Areas
SNWA	Southern Nevada Water Authority
SO2	Sulfur dioxide
SPCC	Spill Prevention, Control and Countermeasures Plan
SPGF	Solar Power Generation Facility
SRS	Solar Receiver System
SSG	Solar Steam Generator
STG	Steam Turbine Generator
SWIP	Southwest Intertie Project
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
TDS	Total Dissolved Solids
TES	Thermal Energy Storage
TERO	Tribal Employment Rights Ordinance
Travel Plaza	Moapa Travel Plaza
Tribe	Moapa Band of Paiute Indians
TSDF	Treatment, Storage and Disposal Facility
μm	micrometer
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
URTD	Upper Respiratory Tract Disease
U.S.	United States
USACE	United States Army Corps of Engineers
USCB	United State Census Bureau
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	United States Geological Survey
USTs	Underground storage tanks
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds

VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEAP	Worker Environmental Awareness Program
WSA	Wilderness Study Areas
°C	degrees Centigrade
°F	degrees Fahrenheit

Executive Summary

EXECUTIVE SUMMARY

The following sections summarize the Final Environmental Impact Statement (FEIS) for the Moapa Solar Energy Center (MSEC) Project. This information is provided as an overview for the public, but is not a substitute for review of the complete FEIS.

This executive summary provides a general overview of the Proposed Project and its purpose and need. It also briefly describes the Proposed Actions by the Bureau of Indian Affairs (BIA) as the lead agency and the U.S. Bureau of Land Management (BLM) as a cooperating agency who will both use this EIS to make their respective decisions. The Moapa Band of Paiutes (Tribe), U.S. Environmental Protection Agency (EPA), and the National Park Service (NPS) are also cooperating agencies on this EIS and the US Fish and Wildlife Service (USFWS) will also use this information to render their decision under Section 7 of the Endangered Species Act (ESA).This executive summary also outlines the Proposed Project and alternatives considered in this EIS as well as the environmental impacts that would occur if they were implemented.

Moapa Solar, LLC (The Applicant) has entered into an agreement with the Tribe to lease land, for up to 30 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing, operating, and maintaining the Moapa Solar Energy Center (MSEC or the Proposed Project), a solar power generation facility (SPGF) with associated infrastructure. The Proposed Project would generate electricity using photovoltaic (PV) technology and would generate up to 200 megawatts (MW).

The Tribe is federally recognized and has a Constitution approved by the Secretary of the Interior on April 17, 1942. The tribal lands originally set aside in 1874 consisted of two million acres, but in 1876 it was reduced to a thousand acres. In December 1980, Congress added approximately 70,000 acres to the Tribal land base. The stated purpose of the restoration of these Tribal lands was to provide economic development opportunities. The current total land base is 71,954 acres and is held in trust by the U.S. government for the Tribe.

ES.1 INTRODUCTION

The Proposed Project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada (**Figure ES-1**). The proposed solar site and an associated water pipeline would be located on wholly on the Reservation. The proposed 230 kV and 500 kV generation interconnection (gen-tie) lines and an access road would be located on Federal lands administered by the BLM and Reservation lands south of the Reservation. The Proposed Project would impact resources on approximately 900 acres of land within the

Reservation and up to 81 acres of BLM-administered land for associated rights-of-way (ROWs). **Figure ES-2** shows the locations of the components of the Proposed Project.

The Proposed Project requires approval by the Bureau of Indian Affairs (BIA). Pursuant to 25 U.S.C. §415 (69 Stat. 539) and 25 U.S.C. § 323-328 (62 Stat. 17), the BIA must approve the solar energy ground lease (approximately 850 acres) and associated ROW grants for the gen-tie lines, water pipeline, and access road on Reservation land between the Tribe and Applicant (BIA's Proposed Action).

The BLM Proposed Action includes BLM approval of the ROW grants under Title V of the Federal Land Policy Management Act (FLPMA) to construct, operate, maintain and terminate the proposed gen-tie lines and access road pursuant to 43 CFR 2800 for the transmission lines and access road on federal lands managed by BLM (also part of BLM ROW application N-88870). The transmission lines would include a 230 kV line crossing about 7.2 miles of BLM land from the Project site to the Harry Allen substation and a 500 kV line that would cross about 0.4 miles of BLM land to the Crystal substation. The proposed access road would cross about 2.4 miles of BLM-administered land connecting the Project site to the I-15 frontage road. The proposed Project ROWs are shown on **Figure ES-2**.

BLM must respond to the Applicant's application under Title V of the FLPMA (43 U.S.C. 1761(a)) for ROW grants to construct, operate, maintain, and decommission electric transmission line(s), water pipeline, and access road ROWs on BLM-administered land and Reservation land (BLM ROW application N-88870). These ROWs would be in compliance with FLPMA, BLM ROW regulations, and other applicable federal law (BLM Proposed Action).

Table ES-1
Summary of Agency Proposed Actions

Agency	Action
BIA	Approval of Solar Energy Ground Lease
	Approval of 230kV and 500kV gen-tie lines, water pipeline, and access road ROWs on the Reservation.
BLM	Approval of the water pipeline and gen-tie line ROW within the utility corridor on Reservation
	Approval of ROWs for the access road, 230kV and 500kV gen-tie lines on BLM lands
Tribe	Approval of 230 and 500kV transmission lines and water pipeline ROWs on the Reservation.

A portion of the water pipeline (approximately 4.7 miles) and a portion of the 500 kV line (approximately 1.0 mile) would lie partially within the existing utility corridor managed by BLM but located on the Reservation. This portion of the utility corridor on Reservation land is administered by the BLM in accordance with P.L. 96-491 (the Moapa Utility Corridor and the Moapa Act) and reserved to the BLM under Public Law 96-491-Dec. 2, 1980.

ES.2 PURPOSE AND NEED

The Applicant proposes to construct, operate, and maintain the Moapa Solar Energy Center, a solar generating facility and associated infrastructure (the Proposed Project). **Figure ES-1** shows the Project location. The Proposed Project would generate electricity using PV technology and would generate up 200 megawatts (MW) of energy.

The primary need for the Proposed Project is to create economic development opportunity for the Tribe as well as provide lease income as a long-term economically viable revenue source, create new jobs and employment opportunities for Tribal members, and develop sustainable renewable resources. Additionally, the Proposed Project would also assist the Federal government, the state of Nevada and neighboring states meet their renewable energy goals by providing clean renewable electricity generation from the Tribe's solar resources that can be efficiently connected to the regional grid in a way that minimizes environmental impacts.

The Reservation was selected as the location of the Proposed Project due to its solar resource, the availability of suitable land, transmission accessibility, and absence of land use constraints (i.e., Desert Wildlife Management Areas [DWMAs], Areas of Critical Environmental Concern [ACECs], designated Wilderness Areas, Wilderness Study Areas [WSAs], Land with Wilderness Characteristics [LWC] and other restrictive land use designations).

The site of the Proposed Project would minimize environmental impacts, infrastructure needs, and costs by being located near existing infrastructure, and contribute to the local economy by creating employment opportunities, generating lease income for the Tribe, and encouraging expenditures in local businesses.

The Proposed Project would also help meet the goals of the Federal Government to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies. Renewable energy produced by the Proposed Project would help reduce the need for fossil-fuel electric generating facilities including those currently affecting the Reservation which would contribute to the reduction of GHG emissions.

ES.3 PUBLIC INVOLVEMENT

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Proposed Project in the Federal Register (FR Doc. 2012–19078) on August 6, 2012. The NOI announced a period for public scoping of alternatives, issues, impacts, and planning criteria. The BIA announced the Proposed Project and scoping process through various means including public notices/news releasespublished in local newspapers, on the project website (http://www.moapasolarenergycentereis.com/), and in letters mailed to interested stakeholders. In addition, two public scoping meetings were held for the Proposed Project - one on the Reservation on August 21, 2012 with 40 attendees, and the other at the BLM offices located in Las Vegas, Nevada on August 22, 2012 with 29 attendees.

The key issues were identified by interested stakeholders and members of the public during scoping for the Proposed Project and include:

- Viable alternatives to the Proposed Project
- Potential impacts to desert tortoise and other sensitive species
- Potential impacts to vegetation and rare plant species
- Socioeconomic impacts to tribal members and the regional economy
- Impacts to air quality and climate change
- Impacts to water resources including the use of groundwater and ephemeral drainages
- Visibility of the project from the Old Spanish National Historic Trail
- Impacts to Air Quality as a result of construction and operations
- Impacts from cumulative projects in the vicinity of the Proposed Project

The BIA published a Notice of Availability (NOA) announcing the publication of the DEIS for the Proposed Project in the *Federal Register* on September 13, 2013. Two amended notices were published in the *Federal Register* extending the public comment period for the Draft EIS to December 10, 2013 - one on Friday October 25, 2013 and a second one (in order to amend/correct the October 25th notice) on Friday November 1, 2013. In addition, notices were placed in local newspapers and two public meetings were held to receive comments on the DEIS for the Proposed Project - one on the Reservation on September 25, 2013, and the other at the BLM offices located in Las Vegas, Nevada on September 26, 2013.

ES.4 ALTERNATIVES

This document analyzes four project alternatives plus the No Action Alternative. This document also discusses alternatives that were considered but eliminated from further consideration. The Proposed Project is the Proposed Action. The alternatives are described in detail in Chapter 2 and are summarized below.

The Proposed Project

The proposed MSEC Project would consist of a SPGF, gen-tie lines that would interconnect the Project to the regional electrical transmission grid, a water pipeline, and an access road between the SPGF and a frontage road along the west side of Interstate 15 (I-15). The SPGF and water pipeline would be located entirely on lands within the Moapa River Indian Reservation, the gen-tie lines would be located on both Reservation and BLM-administered lands, and the proposed access road would be located on BLM-administered lands. The SPGF would be developed using PV technology and would generate up to 200 Megawatts (MWs) of energy. The Project would be located on an 850-acre site, and while partial blading would be conducted as necessary, it is assumed that development would disturb up to the entire site.

CSP Project Alternative – AREVA Technology

CSP technology focuses sunlight to receivers where the heat is used to produce steam that creates electricity via a conventional steam turbine generator. The primary components of a CSP project include:

- Solar Field containing mirrors that concentrate sunlight onto solar receivers to create steam.
- Steam Turbine Generator (STG) that converts the thermal energy of the steam to electrical energy for delivery to the grid.
- Thermal Energy Storage (TES) system.
- Plant control system that coordinates the functions of the CSP project components.

The CSP technology being proposed for this alternative is the AREVA CSP technology which utilizes the Compact Linear Fresnel Reflector (CLFR) system. Rows of solar reflectors focus sunlight onto boiler tubes located in a linear receiver supported on towers approximately 80 feet above the reflector field. This CSP alternative is expected to disturb the entire 850-acre site.

eSolar CSP Technology Alternative

In this alternative, instead of the AREVA CSP technology proposed to be for the CSP Project, the eSolar CSP technology and solar field would be used. The eSolar CSP power technology uses many small, flat heliostats focused to reflect sunlight onto receivers mounted on towers. The receivers are essentially traditional high-efficiency boilers that generate steam and provide it to a conventional steam turbine power block. The eSolar design is modular, currently with a standard plant size of 46 MW composed of 12 receivers and two subfields of heliostats per receiver. The MSEC Project would include three of these modules, with 36 receivers, for a total size of 138 MW on the 850-acre site.

Dry-Cooling Alternative

This alternative was developed to respond to concerns expressed during public and agency scoping about consumptive water use by the CSP technologies being considered for the Proposed Project. Under this alternative, either of the CSP alternatives described above would be constructed using a dry-cooling technology rather than the wet-cooling technology proposed. Dry-cooling uses approximately 90 percent less water than wet-cooling so this alternative would require approximately 60 to 80 AFY for operations. This water would be supplied by the Tribe from the same well and pipeline as the Proposed Action.

Except for the water use described above, this alternative would be the generally the same as that described for the CSP alternatives.

Access Route Alternative

An alternative access road route to connect the SPGF to the existing paved frontage road adjacent to I-15 was developed. This alternative site access road would follow the same existing road on BLM-administered lands from the frontage road for approximately 0.8 miles until it reaches an existing transmission line access road which it would follow approximately 1.15 miles north onto Reservation lands to a point where it would turn due west to the SPGF site. This road would be approximately 2.1 miles long.

This access road would be constructed to the same standards as the proposed access road with an approximately 24-foot wide gravel surface, with shoulders and drainage swales on either side. Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained by the Project. This alternative would also be constructed on both BLM-administered and Reservation lands.

The No Action Alternative

Under NEPA, the BIA and cooperating agencies must consider an alternative that assesses the impacts that would occur if the Proposed Project were not constructed and the lease agreement and ROWs were not approved. The No Action Alternative assumes that the lease agreement is denied, the BLM utility ROWs are not issued, and the solar project is not built. Under the No Action Alternative the purpose and need of the project would not be met-the Tribe would not benefit economically from the energy production that can be obtained from their prime solar resources and the development of sustainable renewable resources would not occur. The Federal government, state of Nevada, and neighboring states would not be assisted in their effort to meet their renewable energy goals from the Tribe's solar resources.

ES.5 ENVIRONMENTAL CONSEQUENCES AND MITIGATION

The environmental consequences of the alternatives analyzed within the FEIS are summarized in **Table ES-2**. Mitigation measures have been identified where feasible and practical to address specific effects regardless of whether they are considered significant. Resource protection measures identified in the planning and design process have been incorporated into the project description. In addition, mitigation measures have been identified to address specific effects identified during the preparation of the DEIS and additional measures were added during preparation of the FEIS in response comments.

Table ES-2 provides a side-by-side comparison of the environmental impacts of constructing, operating, maintaining, and decommissioning the solar facility as analyzed in the Proposed Project, four Alternatives, and the No Action Alternative.

Table ES-2 Comparison of Alternatives							
Resource	**Proposed Project**	**CSP Project Alternative AREVA Technology**	**eSolar CSP Technology Alternative**	**Dry Cooling Alternative**	**Access Route Alternative**	**No Action Alternative**	**Mitigation**
Climate	Short term direct and indirect impacts with contribution of NO_x and VOCs during construction; long term benefits in reduction of GHG due to non-fossil fuel energy generation.	Similar to Proposed Project but greater construction impacts from longer construction period	Same as CSP alternative using AREVA technology	Similar to Proposed Project but greater construction impacts from longer construction period	Same as Proposed Project	No direct or indirect effects to climate or emissions of GHGs. No long term benefit of GHG reduction	See air quality
Topography	Limited grading. No direct, indirect or cumulative impacts	Similar to Proposed Project but would grade the entire site	Similar to Proposed Project but would grade the entire site	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	No mitigation recommendations
Geology	No direct, indirect or cumulative impacts	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	No mitigation recommendations
Soils	Short-term and potentially long-term direct and indirect impacts from clearing of vegetation, grading, increased erosion and compaction	Similar to Proposed Project but would grade the entire site	Similar to Proposed Project but would grade the entire site	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	Site Restoration and Revegetation Plan; Stormwater Pollution Prevention Plan (SWPPP)
Water Resources (surface)	Short-term direct effects for contamination during construction and operations; Short and long-term effects to downstream flooding and sedimentation during high rain events.	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	Emergency response plan and Spill Prevention Control and Countermeasure Plan (SPCC), SWPPP, maintenance of existing drainage patterns, erosion control measures.

Table ES-2
Comparison of Alternatives

Resource	Proposed Project	CSP Project Alternative AREVA Technology	eSolar CSP Technology Alternative	Dry Cooling Alternative	Access Route Alternative	No Action Alternative	Mitigation
Water Resources (ground)	No direct impacts to ground water. Withdrawal of 30 AFY of groundwater would have minor impacts to groundwater levels and spring flows.	Withdrawal of up to 800 AFY of groundwater would have more but still minor impacts to groundwater levels and spring flows than Proposed Project.	Same as CSP alternative using AREVA technology	Similar to the Proposed Project. Withdrawal of 60 to 80 AFY of groundwater would have minor impacts to groundwater levels and spring flows.	Same as Proposed Project	No direct, indirect or cumulative impacts	No recommendations
Air Quality	Short-term direct and indirect effects as a result of fugitive dust and vehicle/generator emission during construction. Long-term and cumulative benefits by offsetting emissions from fossil fuel energy generation. Cumulative short-term impacts if multiple projects are constructed simultaneously.	Construction impacts similar to Proposed Project. PM_{10} emissions from cooling towers during operations would be approximately twice those as Proposed Project	Same as CSP alternative using AREVA technology	Similar to Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	Limit vehicular speeds on non- paved roads, apply water or dust suppressants, stop work during high winds, Site Restoration and Revegetation Plan.

Table ES-2
Comparison of Alternatives

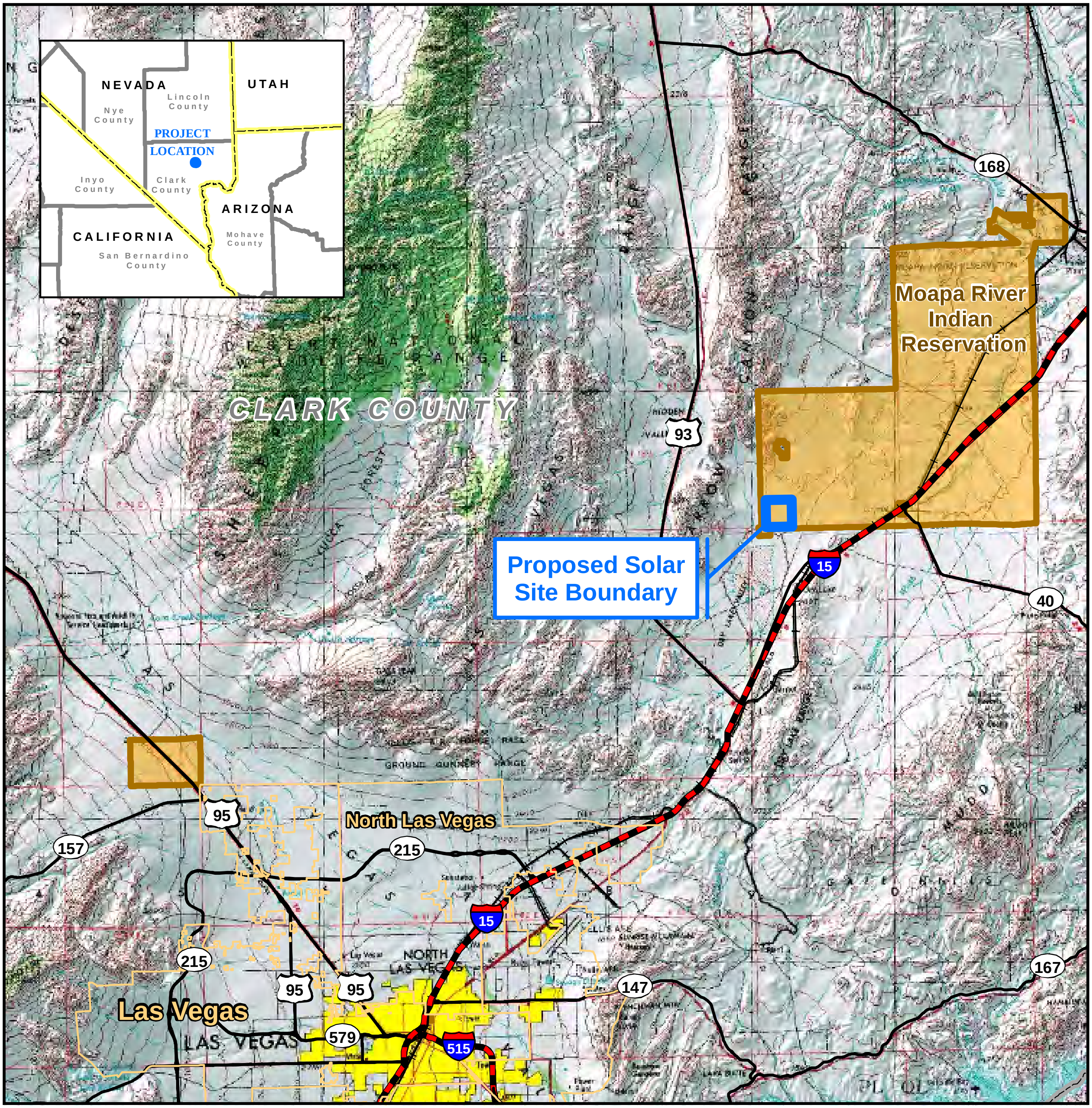
Resource	Proposed Project	CSP Project Alternative AREVA Technology	eSolar CSP Technology Alternative	Dry Cooling Alternative	Access Route Alternative	No Action Alternative	Mitigation
Noise	No direct or indirect short-term, long-term or cumulative effects due to no nearby receptors. Short-term direct effects to resident wildlife would occur.	Similar to Proposed Project but greater construction impacts from longer construction period	Same as CSP alternative using AREVA technology	Same as CSP alternative using AREVA technology	Same as Proposed Project	No direct, indirect or cumulative impacts	No recommendations
Vegetation	Short and long-term direct and indirect effect to up to 962 acres of vegetation from construction and operation activities, potential spread of invasive or noxious species.	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	Site Restoration and Revegetation Plan, Weed Management Plan, reduce grading and clearing as much as practical.
Wildlife	Short and long-term direct and indirect effects to up to 962 acres of habitat, nuisance from noise and human presence during construction and operations.	Similar to Proposed Project. Evaporation pond would be about 10 times larger with associated greater potential to impact bats and birds.	Same as CSP alternative using AREVA technology	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	Worker environmental awareness program, biological monitors onsite during construction.

Table ES-2
Comparison of Alternatives

Resource	Proposed Project	CSP Project Alternative AREVA Technology	eSolar CSP Technology Alternative	Dry Cooling Alternative	Access Route Alternative	No Action Alternative	Mitigation
Special Status Species	Short and long-term direct and indirect adverse impacts to desert tortoise as a result of loss of about 962 acres of habitat and foraging area. Short and long-term indirect effects to golden eagles as a result of loss of foraging habitat. Incremental adverse cumulative effects to desert tortoise. Potential adverse effect to Moapa dace from groundwater withdrawal of 30 AFY.	Same tortoise and golden eagle impacts as Proposed Project. Potentially greater adverse effect to Moapa dace from groundwater withdrawal of up to 800 AFY.	Same as CSP alternative using AREVA technology.	Same tortoise and golden eagle impacts as Proposed Project. Potentially greater adverse effect to Moapa dace from groundwater withdrawal of up to 60 to 80 AFY.	Same as Proposed Project	No direct, indirect or cumulative impacts	Worker awareness program, reduced vehicle speed limits, biological monitors onsite during construction, Weed Management Plan, design avian safe transmission towers.
Cultural Resources	No direct or indirect, short or long-term adverse effects.	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	No recommendations No recommendations
Socioeconomics	Beneficial short and long-term direct and indirect impacts from increases in employment, population and local spending, economic stimulus to the Tribe and incremental contribution to cumulative beneficial impacts.	Similar to Proposed Project but an additional year of construction employment / benefits and about 20 more operational employees	Same as CSP alternative using AREVA technology.	Same as CSP alternative using AREVA technology.	Same as Proposed Project	Short and long-term adverse impacts from no economic stimulus to the Tribe and local area	No recommendations

Table ES-2
Comparison of Alternatives

Resource	Proposed Project	CSP Project Alternative AREVA Technology	eSolar CSP Technology Alternative	Dry Cooling Alternative	Access Route Alternative	No Action Alternative	Mitigation
Transportation	Short-term direct and indirect impacts due to construction workforce and commercial truck traffic; negligible long-term impacts from operational traffic.	Similar to Proposed Project but one additional year of construction.	Same as CSP alternative using AREVA technology	Same as CSP alternative using AREVA technology	Same as CSP alternative using AREVA technology	No direct, indirect or cumulative impacts	Implementation of Traffic Management Plan during construction
Visual Resources	Potential for views of the Proposed Project from I-15 but most potential views would be blocked by intervening topography. Not visible from Old Spanish National Historic Trail.	Similar to Proposed Project.	Project would be more noticeable than the Proposed Project from solar receivers mounted on 250-foot towers. Not visible from historic trail.	Similar to the Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	No recommendations
Public Health and Safety	Minimal potential for onsite and off-site direct and indirect impacts due to handling and storage of hazardous materials	Similar to Proposed Project. Potential additional fire risk if thermal storage is included.	Same as CSP alternative using AREVA technology	Same as Proposed Project	Same as Proposed Project	No direct, indirect or cumulative impacts	Hazardous Waste Storage Plan; Spill Prevention and Countermeasure Plan; Health and Safety Programs.



Legend

- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Indian Reservation

0 2 4 6 8 10

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

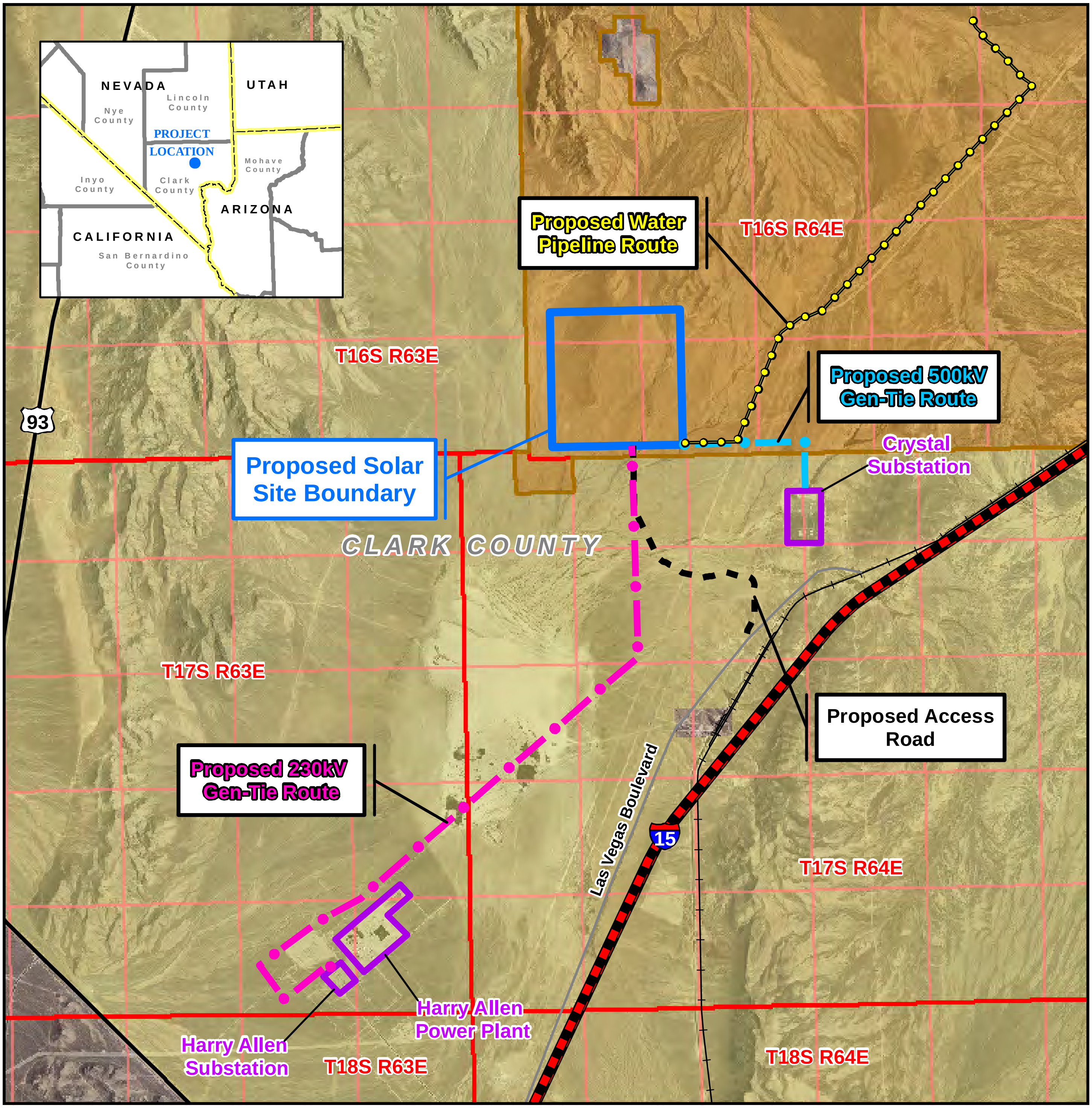
Moapa Solar Energy Center EIS

FIGURE ES-1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 06-07-13		Author: djb

I:\Moapa Solar/MXD's/Project Location 8.5x11 060713_EIS Figure ES-1.mxd



Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Reservation

0 0.5 1 1.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE ES-2
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 06-10-13		Author: djb

I:\Moapa Solar/MXD's/Proposed Project Facilities 8.5x11 061013_EIS Figure ES-2.mxd

Chapter 1

Purpose and Need

CHAPTER 1
PURPOSE AND NEED

This chapter describes the purpose of and need for the Proposed Project, discusses the laws, plans, policies, and programs that affect the Proposed Project and this Final Environmental Impact Statement (FEIS), and briefly describes the issues raised during scoping and review of the Draft EIS (DEIS) addressed in this FEIS.

1.1 Purpose of the Proposed Project

Moapa Solar LLC (Applicant) has entered into an agreement with the Moapa Band of Paiute Indians (Tribe) to lease land, up to 30 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing, operating, and maintaining the Moapa Solar Energy Center (MSEC), a solar generating facility and associated infrastructure (the Proposed Project). **Figure 1-1** shows the Project location. The Proposed Project would generate electricity using photovoltaic (PV) technology and would generate up 200 megawatts (MW) of energy.

The Tribe is federally recognized and has a Constitution approved by the Secretary of the Interior on April 17, 1942. The Reservation lands originally set aside in 1874 consisted of two million acres, but in 1876 it was reduced to a thousand acres. In December 1980, Congress added approximately 70,000 acres to the Tribal land base. The stated purpose of the restoration of these Tribal lands was to provide economic development opportunities. The current total land base of the Moapa Indian Paiute Reservation is 71,954 acres and is held in trust by the U.S. government for the Tribe.

The solar generating facility would be constructed entirely on the Reservation. The infrastructure associated with the facility would be constructed both on the Reservation and on Federal lands managed by the Bureau of Land Management (BLM). **Figure 1-2** shows the Project area and surrounding area.

The Project infrastructure would include 230 and 500 kilovolt (kV) electric lines, an access road, and a water pipeline. A portion of the water pipeline and 500 kV transmission line located on the Reservation would be constructed within an existing designated utility corridor managed by BLM. This segment of the utility corridor on Reservation land is administered by the BLM in accordance with Public Law (P.L.) 96-491 (the Moapa Utility Corridor and the Moapa Act) and reserved to the BLM under P.L. 96-491-Dec. 2, 1980.

The Proposed Project would impact resources on up to 900 acres of land within the Reservation and up to 81 acres of Federal land managed by the BLM. The 850-acre solar generation facility and proposed 5.4-mile underground water pipeline would be located within the Reservation as would about 1.2 miles of the 500 kV transmission line. About 4.7 miles of the pipeline and 1.0 mile of the 500 kV line on the Reservation would be within the designated utility corridor administered by the BLM. Approximately 0.7 miles of the pipeline and 0.2 miles of the 500 kV line would be located on the Reservation but outside the utility corridor as would approximately 0.1 mile of the access road and 0.1 mile of the 230 kV line. The Proposed Project on Federal lands managed by the BLM would include up to two transmission lines (7.2 miles of 230 kV and 0.4 miles of 500 kV) and approximately 2.4 miles of access road.

The Proposed Project would require approval by the Bureau of Indian Affairs (BIA) and the BLM. Pursuant to 25 United States Code (U.S.C.) §415, the BIA must approve the solar energy ground lease and associated right-of-way (ROW) agreements between the Tribe and Applicant for the transmission lines (500 and 230kV), a portion of the proposed access road, and the water pipeline on the Reservation (BIA's Proposed Action).

The BLM Proposed Action is the approval of the ROW grants under Title V of the Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1761(a)) to construct, operate, maintain and terminate the proposed electric transmission lines and access road pursuant to 43 Code of Federal Register (CFR) 2800 for the transmission lines and access road on Federal lands managed by the BLM and those portions on the Reservation within the designated utility corridor (BLM ROW application N-88870). These ROWs would be in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws. The proposed Project ROWs are shown on **Figure 2-1**.

BLM's Proposed Action, if approved, would assist BIA in addressing the management objectives in the Energy Policy Act of 2005 (Title II, Section 211) and Secretarial Order 3285A1 (March 11, 2009) that establishes the development of environmentally responsible renewable energy as a priority for the Department of the Interior. The BLM will decide whether to deny the proposed ROWs, grant the ROWs, or grant the ROWs with modifications. Modifications may include modifying the proposed use or changing the route or location of the proposed ROWs (43 CFR 2805.10(a)(1)).

The water supply required for the Proposed Project would be leased from the Tribe and provided from the Tribe's existing production wells on the Reservation. It would be delivered to the solar generating facility via the water pipeline described above.

Table 1-1 summarizes the agency proposed actions for the Proposed Project.

Table 1-1 SUMMARY OF AGENCY PROPOSED ACTIONS	
Agency	**Action**
BIA	Approval of solar energy ground lease
	Approval of ROWs for portions of the 230 kV and 500 kV gen-tie lines, water pipeline, and access road located solely on the Reservation
BLM	Approval of ROWs for portions of the 230 kV and 500 kV gen-tie lines, and access road located on Federal lands managed by the BLM
	Approval of ROWs for portions of the water pipeline and 500 kV gen-tie line located on the Reservation and within the BLM-administered utility corridor
Tribe	Approval of ROWs for portions of the 230 kV and 500 kV gen-tie lines, water pipeline, and access road located solely on the Reservation

Because the BIA has a jurisdictional trust responsibility over Indian lands and the BLM has land management responsibilities under FLPMA, the Proposed Project is a major Federal action and compliance under the National Environmental Policy Act (NEPA) of 1969 is required. The Tribe, BLM, EPA, and NPS are cooperating agencies on the Proposed Project. The BIA and BLM will use this EIS to make their respective decisions.

1.2 Need for the Proposed Project

The primary needs for the Proposed Project are to create an economic development opportunity for the Tribe as well as providing lease income as a long-term economically viable revenue source, create new jobs and employment opportunities for Tribal members, and develop sustainable renewable resources. Additionally, the Proposed Project would assist the Federal Government, the state of Nevada, and neighboring states meet their renewable energy goals by providing clean renewable electricity generation from the Tribe's solar resources that can be efficiently connected to the regional grid.

Prior to the 1800s, the Moapa People were a culturally well-adapted people who combined farming with hunting and gathering. They used the resources of the land with great ingenuity. Most domestic objects of their ancestors were various forms of intricately designed basketry, including water jars, winnowing and parching trays, cradle boards, cooking baskets and seed beaters. They had great skill in the use of animal skins and plants. Their knowledge of nutritional and medicinal uses of plants was extensive (Moapa Paiutes, n.d.).

The Tribe identified the solar facility development as meeting its economic development goals, as it would provide much needed revenue to the Tribe, afford employment opportunity, and occupy a small portion of the Reservation (1.5 percent). The Proposed Project would provide long-term economic benefit and employment opportunities for the Tribe and its members through a project that is consistent with the Tribe's tradition of respect for the land. It also fulfills the purposes for which the 70,000 acres were restored to the Tribe by the Federal Government in 1980 (Moapa Paiutes, n.d.).The use of the Tribe's water by the Project would help the Tribe affirm and sustain its rights to this water.

The Reservation was selected as the location of the Proposed Project due to its solar resource, the availability of suitable land, transmission accessibility, and absence of land use constraints (i.e., Desert Wildlife Management Areas [DWMAs], Areas of Critical Environmental Concern [ACECs], designated Wilderness Areas, Wilderness Study Areas [WSAs], Land with Wilderness Characteristics [LWC], and other restrictive land use designations).

The site of the Proposed Project was selected to minimize environmental impacts, infrastructure needs, and costs by being located near existing infrastructure. The Proposed Project would contribute to the local economy by creating employment opportunities, generating lease income for the Tribe, and encouraging expenditures in local businesses.

The Proposed Project would also help meet the goals of the Federal Government to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies. Renewable energy produced by the Proposed Project would help reduce the need for fossil-fuel electric generating facilities including those currently affecting the Reservation, which would contribute to the reduction of GHG emissions.

1.3 Summary of Public Scoping and Issue Identification

1.3.1 Public Scoping Process

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Proposed Project in the *Federal Register* on August 6, 2012. In addition, notices were placed in local newspapers and two public scoping meetings were held for the Proposed Project - one on the Reservation on August 21, 2012, and the other at the BLM offices located in Las Vegas, Nevada on August 22, 2012. The scoping report, found in **Appendix A**, summarizes the comments received and provides a preliminary list of issues and/or concerns identified.

The identified issues help determine the appropriate scope of environmental analysis to be addressed in this EIS that are within the scope of the decisions to be made by the BIA and cooperating agencies.

Table 1-2 below provides a summary of the key issues identified by interested stakeholders and members of the public during scoping for the Proposed Project. These issues are the focus of the EIS analysis.

Table 1-2
KEY ISSUES IDENTIFIED DURING SCOPING

ISSUE TOPIC	ISSUE/COMMENT
Purpose and Need	The Purpose and Need for the project needs to be well substantiated including the need to provide economic opportunity for the Tribe as well as meeting the renewable energy goals of the country and region.
Alternatives	A range of meaningful alternatives need to be developed including a dry-cooling and hybrid wet/dry cooling technology alternatives for the concentrating solar power (CSP) with a corresponding cost/benefit analysis.
Sensitive Wildlife/ Habitats	Habitat loss or degradation and other impacts to sensitive species must be evaluated. The desert tortoise is the primary species of interest and the potential effect of groundwater withdrawal on the Moapa Dace was also identified. Other species of interest include the Gila monster, burrowing owls, raptors including eagles and other migratory birds.
Vegetation	The evaluation of vegetation impacts must include the potential effects on sensitive or protected plant species as well as the potential for the project to facilitate the introduction or spread of weeds.
Water Resources	Potential hydrology impacts of groundwater usage particularly those associated with the proposed CSP solar technology and potential impacts from surface disturbance, including an evaluation of impacts on desert washes and site drainage/flood control must be evaluated. Project variations or mitigations that would minimize water use over the project life need to be considered. Potential effects on water quantity must also be included.
Climate Change	Additive impacts from climate change on resources affected by the project must be addressed, including impacts that the project would have on desert tortoise habitat and habitat linkages, carbon sequestration from the loss of desert vegetation and soil disruption; and document the benefits from reduced greenhouse gas emissions from the proposed project as it compares to energy production associated with fossil fuels.
Air Quality	An analysis of air quality impacts including estimates of emissions for both the construction and operational phases needs to be conducted for each alternative.
Socioeconomics	The potential socioeconomic effects of the project, particularly on tribal members, need to be evaluated. This must include a description of the training and employment available to the Tribe that would be provided by the Applicant.

Table 1-2 KEY ISSUES IDENTIFIED DURING SCOPING	
ISSUE TOPIC	**ISSUE/COMMENT**
Land / Resource Use	The potential impacts of the project on the execution of military training activities conducted by Nellis Air Force Base in the area must be addressed. In addition, the location and land ownership of new transmission lines, water lines and access roads must be clarified.
Visual Resources	The visibility of the project from the Old Spanish National Historic Trail must be assessed to determine the potential impact to the trail.
Cumulative Impacts	The cumulative effect of the proposed project when combined with other projects in the area needs to be evaluated, including specific attention to potential impacts to groundwater and sensitive biological resources.

1.3.2 Comments on DEIS

The BIA published a Notice of Availability (NOA) announcing the publication of the DEIS for the Proposed Project in the *Federal Register* on September 13, 2013. Two amended notices were published in the *Federal Register* extending the public comment period for the Draft EIS to December 10, 2013 - one on Friday October 25, 2013 and a second one (in order to amend/correct the October 25th notice) on Friday November 1, 2013. In addition, notices were placed in local newspapers and two public meetings were held to receive comments on the DEIS for the Proposed Project - one on the Reservation on September 25, 2013, and the other at the BLM offices located in Las Vegas, Nevada on September 26, 2013. **Appendix Q** outlines the comments received on the DEIS and provides a table summarizing responses to the comments and how they were addressed in this FEIS.

1.4 Policies and Programs

1.4.1 Relationship to Federal Policies, Plans, and Programs

The Proposed Project will conform to the laws, regulations or policies shown in **Table 1-3**. Additional details and summation of Federal, Tribal, state, and local policies, plans, and laws that may apply to the Proposed Project are found in **Appendix B**. It should be noted that portions of the Proposed Project that lie wholly within the Reservation would be regulated under the Tribe's Environmental Policy Ordinance, in accordance with NEPA, and in compliance with other Federal regulations that apply on Tribal lands (State, County, and local laws and policies are not applicable to Tribal lands). Furthermore, the water pipeline portion of the Proposed Project that is on the Reservation and within the BLM managed utility corridor as well as transmission lines and an access road on BLM land may be regulated under county, state, and Federal regulations that apply to the BLM.

Table 1-3
ENVIRONMENTAL LAWS, REGULATIONS, AND POLICIES

LAWS, REGULATIONS, and POLICIES	RECORD
GENERAL	
National Environmental Policy Act (NEPA)	42 U.S.C. 4321 et seq.
Administrative Procedures Act	5 U.S.C. 701-706
Moapa Band of Paiutes Tribal Environmental Policy Ordinance	Tribal Document 12708\2\1398527.3
Bureau of Indian Affairs (BIA) NEPA Guidebook	59 Indian Affairs Manual (IAM 3-H) (2012)
Bureau of Land Management(BLM) NEPA Handbook	BLM Manual H-1790-1
NEPA, Protection and Enhancement of Environmental Quality	Executive Order 11514
Department of Energy Organization Act	42 U.S.C. 7131
Consultation and Coordination with Indian Tribal Governments	Executive Order 13175
Authority for BIA to approve business leases on Tribal trust lands implementing regulations	25 U.S.C. 415 25 CFR 162
AIR QUALITY AND CLIMATE	
Clean Air Act (CAA)	42 U.S.C. 7401 et seq.
NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions	Council on Environmental Quality (CEQ), February 18, 2010
Air pollution control program: Clark County Department of Air Quality and Environmental Management	Nevada Revised Statute (NRS) 445B.500
SOILS	
Farmland Protection Policy Act	7 U.S.C. 4201, et seq.
WATER RESOURCES	
Clean Water Act (CWA) Sections 401, 402 and 404	33 U.S.C. 1251 et seq.
Safe Drinking Water Act	42 U.S.C. 300f et seq.
Nevada State Surface Water Quality	Nevada Administrative Code 445A.118-225
Floodplain Management	Executive Order 11988
Protection of Wetlands	Executive Order 11990
CULTURAL AND HISTORICAL	
National Historic Preservation Act	16 U.S.C. 470 et seq.; Executive Order 11593
Archaeological Resources Protection Act	16 U.S.C. 470aa-470ll
Archaeological and Historic Preservation Act	16 U.S.C. 469 et seq.
American Indian Religious Freedom Act	42 U.S.C. 1996 et seq.
Indian Sacred Sites	Executive Order 13007
Native American Graves Protection and Repatriation Act	25 U.S.C. 3001
Antiquities Act	16 U.S.C. 431 et seq.
Paleontological Resources Preservation Act	Subtitle D of the Omnibus Public Land Management Act of 2009, Pub. L. 111-011

Table 1-3
ENVIRONMENTAL LAWS, REGULATIONS, AND POLICIES

LAWS, REGULATIONS, and POLICIES	RECORD
BIOLOGICAL RESOURCES	
Endangered Species Act	16 U.S.C. 1531-1543
Fish and Wildlife Conservation Act	16 U.S.C. 2901
Fish and Wildlife Coordination Act	16 U.S.C. 661, 48 Stat. 401 as amended
Migratory Bird Treaty Act	16 U.S.C. 703 et seq.
Bald and Golden Eagle Protection Act of 1940, as amended	16 U.S.C. 668
Public Lands - Wild Horses and Burros	Pub.L.No.92-195, 85 Stat. 649
Invasive Plants and Noxious Weeds	Executive Order 13112
Nevada State Protected Species	Nevada Revised Statute 527.060–527.120
LAND USE LAWS	
Title V Federal Land Public Management Act	43 U.S.C. 1761 (a)
Enforcement of State Wildlife Resources	Nevada Revised Statute 501
Clark County Comprehensive Plan	Clark County's Utilities Policy UT 1-6
Las Vegas Resource Management Plan	BLM Document: BLM/LV/LP-99/002+1610 and 43CFR 2800
43 Code of Federal Regulations, Part 2800	Rights –of-ways under FLMPA
NOISE	
Noise Control Act	42 U.S.C. 4901-4918
Clark County Noise Ordinance	Sec 30.68.020 (h) & (e)
Federal Aviation Administration	14 CFR Part 77
SOCIAL/ECONOMIC	
Environmental Justice	Executive Order 12898
Limited English Proficiency	Executive Order 13166
MANAGEMENT AREA	
National Wildlife Refuge System Administration Act	16 U.S.C. 668dd
HUMAN HEALTH AND HAZARDOUS MATERIALS	
Hazardous Waste and Solid Waste Amendments Act	42 U.S.C. 6901
Federal Compliance with Pollution Control Standards	Executive Order 12088
Superfund Implementation	Executive Order 12580
Occupational Safety and Health Act	29 U.S.C. 657 et seq.
Comprehensive Environmental Response, Compensation and Liability Act	42 U.S.C. 9601
Federal Insecticide, Fungicide, and Rodenticide Act	7 U.S.C. 136
Toxic Substances Control Act	15 U.S.C. 2601 et seq.
Pollution Prevention (Right to Know)	Executive Order 12856
Clark County Fire Department	Ord. 2762 (part), 2002; Ord.1881 (part), 1996

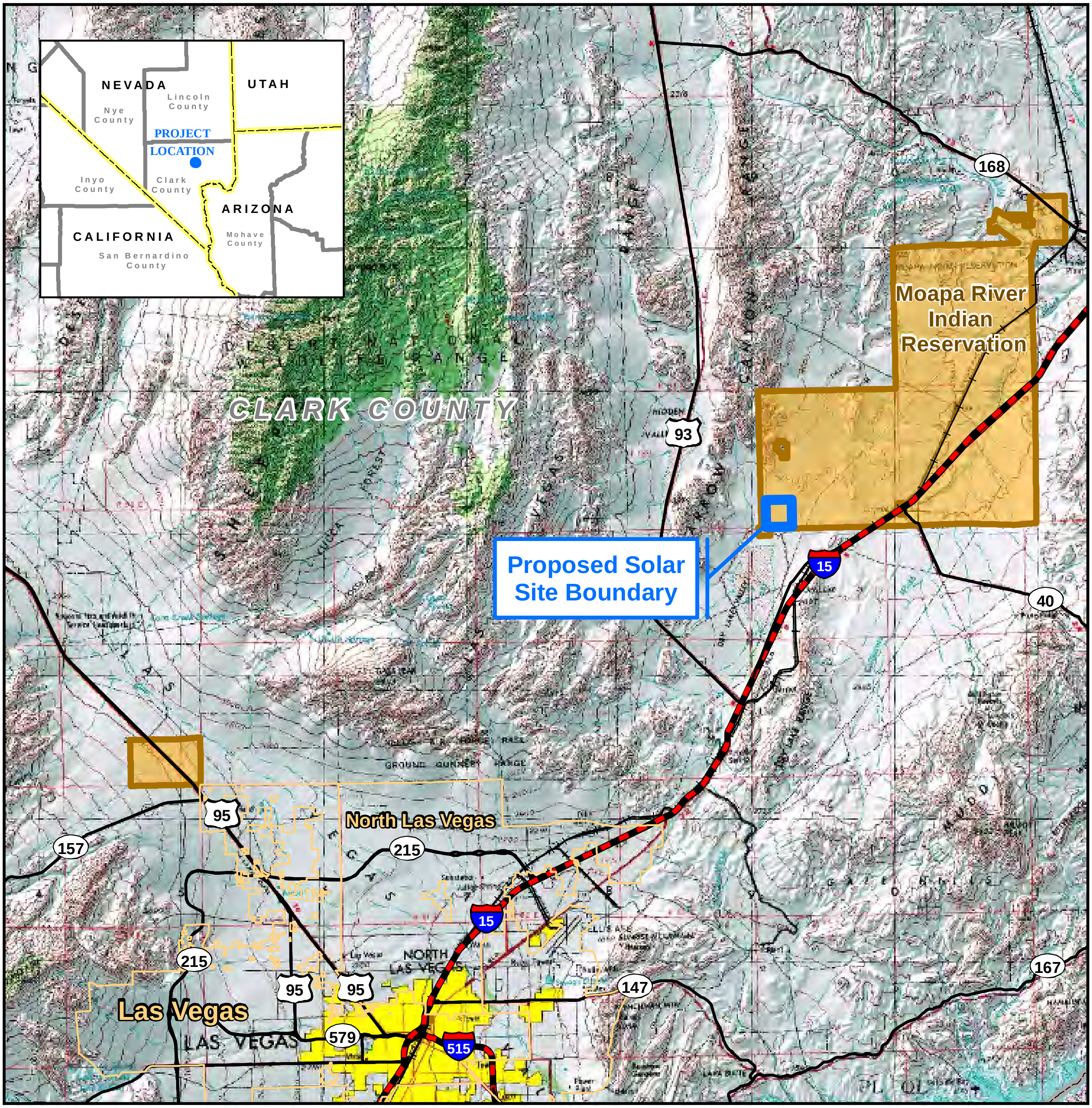
1.5 Permits and Approvals Required for the Proposed Project

Table 1-4 lists the anticipated local, Tribal, state, Federal and private permits or approvals that may be required for the Proposed Project. The table has been subdivided by the various components of the Project and land jurisdiction – Tribal and Federal land administered by the BLM.

Table 1-4
ANTICIPATED PERMITS FOR THE PROPOSED PROJECT

Land Ownership	Project Components		
	Moapa Solar Energy Center/Water Line	Transmission Lines	Access Road
Moapa River Indian Reservation	NPDES 402 Construction Stormwater Permit (EPA)	NPDES 402 Construction Stormwater Permit (EPA)	NPDES 402 Construction Stormwater Permit (EPA)
	Section 7 Consultation (USFWS)	Section 7 Consultation (USFWS)	Section 7 Consultation (USFWS)
	Section 106 Consultation (SHPO)	Section 106 Consultation (SHPO)	Section 106 Consultation (SHPO)
	Compliance with Tribal Environmental Policy Ordinance	Compliance with Tribal Environmental Policy Ordinance	Compliance with Tribal Environmental Policy Ordinance
BLM	N/A	Section 404 Permit (USACE)	Section 404 Permit (USACE)
	N/A	Plan of Development (BLM)	Plan of Development (BLM)
	N/A	Section 7 Consultation (USFWS)	Section 7 Consultation (USFWS)
	N/A	NPDES 402 Construction Stormwater Permit	NPDES 402 Construction Stormwater Permit
	N/A	401 Water Quality Certification (EPA)	401 Water Quality Certification (EPA)
	N/A	Section 106 Consultation (SHPO)	Section 106 Consultation (SHPO)
	N/A	Clark County Air Pollution Control Program	Clark County Air Pollution Control Program
	N/A	Encroachment Permit with Kern River Gas Transmission Company	Encroachment Permit with Kern River Gas Transmission Company
	N/A	Special Purpose Permit for Desert Tortoise relocation (NDOW)	Special Purpose Permit for Desert Tortoise relocation (NDOW)
NV Energy -Crystal Substation	N/A	Interconnection Agreement	
NV Energy –Harry Allen Substation	N/A	Interconnection Agreement	

Note: State approvals are required only for water-permitting processes on BLM managed lands



Legend

Interstate

US/ State Highway

Railroad

Municipal Boundary

Proposed Solar Site Boundary

Jurisdictional Land Ownership

Indian Reservation

0 2 4 6 8 10

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

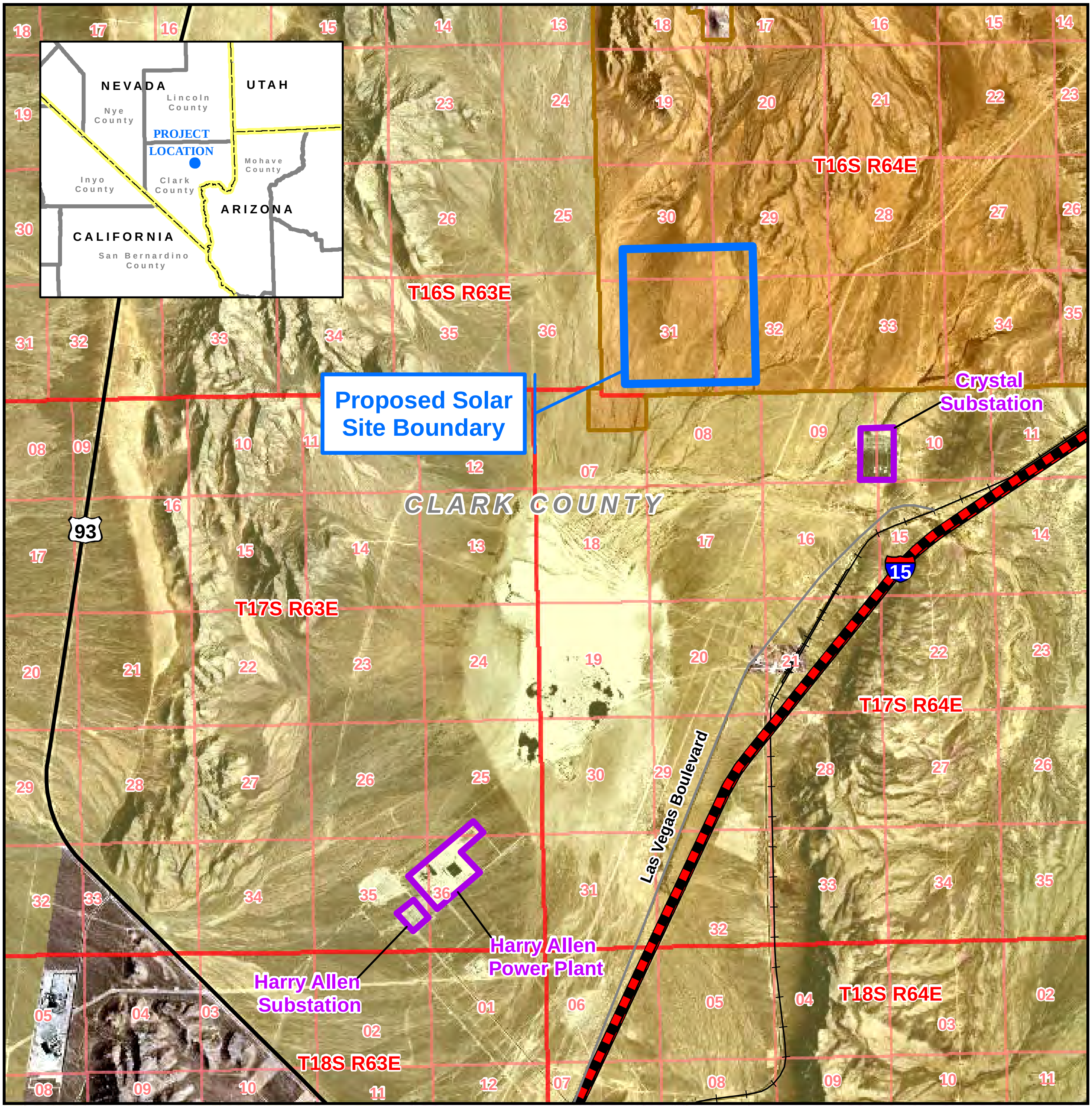
Moapa Solar Energy Center EIS

FIGURE 1-1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

I:\Moapa Solar/MXD's/Project Location 8.5x11 043013_EIS Figure 1-1.mxd



Legend

Interstate		Existing Substation Boundary	
US/State Highway		Proposed Solar Site Boundary	
Local Road		Jurisdictional Land Ownership	
Railroad		Bureau of Land Management Land	
Township/Range Boundary		Indian Reservation	
Section Line			

0 0.5 1 1.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE 1-2
PROJECT AREA

Map Extent: Clark County, Nevada

Date: 04-30-13 | Author: djb

I:\Moapa Solar/MXD's/Project Area 8.5x11 04-30-13_EIS Figure 1-2.mxd

Chapter 2

Proposed Action and Alternatives

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

This chapter provides a detailed description of the proposed MSEC Project. It describes the various components of the Project and includes discussions of the proposed construction process, operations and maintenance procedures, and decommissioning.

This chapter describes the Proposed Action, the No Action Alternative, additional action alternatives, and several alternatives considered by the Applicant, the Tribe, the BIA, and Cooperating Agencies but eliminated from further analysis and consideration. The rationale for dismissing other alternatives to the Proposed Project is also discussed.

2.2 Description of Proposed Project

The Proposed Project would consist of a PV solar power generation facility (SPGF), electrical lines that would interconnect the generation Project to the regional electrical transmission grid (gen-tie lines), a water pipeline, and an access road between the SPGF and a frontage road (North Las Vegas Boulevard) along the west side of Interstate 15 (I-15). The SPGF and water pipeline would be located entirely on lands within the Moapa River Indian Reservation. A portion of the water pipeline and part of a gen-tie line on the Reservation would be located within a designated utility corridor that is administered by the BLM. Other portions of the gen-tie lines and the proposed access road would be located on Federal land managed by the BLM.

Table 2-1 summarizes the BIA and BLM lands and jurisdictions associated with the Proposed Project solar site and ROWs.

2.2.1 Location and Setting

The Proposed Project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1-1**). The SPGF would be located on approximately 850 leased acres within the Reservation in Mount Diablo Meridian, Township 16 South, Range 64 East, Sections 29, 30, 31,and 32.

The gen-tie lines and access road would be located on Federal lands managed by the BLM south of the SPGF site within Township 17 South, Range 63 East and Township 17 South, Range 64 East. The water pipeline associated with the Project would be located on the Reservation north and east of the SPGF in Township 16 South, Range 64 East. **Figure 2-1** shows the location of the components of the Proposed Project and associated facilities.

Table 2-1
SUMMARY OF AGENCY LANDS / JURISDICTION
PROPOSED MSEC PROJECT

Agency	Project Component	Location	Agency Action	Acreage/ Mileage
BIA	SPGF	Reservation	Lease	850 acres
	Water Pipeline	Reservation outside BLM-administered utility corridor	ROW	0.7 mile / 4.0 acres
	230 kV Line	Reservation	ROW	0.1 mile / 1.8 acres
	500 kV Line	Reservation outside BLM-administered utility corridor	ROW	0.2 mile / 3.5 acres
	Access Road	Reservation	ROW	0.1 mile / 1.0 acres
BLM	Water Pipeline	Reservation within BLM-administered utility corridor	ROW	4.7 miles / 28.5 acres
	230 kV Line	Federal lands managed by BLM	ROW	7.2 miles / 132.4 acres
	500 kV Line	Reservation within BLM-administered utility corridor	ROW	1.0 mile / 17.5 acres
		Federal lands managed by BLM	ROW	0.4 mile / 6,7 acres
	Access Road	Federal lands managed by BLM	ROW	2.4 miles / 29.1 acres

2.2.2 Proposed Project Components

2.2.2.1 Solar Power Generation Facility (SPGF)

The SPGF would be located wholly on lands within the Reservation. It would be developed using PV solar technology to generate up to 200 MWs of solar energy. The SPGF would disturb up to the entire 850-acre site.

PV technology converts sunlight directly into direct current (DC) electricity. The process starts with PV cells that make up photovoltaic modules. There are several types of PV solar cells. The two major types of cells are wafer-based silicon cells and thin-film cells. A number of solar cells electrically connected to each other and mounted in a single support structure or frame is called a module. Several modules can be wired together to form an array and arrays can be connected in both series and parallel electrical arrangements to produce any required voltage and current combination.

The DC from the array is collected at inverters where the DC is converted to alternating current (AC). The voltage of the electricity is increased by a transformer at each inverter. Medium voltage electric lines (underground and/or overhead) are used to collect the electricity from each transformer and transmit it to the facility substation, where the voltage is further increased by a high voltage transformer to be transmitted to the electric grid.

2.2.2.1.1 Solar Field

The proposed PV solar field would utilize crystalline silicon or thin-film PV panels that would be mounted on single-axis trackers. Using single-axis trackers, the panels would be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day. It is assumed that a 200 MW PV project would disturb the entire 850-acre site.

The PV modules would convert sunlight into DC electricity, and the DC output of multiple rows of PV modules would be collected through one or more combiner boxes and directed to an inverter. The inverter would convert the DC power to AC power, which would then flow to a transformer where it is stepped up to distribution level voltage. Multiple transformers would be connected in parallel via low voltage (12.5-kV or 34.5-kV) below-ground collector lines to the Project substation, where the power is stepped up for delivery to the grid via the gen-tie line described below. **Figure 2-2** shows the proposed site plan for the full PV project layout.

The PV modules, inverters, and transformers would be grouped into approximately 1 to 2 megawatts of alternating current (MWac) blocks. Inverter and transformer sizes would be selected based on cost and market availability prior to construction. A typical layout depicting the arrangement of a block of solar arrays for a single-axis tracker configuration is shown on **Figure 2-3**.

The highest point on the single axis-trackers would be about 6 to 12 feet, occurring during the morning and evening hours when the panels are tilted to face the rising or setting sun. This is based on a 2 or 3-panel mounting system. The degree of tilt would change over the course of each day for the single-axis trackers. The PV units would be mounted on driven pile foundations to support the panel mounting system. The electrical equipment (inverters and transformers) would be in enclosures or covered by shade structures approximately 8 to 10 feet high.

The Project would also include one or more small meteorological monitoring stations to track solar insulation, temperature, wind direction, and speed. These stations would have a height of approximately 10 feet and would be located within the disturbed site.

2.2.2.2.2 Operations and Maintenance Area

An Operations and Maintenance (O&M) building would be developed on the site that would contain administrative offices, parts storage, a maintenance shop, plant security systems, and plant monitoring equipment with adjacent worker parking. The O&M building would likely consist of one or more single story buildings with a maximum height of approximately 18 feet. The building would have exterior lighting on motion sensors and would have fire and security alarms.

2.2.2.2.3 Water Use

During operations of the PV project, up to 30 acre-feet / year (AFY) of water would be needed for the Project. Panel washing would generate up to 65 percent of the water demand for the Project. The remainder would be used for potable and sanitary uses and other operational uses such as dust control.

Water would be provided by the Tribe and transported to the site via the proposed pipeline described below. A water treatment system would be needed to make the water suitable for the proposed uses. The raw water treatment system may consist of various components including multimedia filters and acid and base cation/anion exchangers. The water treatment system components would be specified during the detailed engineering of the Project.

2.2.2.2.4 Water Supply / Pipeline

Water for the PV project would be provided to the Project by the Tribe from an existing groundwater well located in Section 15, about 5.4 miles northeast of the SPGF site. It would be delivered to the SPGF site via a water pipeline located wholly on the Reservation. A portion of this pipeline (about 4.7 miles) would be within a designated utility corridor administered by the BLM. The pipeline would originate at the well and would follow existing roads and ROWs from the well to the SPGF site. **Figure 2-1** shows the proposed location of the water pipeline.

The water pipeline would be 8 to 12 inches in diameter and would be buried 3 to 6 feet below the ground surface.

2.2.2.2.5 Wastewater Management

The Project would generate wastewater streams from the water treatment system which would be piped to lined, on-site evaporation ponds. The ponds would be sized to retain all solids generated during the life of the Project. However, if required for maintenance, dewatered residues from the ponds would be sent to an appropriate off-site landfill as non-hazardous waste. The evaporation pond would be located on the solar site and would cover up to 5 acres.

2.2.2.3 Project Support Systems

The following project support systems would be developed for the Project.

2.2.2.3.1 Site Substation

A substation with medium voltage (12.5-kV or 34.5-kV) to high voltage (230-kV/500-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment would be located on the site. The relative location of the site substation is shown on the site layout plan for the Project.

Figure 2-4 shows a conceptual layout of the substation/switchyard. The substation would be fenced for safety in accordance with applicable codes and one or more structures may be outside the fence for meters and control equipment. The communication system for the substation may include above-ground fiber optic cable or a microwave tower. If a fiber optic line is used, it would be mounted on the gen-tie line structures as one of the shield-wires. The project would be interconnected to the regional transmission system from this on-site substation/switchyard via the gen-tie interconnections described in subsection below.

2.2.2.3.2 Fencing

The SPGF perimeter would be secured with a minimum 8-foot tall, chain link metal-fabric security fencing with 1-foot barbed wire or razor wire on top. Controlled access gates would be located at the SPGF site entrance.

2.2.2.3.3 Fire Protection System

The Project's fire protection water system would be supplied from a dedicated raw water storage tank, holding a minimum of 2-hours of full flow run-time, located on the plant site. One electric and one diesel-fueled backup firewater pump would be installed to deliver water to the fire protection water-piping network. Fire protection pump flowrates would be in accordance with applicable standards. 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, a main fire protection pump starts automatically. All fire protection system pumps must be shut off manually.

The 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. Portable fire extinguishers of appropriate sizes and types would be located throughout the plant site.

2.2.2.3.4 Security

As mentioned above, the SPGF site would be fenced with a chain-link security fence. Site security would be provided via a small guard station the gated access point to the site. Security cameras would be deployed throughout the site and monitored at the guard station and remotely by a security service at night. Lights, triggered by motion sensors and powered by station power with backup battery power, would also be installed at each entry gate and at each inverter.

Perimeter signage, in both English and Spanish, would also be provided and installed at intervals along the perimeter fence stating the following: "Danger, Keep Out!", and "Hazardous Voltage Inside".

2.2.2.3.5 Lighting

The Project's lighting system would provide operation and maintenance personnel with illumination for both normal and emergency conditions near the main entrance and the Project substation. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. There would be no lighting in the solar field. Therefore, light trespass on surrounding properties would be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting would be used.

2.2.2.3.6 Erosion Control and Stormwater Drainage

The Project site would be graded as needed to provide the needed clearances for construction and operation of the solar field. Where grading is not necessary, vegetation will be trimmed or mowed as needed to allow the surface soils and local drainage to be left undisturbed. The stormwater collection system, including interception ditches, the collection ditch, retention ponds, and all ancillary facilities would be designed to meet applicable standards.

The majority of the site would continue to be drained by sheet flow to on- and off-site drainages. Areas of the facility that have the potential for release of contaminates, such as the O&M building, delivery areas, and paved roads would be provided with storm water containment that would be directed to an on-site retention basin. The basin would be designed to accommodate runoff from the 100-year storm event.

Erosion on the site would be controlled through the implementation of best management practices that would be detailed in stormwater pollution prevention plans (SWPPPs) that would be developed for the construction and operational phases of the project.

2.2.2.3.7 Spill Prevention / Containment

Local area containments would be provided around certain locations, such as oil-filled transformers and chemical storage areas, in order to prevent water that may come in contact with oil or chemicals from leaving the site. The water from these areas and from other plant drains would be collected and sent to an onsite oil-water separator. The oil-free water would be added to the plant water, and oil-water separator waste would be hauled off-site to an appropriate treatment facility.

A spill prevention control and countermeasure plan (SPCC) would be prepared to meet the requirements of the regulations administered by the EPA.

2.2.2.2 Gen-Tie Transmission Line and Interconnections

The construction of a new transmission line is necessary to deliver the power generated by the Proposed Project to the electrical grid. Two gen-tie transmission lines would be constructed -

one to the Harry Allen Substation (via a 230 kV transmission line) and one to the Crystal Substation (via a 500 kV transmission line) as different entities can be accessed from each location. The 230 kV and 500 kV transmission lines would originate at the Project substation located on the SPGF site. Both transmission lines would be constructed within an approximately 150-foot wide ROW.

The gen-tie lines would consist of the following:

- Approximately 7.3 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation,
- Approximately 1.6 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation.

The 230 kV line to Harry Allen Substation would extend south from the SPGF site for approximately 2 miles until meeting an existing 500-kV transmission line. The proposed transmission line would then follow, on the north side, the existing transmission line for approximately 3.3 miles and then turn west and southwest for about 1.1 miles to be routed around the Harry Allen 230-kV Substation. The maintenance road associated with the existing 500 kV line would be used to the extent possible for construction and maintenance of the proposed 230 kV transmission line. Approximately 0.3 miles past the substation, the proposed line would cross the existing 500-kV transmission line at a 90-degree angle and proceed for another 0.5 miles before turning northeast for another 0.4 miles and connecting into the Harry Allen 230-kV Substation on the south side of the substation (**Figure 2-5**).

Following publication of the DEIS, a minor reroute was made to the 230 kV line in the area around the Harry Allen Substation. The numbers above reflect this reroute of the 230 kV line and it is shown on **Figure 2-5a**.

The 500 kV line to the Crystal Valley Substation would follow the alternate access road on Reservation land for approximately 0.5 miles east from the southeast corner of the site. It would continue for another 0.6 miles east and the turn south for approximately 0.5 miles to the Substation.

The design, construction, operation, and maintenance of the transmission lines would meet requirements of the National Electrical Safety Code (NESC); U.S. Department of Labor, Occupational Safety and Health Standards; and the Resource Management Plan's requirements for safety and protection of landowners and their property. Transmission line design would also be consistent with recommendations for reducing negative impacts of power lines on birds found in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC, 2006) and *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC 2012).

The Project is considering steel monopole transmission structures for the 230 kV line to the Harry Allen Substation. **Figure 2-6** is a diagram showing the typical 230 kV steel pole structure. The monopole structures for the 230 kV line would range in height from 60 feet to 100 feet, and one or more structures could be located on the solar site on Reservation lands. The structures for the 500 kV line to the Crystal Substation would also be steel monopoles shown on **Figure 2-7**.

2.2.2.3 Access Road

The Proposed Project would require vehicular access for construction, operation, maintenance, and decommissioning. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands. From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230 kV gen-tie transmission line ROW that it would follow for approximately 0.5 mile north to the SPGF site (**Figure 2-8**). The northernmost approximately 0.1 mile of this road would be located on the Reservation.

The access road would be designed to accommodate equipment deliveries, the construction workforce, and ultimately, the operational needs of the Project. The roadway section would consist of two travel lanes, 24-foot wide with 5-foot shoulders and drainage swales on either side. The Applicant has requested a 100-foot-wide ROW so the existing road can be straightened if needed in some places. Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained by the Project.

2.2.3 Proposed Project Construction

2.2.3.1 SPGF Construction

2.2.3.1.1 Grading / Site Preparation

Prior to the initiation of Project construction, the SPGF site would be surveyed and staked. Preconstruction survey work would consist of locating the site and ROW boundaries, the locations of proposed facilities, and the centerlines of linear features. Intensive field surveys would also be conducted prior to construction to determine the presence of cultural resources and special-status species within areas potentially affected by ground disturbance. These surveys would be initiated following site survey and marking. Prior to the initiation of any preconstruction surveys, the necessary survey permits for rights-of-entry would be obtained.

After all staking and surveying is complete, vegetation would be removed where needed during clearing and grading activities on the 850-acre SPGF site. This removed vegetation would be handled in accordance with a plan that would be prepared in consultation with the Tribe and BIA. It would be hauled off-site for disposal.

The SPGF site would be graded as needed to facilitate the construction and operation of the PV tracking system. Any needed grading would take advantage of the existing slope of the site, while eliminating any abrupt grade changes. Where grading is not needed, the PV panels would be mounted at a height sufficient to avoid conflict with existing vegetation and/or the vegetation would be trimmed if needed to allow installation and operation of PV tracking system. This will allow those areas to retain the local undisturbed soil surface and local drainage. The final grading and drainage plan would be in compliance with all applicable stormwater standards and BMPs for erosion control.

2.2.3.1.2 Construction Workforce

The projected construction work force includes all personnel required to complete construction of the Project including overall Project and site management, laborers, skilled craft, and startup personnel. Skilled craft and laborers would be drawn from the local area with construction management and startup functions provided by relocated personnel from the EPC contracting firm.

The MSEC Project is expected to create up to 300 construction jobs for a period of 24 months.

2.2.3.1.3 Construction Sequencing

Construction of the SPGF, from site preparation and grading to commercial operation, would be expected to take 18 months. This schedule is conceptual and subject to change, including potential acceleration, depending on market conditions within the regional power markets.

Construction would generally occur between 7 a.m. and 7 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures.

The construction phases of the Project are expected to be as follows:

- **Clearing**—Vegetation removal for installation of the SPGF facilities would be completed only as necessary to advance ahead of equipment installation, but conducted to minimize the amount of disturbed ground surface at any one time.
- **Parking and Laydown**—Parking areas for construction workers and laydown areas for construction materials would be prepared inside the solar field area. Detailed information regarding the location of the laydown and parking areas within the solar field would be developed after a contractor is hired to construct the facility.
- **Access Road**—Construction access road beds would typically be 24 feet wide and surfaced with gravel, with 5-foot-wide crushed rock shoulders.
- **Site Grading**—Because of the relatively flat topography at the site, relatively minimal volumes of soil would be moved as a result of grading. The solar modules have

telescoping legs that allow for installation on uneven ground, further minimizing the need for grading.

- **Module Installation** - The solar modules would be assembled and erected at an onsite erection facility.
- **Balance of Plant (BOP)** -With the major equipment in place, the remaining field work would be electrical and smaller component installations.
- **Testing and Commissioning** -Testing of subsystems would be conducted as they are completed. Modules would be tested once all supporting subsystems are installed and tested.
- **Site Stabilization**—Disturbed areas would be stabilized during construction to minimize wind and water erosion and fugitive dust by watering and/or use of dust palliatives approved by the USFWS. Permanent roads would be either paved or graveled. Cleared and graded surfaces that would not be subject to future disturbance would be revegetated. Revegetation would be conducted as soon as practicable, based on seasonal weather conditions, to maximize revegetation success.
- **Demobilization**—Any temporary fabrication and construction facilities would be removed from the site once construction is complete.

The project construction contractor would mobilize and develop temporary construction facilities and laydown areas within the project site. Once a final design has been established, the contractor would prepare site maps showing the construction project in detail. Temporary construction facilities would include:

- Full-length trailer offices or equivalent
- Portable toilets
- Parking for construction vehicles
- Tool sheds/containers
- Parking construction equipment
- Construction material laydown area
- Solar field equipment laydown area
- Batch plant (if needed, it may be located off-site at concrete supplier's facility)

Construction materials such as concrete, pipe, wire and cable, fuels, reinforcing steel, and small tools and consumables would be delivered to the site by truck. Initial grading work would include the use of excavators, graders, dump trucks, and end loaders, in addition to support pickups, water trucks, and cranes.

2.2.3.1.4 Site Access and Traffic

All equipment, permanent materials, and commodities for the Project would be transported to the site via rail and/or local highways. Any heavy equipment would be shipped via rail to the nearest active railroad spur for offloading and transported by truck to the Project site. All equipment and material deliveries would utilize the site access route.

Truck deliveries of equipment and materials would occur from the initial construction notice to proceed through the entire duration of the Project. Initial truck deliveries would include haul trucks for importing engineered fill materials, as required, followed by concrete trucks for installation of major foundations, and deliveries of reinforcing steel. Piping materials for buried piping would be delivered to Project site early in the construction period corresponding to approximately the time frame for foundation installation. Deliveries of large major equipment such as inverters would commence at about midpoint of the construction period.

On-site roads would be surfaced with asphalt or aggregate base, or would be left surfaced with the native soil and treated with a dust palliative approved by USFWS. The roads that are expected to be heavily used would be surfaced with asphalt; the primary roads within the solar fields would be surfaced with aggregate base; and the secondary roads within the solar fields would be graded native soils treated with dust palliative approved by USFWS to minimize dust.

There is currently little traffic on any of the roads bordering or in the immediate vicinity of the Project. The use on these roads is associated with the energy infrastructure in the area. Construction of the PV Project is expected to take up to 24 months. Daily trip generation during construction of the project would be generated by delivery of equipment and supplies and the commuting of the construction workforce. The number of workers expected on the site during construction of the Project would vary over the construction period and is expected to average up to approximately 300 workers each day, generating about 600 daily trips. Also, up to 100 trips per day (50 trips to the site and 50 trips leaving the site) would occur as a result of delivery of construction equipment and materials to the site. Combined, these would result in an increase of 700 vehicle trips (or 350 roundtrips) per day during construction. All project related parking would be onsite during construction, moving within the solar field as it is developed.

2.2.3.2 Gen-Tie Construction

Mobile construction equipment access would be required at each transmission structure. The Project would use a combination of existing and new access roads and spur roads on designated routes to place construction equipment at each structure.

To access the ROW, construction vehicles would use the existing access road off the existing paved frontage road adjacent to I-15 (North Las Vegas Boulevard) going to the Harry Allen and Crystal Substations. This primary access road is maintained by NV Energy and minimal to no improvements would be necessary to facilitate gen-tie construction.

Existing secondary access roads would be used to access the ROW where possible. Once within the ROW, spur roads maybe used to access structure locations. The secondary access and spur roads are not routinely maintained and at some locations may require improvements. Typical improvements would consist of minor grading and possibly limited addition of road base or rock in areas to allow safe vehicle travel. If used, spur roads would be staked and flagged. To the extent possible, drainages would be crossed at grade. Standard road design techniques such as installing water bars and dips to control erosion may be used in sloped areas as necessary.

2.2.3.2.1 Geotechnical Testing

Geotechnical investigations are needed to determine the site soil conditions and to provide geotechnical engineering data for the foundation design of the proposed gen-tie lines. Right-of-entry and geotechnical field work would require limited access to locations along the gen-tie routes.

Prior to final design of the lines, analysis of soil borings must be conducted along the proposed alignment to establish the design parameters for structural foundations. Up to ten test locations would occur at proposed structure locations mostly on BLM land. The testing process begins with field survey staking of each test location. This would be done from a standard light-duty pickup truck and a one or two-person survey crew. Test locations would be marked with wooden stakes and flagged. Once marked, a two or three-person drilling crew would collect samples via a truck-mounted drill rig at various depths along the boring. Samples collected from the borings would be analyzed to determine soil classification, moisture content, density, depth to groundwater and other characteristics. Each boring wouldl be approximately 6 inches in diameter and 50 feet deep.

Work areas surrounding each geotechnical boring location that would be needed for construction equipment, vehicles, and personnel during geotechnical activities would be confined to a 30 x 40 foot area. After each test boring is completed, the spoils would be hand-backfilled into the boring hole and lightly compacted. After backfill, the test location would be smoothed and hand-graded as necessary to return the area to the pre-test grade.

2.2.3.2.2 Structure Site Clearing

Adequately sized work areas would be required at each structure location to safely operate construction equipment and conduct construction activities. In typical flat-terrain, a work area would not be required outside the permanent ROW for cranes to erect structures except at turning structure locations. Each conductor pulling and tensioning location would require an additional work area. The following describes the temporary work areas anticipated for each gen-tie line:

- 500kV Line–An estimated eight structures would be required, each having a 200 foot by 200 foot work area. Two 200 foot by 600 foot pull sites would be required along with the access road paralleling the line.
- 230kV Line –Up to 47 structure locations are estimated to be required, each with a 200 foot by160 foot work area. Approximately six 100 foot by 200 foot pull-sites would be needed and access to structure locations would be required by existing and new adjacent access roads.

Dead-end structures would be required where the transmission line turns at a large angle or crosses major obstacles such as large valleys, or in areas where the line ends (see **Figure 2-1**). The work areas at each dead-end structure would provide adequate space for vehicle turnaround.

Each dead-end and angle structure would be stabilized with either screw-anchor or plate-anchor guy wires. Plate anchors would be installed where soil stability is inadequate for screw-in anchors. Plate anchors would require trench excavation and potentially vegetation clearing. The number and location of dead-end structures would be determined during transmission line engineering and design.

Vegetation at each structure location and work area would be cleared only to the extent necessary as required to maintain safe working conditions at each location. Grading would not be conducted unless needed to provide a safe work area for equipment. Following construction, surface disturbance at work areas and structure locations on BLM-administered lands would be rehabilitated using seed mixtures and techniques developed in consultation with BLM. Surface disturbance on Tribal lands would be rehabilitated according to Tribal specifications. Permanent surface disturbance at structure locations would be minimized.

2.2.3.2.3 Hole Excavation and Foundation Installation

Power equipment would be used to excavate holes for installing transmission structures. In extremely sandy areas, soils may be stabilized with water or gelling agents approved by the USFWS prior to and during excavation. Where soil conditions permit, a vehicle-mounted power auger would be used. In rocky areas, holes may be excavated by drilling. The need for blasting is not anticipated. Holes for guy-wire anchors would be dug with a backhoe.

Excavated materials would be stockpiled in the work area and used for backfill following structure placement. Backfill would be compacted with hydraulic or pneumatic compaction equipment. Excess backfill soil would be spread onsite or removed to an approved disposal area if required.

Concrete anchor-bolt foundations are expected to be used only with steel structures. Cast-in-place foundations would be used to install concrete foundations. The cast-in-place foundations would be installed by placing reinforcing steel and anchor bolt clusters into the foundation hole, positioning the anchor bolt cluster, and encasing it in concrete. Spoil material would be used for fill where suitable. The foundation excavation and installation would require a power auger or drill, crane, material trucks, and concrete trucks. Where concrete is required, concrete truck chutes would be washed at the structure location in an excavated depression within the work area. Inactive open excavations would be temporarily guarded with high-visibility plastic fencing.

2.2.3.2.4 Temporary Work Areas

Transmission line construction would require several types of temporary work areas defined by function and location:

- Material storage, construction staging, and laydown
- Transmission structure installation
- Conductor pulling and tensioning

The staging and laydown areas would be located on the SPGF site and the structure work areas and pulling sites would be located along the gen-tie line. After completing construction, temporary work areas on BLM-administered lands would be rehabilitated using seed mixtures and techniques developed in consultation with BLM. Noxious weed control would continue onsite during the rehabilitation process according to the specifications stipulated by BLM. The prevention of weedy and exotic species invasion would be addressed throughout construction. The draft weed control plan included in **Appendix C** would be followed to minimize impacts from weed species. Temporary work areas located on Tribal lands would be rehabilitated according to Tribal specifications.

2.2.3.2.5 Material Storage/Staging/Laydown Areas

Areas for material storage, construction staging, and laydown would be established to support transmission line construction. These areas would be used throughout the construction period for receiving and transferring required materials and for staging of equipment and crews. The number of areas required would be determined by the successful construction bidder; however, all material storage, staging, and laydown areas would be constructed within the proposed ROW or on the disturbed SPGF site on the Reservation.

2.2.3.2.6 Work Areas for Transmission Structure Installation

A temporary work area would be established at each structure location. These areas are expected to be 200 feet by 200 feet for the 500 kV line and 200 feet by 160 feet for the 230 kV line. The exact size would be determined during final engineering but would not be expected to exceed the dimensions indicated above. Work areas would support structure assembly and erection with a crane.

2.2.3.2.7 Conductor Pulling and Tensioning Sites

Temporary work areas would be established for conductor pulling and tensioning spaced at approximately 2-mile intervals along the ROW. The size of tensioning and pulling work areas are variable depending on site-specific conditions. They are currently expected to be 200 feet by 600 feet for the 500 kV line and 100 feet by 200 feet for the 230 kV line and would include space to turn around the equipment. Final dimensions would be determined during final engineering but would not be expected to exceed the dimensions indicated above.

2.2.3.2.8 Transmission Structure Hauling, Assembly, and Erection

Conventional construction methods would be used to haul, assemble, and erect the transmission structures. Trucks would be used to transport materials to each structure location. Structure materials would include:

- Steel and wooden poles
- Steel cross arms
- Insulators
- Hardware
- Stringing sheaves

Steel structures would be assembled onsite and hoisted into place with a crane. In contrast, wooden poles would be placed in holes by the crane and then assembled.

It is estimated that construction of the transmission line would occur over a period of approximately 4 to 6 months. Employment would vary during the construction period with a maximum of approximately 12 to 20 onsite jobs during a single month. Aggregate employment over the duration of the construction period would be the equivalent of about 35 full-time jobs.

2.2.3.3 Access Road Construction

The proposed access road would include both upgrades to existing roads and development of new sections of road. Construction of the access road would be conducted using the proposed techniques identified below and discussed in the following subsections. Any major modifications to the proposed construction techniques described in this section that arise during construction on BLM lands would be approved by the BLM prior to implementation to determine potential impacts and appropriate mitigation measures. The primary construction activities and areas of potential impact would be confined to the proposed road ROW.

Coordination with existing ROW grant holders for the existing access roads would be conducted and affected agencies would be consulted before construction begins.

The existing roads would be widened and sections of new road would be constructed using a bulldozer or grader. Front-end loaders would be used to move the soil locally. The road surface would be widened or developed to 24 feet and a 5-foot shoulder would be constructed on each side to facilitate drainage and to blend into the adjacent topography.

Following grading, the surface 12 inches of the subgrade of the road would scarified and moisture-conditioned and a roller would compact and smooth the ground surface. Approximately 14 inches of Class 2 road base would be placed above the compacted subgrade, and it also would be moisture-conditioned and compacted. A cross-section of the road is shown on **Figure 2-9**.

After project construction, this upgraded permanent access road would be used to provide access to the SPGF and also continue to be used by the existing road users who have ROWs from the BLM. The construction contractor selected to build this Project would be required to submit a specific Access Road Use Plan to the BLM and BIA. The plan would address continued use of the existing roads by the current ROW grant holders. The installation of culverts and other road improvement amenities would be reviewed and addressed on a site-by-site basis.

Disturbed areas where vegetation was removed during construction activities and that are no longer needed for future operation and maintenance would be restored in a manner consistent with BLM and Tribal requirements to encourage natural revegetation.

2.2.4 Proposed Operation and Maintenance

Operation and maintenance activities associated with the PV Project are minimal. The PV Project is expected to require up to 20 personnel during operations. Daily operation of the plant begins when there is sufficient sunlight to begin operation of the solar trackers. The panels would be facing east in the morning and rotate on the single axis to follow the sun throughout the day. In the evening, the trackers would be rotated back to the east using power from the electrical grid so that the panels are once again in position to receive the morning sun.

Maintenance and administrative staff typically work 8-hour days, Monday through Friday. Security and some maintenance staff would be on site on a 24-hour basis. Periods when non-routine maintenance or major repairs are in progress, the maintenance force may work longer hours, and contract labor may be utilized as necessarily.

Long-term maintenance schedules would be developed to include periodic maintenance and equipment replacement in accordance with manufacturer recommendations. Solar panels are designed for a 20-year life with a degradation rate of 0.5 percent per year. Moving parts, such as motors and tracking module drive equipment would be serviced on a regular basis, and unscheduled maintenance would be conducted as necessary.

No heavy equipment would be used during normal plant operation. Operation and maintenance vehicles would include trucks (pickups, flatbeds, dump trucks), forklifts, and loaders for routine and unscheduled maintenance, and occasionally water trucks for solar panel washing. Large heavy-haul transport equipment may be brought to the site infrequently for equipment repair or replacement.

Operation of the site would be expected to generate only up to 10 to 15 round trips per day from maintenance and security personnel. Trips for water trucks to deliver water to the site to clean the panels could also occur but would be relatively infrequent as the panels could be cleaned only periodically. There could also be other deliveries of supplies or equipment that could occur to support operations and maintenance. This would result in a maximum of up to 25 daily round trips (during washing events) and more commonly 10 or less during the operational phase of the Project.

2.2.5 Proposed Project Decommissioning

The Project would operate at a minimum for the life of its power purchase agreement (PPA) or other energy contracts and its lease with the Tribe. It is possible, because much of the needed electrical infrastructure would have been developed, the SPGF would continue to be upgraded and used to generate solar energy even beyond the term of the initial energy purchase agreements and/or lease. Therefore, it is possible that the SPGF site would remain in solar energy production for the foreseeable future.

If the Project were to be decommissioned, the solar field, support structures, and electrical equipment would be removed from the SPGF site, and it would be revegetated with native species to a condition similar to the original condition of the Site. A draft Decommissioning Plan has been developed and is included in **Appendix D**.

A restoration plan would include the following information:

- Goals and objectives of the plan
- Methods to be used to achieve site restoration
- Criteria to be used to determine the success or failure of the restoration
- Monitoring and maintenance of the site during and periodically after restoration
- What facilities and access routes would be removed, reclaimed and/or restored
- How facilities and access routes would be removed, and the disturbed areas restored
- The time of year the facilities and access routes would be removed and restored
- Noxious weed control during rehabilitation
- Stabilization and reclamation techniques to be used during restoration
- Annual reporting procedures
- Restoration implementation and monitoring schedule

A draft Restoration and Revegetation Plan has been developed and is included in **Appendix E**.

2.3 Description of Proposed Alternatives

2.3.1 Alternatives Development

This section describes the process used to identify potential alternatives to the Project that were initially identified by the BIA, cooperating agencies, and the Applicant. Alternatives identified by these entities and those suggested by the public or developed to respond to issues identified during the scoping process were evaluated for feasibility using the following criteria:

- Does the alternative fulfill the Project's purpose and need?
- Does the alternative minimize impacts to human and environmental resources?
- Is the alternative technically and/or economically feasible to construct, operate, maintain, and decommission?

Based on this evaluation, potential alternatives were categorized as those that were carried forward for detailed analysis and those that were considered but dropped from detailed analysis.

2.3.2 Alternatives Considered and Carried Forward for Detailed Analysis

This section describes the alternatives to the Project that are carried forward for full environmental impact analysis in Chapter 4, Environmental Consequences.

2.3.2.1 No Action Alternative

Under NEPA, the BIA and cooperating agencies must consider an alternative that assesses the impacts that would occur if the Project were not constructed and the lease agreement and ROWs were not approved. The No Action Alternative assumes that the lease agreement is denied, the BLM utility ROWs are not issued, and the solar Project is not built. Under the No Action Alternative the purpose and need of the Project would not be met the Tribe would not benefit economically from the energy production that can be obtained from their prime solar resources and the development of sustainable renewable resources would not occur. The Federal government, Nevada, and neighboring states would not be assisted in their effort to meet their renewable energy goals from the Tribe's solar resources.

2.3.2.2 CSP Project Alternative – AREVA Solar Technology

Concentrating solar power (CSP) technology focuses sunlight to receivers where the heat is used to produce steam that creates electricity via a conventional steam turbine generator. The primary components of a CSP facility include:

- Solar Field containing mirrors that concentrate sunlight onto solar receivers to create steam.
- Steam Turbine Generator (STG) that converts the thermal energy of the steam to electrical energy for delivery to the grid.
- Thermal Energy Storage (TES) system
- Plant control system that coordinates the functions of the CSP project components.

The CSP technology being proposed for this alternative is the AREVA CSP technology which is described below. This CSP alternative is expected to disturb the entire 850-acre site.

2.3.2.2.1 Project Description

2.3.2.2.1.1 Solar Field

AREVA Solar's Thermal CSP technology utilizes the Compact Linear Fresnel Reflector (CLFR) system. Rows of solar reflectors focus sunlight onto boiler tubes located in a linear receiver supported on towers approximately 80 feet above the reflector field. This system is collectively referred to as the Solar Steam Generator (SSG). **Figure 2-10** provides a schematic of the AREVA system.

The SSG is modular in design utilizing standard steel sections and near-flat mirrors to concentrate the sunlight onto a stationary, single receiver located above the reflectors. The receiver contains absorber tubes in which water is converted directly to superheated steam. **Figure 2-11** shows a photograph of the AREVA SSG system.

Reflector assemblies are coupled together in a north-south direction to form an independently tracked row-segment and multiple rows of reflectors are mounted side by side across the east-west width of each line to form a segment. There are four segments per SSG. Each CLFR reflector is supported at both ends by cradles that have motors to drive each group of reflectors to independently track the sun, to rotate for cleaning or "stow" the reflectors in a protective position. **Figure 2-12** shows the proposed layout for the CSP project using the AREVA technology.

Each linear receiver consists of boiler tubes in a stationary, insulated cavity. The boiler tubes are housed in an enclosure with a tempered glass bottom and an insulated galvanized steel shell top cover. AREVA Solar boiler tubes are coated with a selective coating to enhance both high solar energy absorption and low radiant heat loss.

Feedwater would be provided at variable conditions from the steam cycle power block. The feedwater would be circulated through the SSGs and the resulting steam would be supplied back to the power block. The feedwater and resulting steam parameters (pressure, temperature, flow) would depend on the cycle operation mode (partial load, design load, booster load).

Within each SSG, the boiler is comprised of:

- Inlet Header and Riser - Feedwater is distributed by the inlet header to riser piping bringing feedwater to each inlet tube of the boiler. The risers include motor-operated balancing valves to provide the correct flow distribution among the tubes.
- Boiler - Boiler tubes are enclosed for their full length within an insulated chamber (receiver), on to which sunlight is reflected. The receiver is located approximately 80 feet above grade. The two-pass once-through boiler has the economizer transformation in the first pass and the superheater transformation in the second pass.

- Return Header - Flow from the first pass is mixed in a return header, and then enters the second pass tubes. The return header is enclosed in a receiver extension.
- Downcomer and Discharge Header - Steam flows down from the boiler tubes to the discharge header which is mounted alongside the inlet header inside a specific tower.

In front of each SSG, the Boiler External Piping (BEP) includes valves and instruments required by the boiler code to control feed water and steam flows.

2.3.2.2.1.2 Power Generation System

The steam generated in the solar field would be routed to a power block where it would be converted to electricity via a STG for delivery to the electric grid. The power block would occupy about 40 acres of the site.

The AREVA technology employs a direct-steam design that converts water directly to steam without an intermediate heat-transfer system. This direct steam system requires a turbine without a reheat section and requires a fast startup time and the robustness to withstand variable input steam conditions in response to weather conditions affecting steam generation. The feed pumps, steam turbine, and other mechanical components would be required to be designed to operate within the operating parameters of the solar power plant. The operating parameters include rapid ramp rates, daily startup and shutdown, and a varying load.

The Applicant proposes to use wet-cooling for the CSP project. This decision was made for two reasons – because wet-cooling is more efficient than dry or hybrid cooling and because using the Tribe's water for the Project would help the Tribe affirm and sustain its rights to the water that has been allocated.

The cooling system for heat rejection from the steam cycle consists of a surface condenser, circulating water system, and a wet cooling tower. The surface condenser is a shell-and-tube heat exchanger with wet, saturated steam exhausted from the low pressure section of the STG condensing on the shell side and circulating water flowing through the tubes to provide cooling. The warmed circulating water exits the condenser and flows to the evaporative cooling tower to be cooled and reused.

The mechanical draft cooling tower employs electric motor-driven fans to move air through each cooling tower cell. The cascading circulating water is partially evaporated, and the evaporated water is dispersed to the atmosphere as part of the moist air leaving each cooling tower cell. Because of the arid climatic conditions at the site, visible moisture plumes are expected to occur relatively infrequently and typically only in winter months. No need is expected for a plume-abated cooling tower. No secondary auxiliary cooling system is required.

2.3.2.2.1.3 Water Use/Water System

Development and operation of the Project using CSP technology would require water. Water uses in a CSP project includes needs for mirror/heliostat cleaning, for the cooling cycle for the steam turbine (makeup to the cooling tower), makeup to SSG system, service water, potable water, and fire protection water. The Project water balance (water needs) would be based on the various process water flow needs for the ambient conditions used as the design basis. Usage rates would vary during the year and would be higher in the summer. Equipment sizing would be consistent with peak daily rates to ensure adequate design margin.

The expected water use for the CSP project is approximately 600 to 800 AFY at average ambient operating conditions. Water would be provided by the Tribe from the same existing well and piped to the site via the same pipeline described for the Proposed Project.

Two (2) raw water storage tanks, each with a capacity to provide 12-hours of water supply to the facility, would be located on-site. A portion of one tank would be dedicated to the fire protection water system.

2.3.2.2.1.4 Water Treatment

The water used by the CSP Project would require onsite treatment. The treatment requirements vary according to the quality required for each of the following uses.

Raw water would be treated prior to feeding to the circulating water system to increase the cycles of concentration at the cooling tower, minimizing water consumption, and reducing the size of the evaporation ponds (described further below). The raw water treatment system may consist of various components including multimedia filters, strong acid cation exchangers, interstage degasifier, and strong base anion exchangers. The water treatment system components would be specified during the detailed engineering of the Project.

Water conditioning chemicals may be added to the water to minimize corrosion and to inhibit mineral scale formation and biofouling. All chemical systems include bulk storage tanks (or chemical tote for smaller systems) and two redundant full-capacity metering pumps. The anticipated chemical systems may include sulfuric acid to adjust alkalinity and reduce mineral scaling, an organic phosphate inhibitor solution fed into the circulating water blowdown flow to further inhibit scaling, sodium hypochlorite shock fed into the circulating water system as a biocide to reduce biofouling.

Makeup water for the CSP steam cycle must meet stringent specifications for suspended and dissolved solids. To meet these specifications, water would be processed through a demineralized water makeup system. This system is anticipated to consist of multiple unit operations, concluding with leased mixed-bed demineralizers. The leased demineralizer trailers would be taken off-site for regeneration, and all waste product contained in the trailer would be disposed of at off-site facilities by the vendor, in accordance with applicable regulations. Water produced by this system would also be used for the mirror/heliostat washing described below.

To facilitate dust and contaminant removal from the CSP solar field, demineralized water is used to clean the solar mirrors on a periodic basis, determined by the reflectivity monitoring program. This operation is generally done at night and involves a water truck spraying the mirrors in a drive-by fashion. Demineralized water for mirror washing is generated by the steam cycle makeup water treatment system.

2.3.2.2.1.5 Wastewater Management

The CSP Project would generate wastewater streams including wastewater from the cooling tower blowdown and neutralized wastewater from the ion exchange pretreatment system. Process wastewater would be piped to lined, one or more on-site evaporation ponds located adjacent to each other on the solar site and covering approximately 50 acres. The multiple ponds or cells would allow plant operations to continue in event that a pond needs to be taken out of service. Each pond would have enough surface area so that the evaporation rate exceeds the cooling tower blowdown rate at maximum and annual average design conditions. The evaporation ponds would be designed to meet the Best Available Demonstrated Control Technology (BADCT).

2.3.2.2.1.6 Thermal Energy Storage System

A thermal energy storage system using molten salt may be included that would allow the CSP project to produce energy at the end of the day after the sun is no longer shining. This would allow the Project to dispatch energy for a longer period of time and during hours that coincide with peak energy consumption.

The AREVA Solar CLFR molten salt storage system is a direct storage system to eliminate need for synthetic oil and extra heat exchangers. It uses a non-flammable, non-toxic “solar salt” (sodium nitrate and potassium nitrate) and a two-tank molten salt storage system.

2.3.2.2.1.7 Plant Control Systems

The AREVA Solar Boiler Control System (ASBCS) provides start-up, shutdown, and control of flow rate and solar power to ensure that steam is supplied at the desired pressure and temperature. The ASBCS is implemented using a standard Programmable Logic Controller (PLC) and manages alarm and protective functions, control of the reflectors and control valves according to solar position and heat input, in response to steam demand. Each reflector segment is wired to a local NEMA rated weather-proof enclosure adjacent to the reflector drive motors.

The plant would be equipped with a comprehensive control and instrumentation (C&I) system. All critical sensors for continuous control and protection would have built in redundancy. The

C&I system would allow the plant to operate safely and stably without operator intervention under any foreseeable conditions.

The plant control system would coordinate the solar field operating system to generate steam to accommodate the turbine steam demand. Depending upon the time of day (sun position) and the DNI (solar energy incident upon the solar field) the number of SSGs operating can be varied to match the steam flow that the turbine can accept. If the turbine is to be operated at less output (lower steam demand) than the solar field is capable of producing at that time, then the solar field output can be reduced to accommodate the steam turbine's demand. It is expected that the steam turbine would operate in a sliding pressure mode over most of its operating range.

The Control System would provide sufficient detail to enable the operators to quickly determine the exact state of the plant at any time and conduct fault level diagnosis down to component level from the control room.

2.3.2.2.1.8 Project Support Systems and Facilities

The project support systems would generally be the same as those described for the Proposed Project. In addition, the ROWs for the gen-ties, access road, and water pipeline would also be the same as described for the Proposed Project.

2.3.2.2.2 Operations and Maintenance

The CSP Project is expected to require up to 40 personnel during operations. It would provide electric power to the grid during daylight hours when solar energy has increased to a level to permit STG operation. Facility generation capabilities vary throughout the year with actual annual operating hours, electricity produced, and startups of the Project determined by the local weather patterns and actual annual solar resource. Operations would be managed using a Plant Control System (PCS) described earlier for control, monitoring, alarm, and data storage functions for power plant systems.

To maintain the operational integrity of the Project, a number of maintenance activities would be routinely performed. Much of these activities would occur within the power block area where equipment would be regularly tested and periodically taken out of service for maintenance.

In the solar field, the mirrors/heliostats associated with the CSP project would be cleaned on a periodic basis, determined by the reflectivity monitoring program. This operation is generally done at night and involves a water truck spraying the mirrors in a drive-by fashion.

The SPGF would be kept clear of vegetation to facilitate maintenance and reduce fire risk. Herbicides would be used where needed. In addition, a soil stabilization treatment (dust-control agent) may be applied to the exposed soil to minimize fugitive dust and its effects on the mirrors/panels in the solar field.

Operation of the CSP Project would be expected to generate only up to 25 to 40 round trips per day from maintenance and security personnel. Deliveries of supplies or equipment to support operations and maintenance would generate 5 to 10. This would result in a maximum of up to 50 daily round trips during the operational phase of the Project.

2.3.2.3 eSolar CSP Technology Alternative

In this alternative, instead of the AREVA CSP technology described above, the eSolar CSP technology and solar field would be used. The eSolar CSP power technology uses many small, flat heliostats focused to reflect sunlight onto receivers mounted on towers. The receivers are essentially traditional high-efficiency boilers that generate steam and provide it to a conventional steam turbine power block. The eSolar design is modular, currently with a standard plant size of 46 MW composed of 12 receivers and two subfields of heliostats per receiver. The MSEC Project would include three of these modules, with 36 receivers, for a total size of 138 MW on the 850-acre site. **Figure 2-13** shows a schematic of the eSolar CSP system.

The eSolar field configuration includes:

- Solar Collector System (SCS) -- Fields of actuated mirrors (heliostats) that focus incident solar energy toward central receivers and includes the heliostats themselves, the calibration and control system necessary for the heliostats to accurately focus the sun's energy on the receiver, the field layout, and the mirror cleaning system.
- Solar Receiver System (SRS) -- The solar receiver (boiler) and supporting tower that converts the energy delivered by the SCS to superheated steam.

The purpose of the SCS is to collect and focus the incident solar energy. The eSolar SCS system uses many smaller mirrors versus fewer larger mirrors resulting in less stringent site grading requirements than some other solar technologies and with no foundations required.

The mirrors are rectangular in shape and relatively thin. The heliostats have a dual-axis drive that positions its reflector accurately so that the control system can direct the reflected beam of light to the solar receiver. **Figure 2-14** shows a photograph of the eSolar SCS.

eSolar's design for the solar receiver includes a preassembled steam generator that is mounted on a tower approximately 250 feet above the heliostat field. The tower is a monopole design similar to wind turbine towers. Each receiver is independently controlled with the total steam flow of the 12-receiver units being collected in common supply steam pipe headers. The feed water to each receiver is supplied via a common header with valve isolation at each receiver.

Figure 2-15 shows the potential site layout using the eSolar CSP technology.

The remainder of the major components of the eSolar CSP project – the power generation system and support systems – would be generally the same as that previously described for the

AREVA CSP technology. It also would use wet-cooling and water use would be expected to be 600 to 800 AFY. Likewise, the construction process and generated employment and traffic would be similar. The ROWs for the gen-ties, access road, and water pipeline would also be the same as described for the Project.

2.3.2.4 Dry-Cooling for CSP Project

This alternative was developed to respond to concerns expressed during public and agency scoping about consumptive water use by the CSP alternatives. Under this alternative, the proposed CSP project would be constructed using a dry-cooling technology rather than the wet-cooling technology considered under the CSP alternatives. Dry-cooling uses approximately 90 percent less water than wet-cooling because no water would be used for primary cooling and consumptive evaporative losses would be considerably lower under this alternative than under the CSP alternatives using wet-cooling.

The description of this alternative would be the generally the same as that described for the two CSP alternatives. Those project parameters and details that would differ substantively from the CSP alternatives are discussed below. Unless otherwise noted, all other actions under this alternative would be the same as the previous CSP alternative descriptions.

2.3.2.4.1 Solar Field

The dry cooling technology used under this alternative would be less efficient than wet cooling. This would result in the generation of less electricity from the same sized solar field. Therefore, the size of the solar field would need to be approximately 10 to 20 percent larger than the wet-cooled alternatives to produce the same amount of energy. However, if this alternative were implemented, the Applicant has decided to not enlarger the solar field. Therefore, the CSP project using dry cooling would produce approximately 10 to 20 percent less energy than the wet-cooled CSP Project.

2.3.2.4.2 Cooling System

Under this alternative, the CSP Project would use an air-cooled condenser (ACC) for power plant cooling instead of a wet-cooling tower as under the two wet-cooled CSP alternatives. Because this alternative would not employ a cooling tower, makeup and evaporative water losses would be minimized.

Steam would exhaust directly from the steam turbine generator to an exhaust header that leads to a multi-cell ACC. In the ACC, the wet steam is converted to condensate in a series of tubes with external fins to facilitate better heat transfer. On the outside of the tubes, ambient air is forced over the tubes using large mechanical fans. The exhaust steam is distributed throughout the ACC through a series of smaller and smaller headers. At low points in each ACC, the condensate water is collected and returned to the solar steam generator. All cooling takes place by convective heat transfer to the air.

2.3.2.4.3 Evaporation Ponds

No cooling water blowdown (wastewater) would be generated under this alternative so the evaporation ponds would only handle wastewater from the reverse osmosis (RO) system reject and would be smaller than under the CSP wet-cooled alternatives but similar to the Proposed Project. The pond would only need to be approximately 5 to10 acres instead of 50 acres for the wet-cooled CSP alternatives.

2.3.2.4.4 Construction and Operations

The construction schedule under this alternative would be the same as under the wet-cooled CSP alternatives but an average of 30 additional employees would be required over the same time period due to the longer ACC construction time.

2.3.2.4.5 Water Requirements

As described above, the dry cooling system would use air rather than water for heat rejection from the steam cycle. The estimated consumptive water usage under this alternative is approximately 60 to 80 AFY for operations, which would be supplied by the Tribe from the same well and pipeline described for the Proposed Action.

2.3.2.5 Alternative Access Route

An alternative access road route to connect the SPGF to the existing paved frontage road (North Las Vegas Boulevard) adjacent to I-15 has been developed. This alternative would be constructed on BLM-administered lands as well as Reservation lands.

From the existing paved frontage road west of I-15, the alternative site access road would follow the same existing dirt road for approximately 0.8 miles until it reaches an existing transmission line access road which it would then follow approximately 1.1 miles north to a point where it would turn due west to the SPGF site (**Figure 2-16**). This road would be approximately 2.1 miles long. About 1.5 miles would be located on BLM-managed lands and 0.6 miles would be located on the Reservation.

This access road would be constructed to the same standards as the proposed access road (24 feet wide, two lanes, gravel surface with shoulders and drainage swales on either side). Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained by the Project.

2.3.3 Alternatives Considered but Eliminated from Detailed Analysis in the EIS

The alternatives below were not carried forward for detailed analysis because they did not meet the purpose and need, were determined to not be practical or feasible from the technical and/or economic standpoint, or would cause greater environmental effects than the alternatives analyzed in detail. The reasons for eliminating these alternatives are described briefly below.

2.3.3.1 Optional Site Locations

The Applicant evaluated other sites on the Reservation for potential solar development. This evaluation considered a variety of factors including up to 1,000 contiguous developable acres, topography, drainage, sensitive resources (including special status species and cultural resources), and proximity to transmission interconnection points and highway access.

This process was designed to identify areas with the greatest potential for development while minimizing potential adverse impacts or permitting issues. This included making use of existing infrastructure to minimize disturbance and impacts associated with the access roads and gen-tie lines. Large portions of the Reservation were eliminated from further consideration by applying these criteria.

The Applicant also eliminated the K Road Moapa Solar Project site and other sites on the Reservation previously studied and eliminated by the K Road Moapa Solar Facility EIS (BIA 2012). In addition, the 11,000 acre desert tortoise relocation areas associated with the K Road Moapa Project are not available for development.

The current Proposed Project site was identified as the best location for the proposed solar project for a number of reasons. It is close to the transmission interconnection points at the Crystal and Harry Allen substations. It is remote from other developments on the Reservation, and has nearby road access. It also has relatively lower quality habitat for desert tortoise and limited anticipated impacts to jurisdictional waters.

2.3.3.2 Alternative 230 kV Gen-Tie Route

A second route for the 230 kV transmission line to the Harry Allen Substation was considered. It would follow the same path leaving the SPGF site as the proposed 230 kV gen-tie route but would cross the existing 500-kV transmission line to its south side. This alternative route would then follow on the south side of the existing 500 kV transmission line for approximately 2.6 miles before turning southwest to go around the Harry Allen Substation. This alternative 230 kV route is approximately 6.7 miles long (**Figure 2-17**).

Through further discussion regarding the best way to route the 230 kV line to and into the Harry Allen Substation, NV Energy indicated that this option created greater technical difficulties and potential conflicts with the existing lines in and out of the substation. Therefore, this route option was dropped from further consideration

2.3.3.3 Hybrid Wet/Dry Cooling for CSP Project

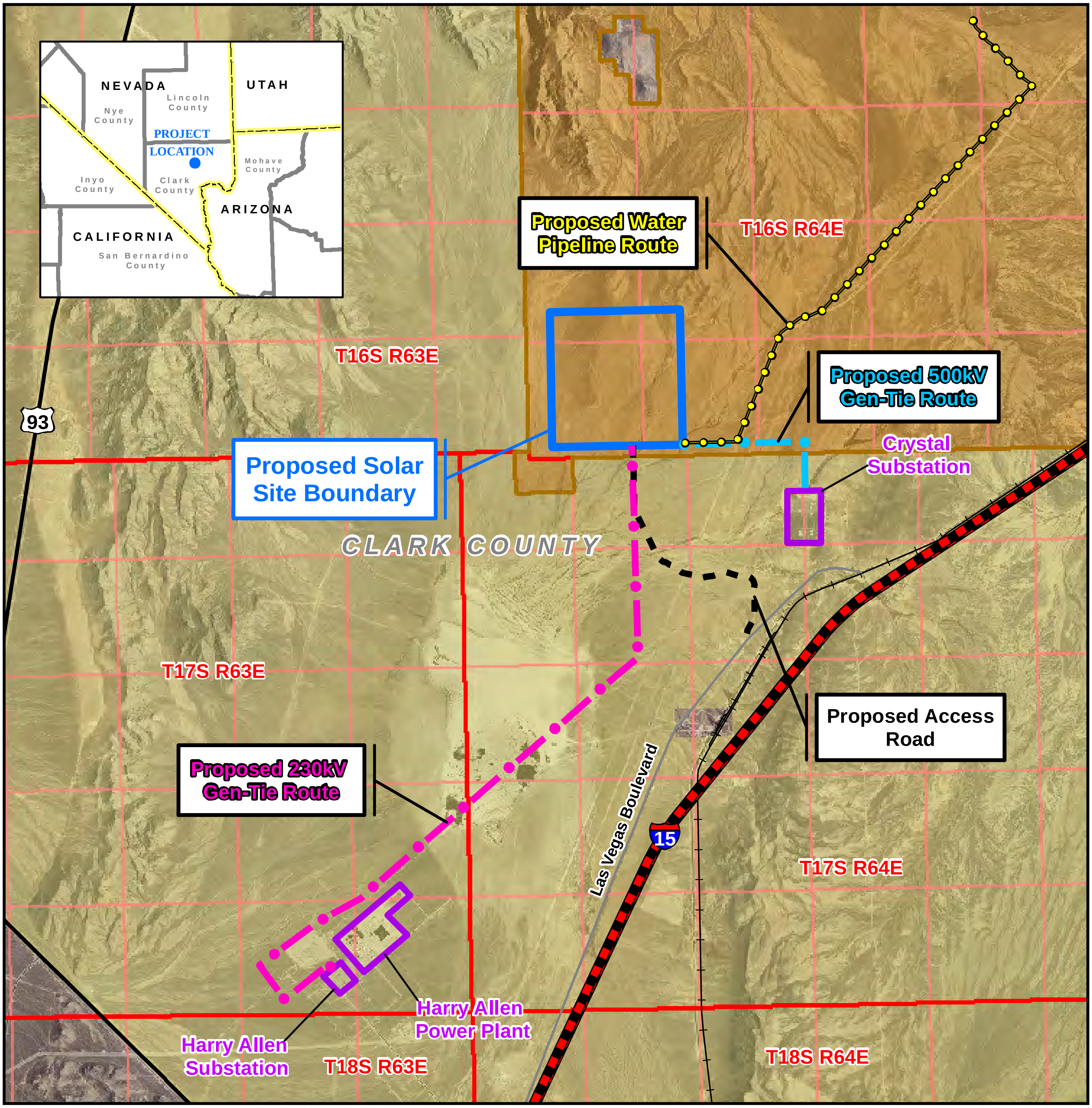
In a hybrid cooling scenario, the wet cooling and dry cooling technologies described under the Proposed Action and Dry-Cooling Alternative would be combined and used in tandem. This combined system would result in less reduced water use than the dry-cooling option and lower electrical generation than the wet-cooled system. A hybrid cooling system essentially requires the construction and operation of both a dry-cooling system and a wet-cooling system in a single plant. This would result in higher capital expenditures to purchase and construct both systems and a higher cost over the life of the project to operate both systems. A hybrid system does not achieve the same level of water savings as a dry-cooled system for the associated costs. Because of the hybrid system’s increased cost and because it would not provide water-saving benefits comparable to a dry-cooled system, this alternative has not been carried forward for detailed analysis.

2.3.3.4 Concentrated Photovoltaic (CPV) Technology

CPV technology uses layers of wafers to absorb different wavelengths of sunlight and provide more power conversion efficiency than typical PV panels. This technology requires dual tracking technology to provide critical alignment with the direct sunlight in order to be efficient. CPV is generally mounted on taller structures than traditional PV (as high as 40 feet above the surface). Because this technology is relatively new, there are risks for long-term performance reliability and manufacturing capacity to supply large-scale utility projects has not been proven to date. Therefore, this alternative has not been carried forward for detailed analysis.

2.4 Federal, State and Local Permitting

If the Proposed Project is approved by the BIA and BLM, the Applicant would be required to obtain permits and other authorizations from Federal and state regulatory agencies prior to construction. These are identified in Section 1.5.



Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Reservation

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Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE 2-1
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

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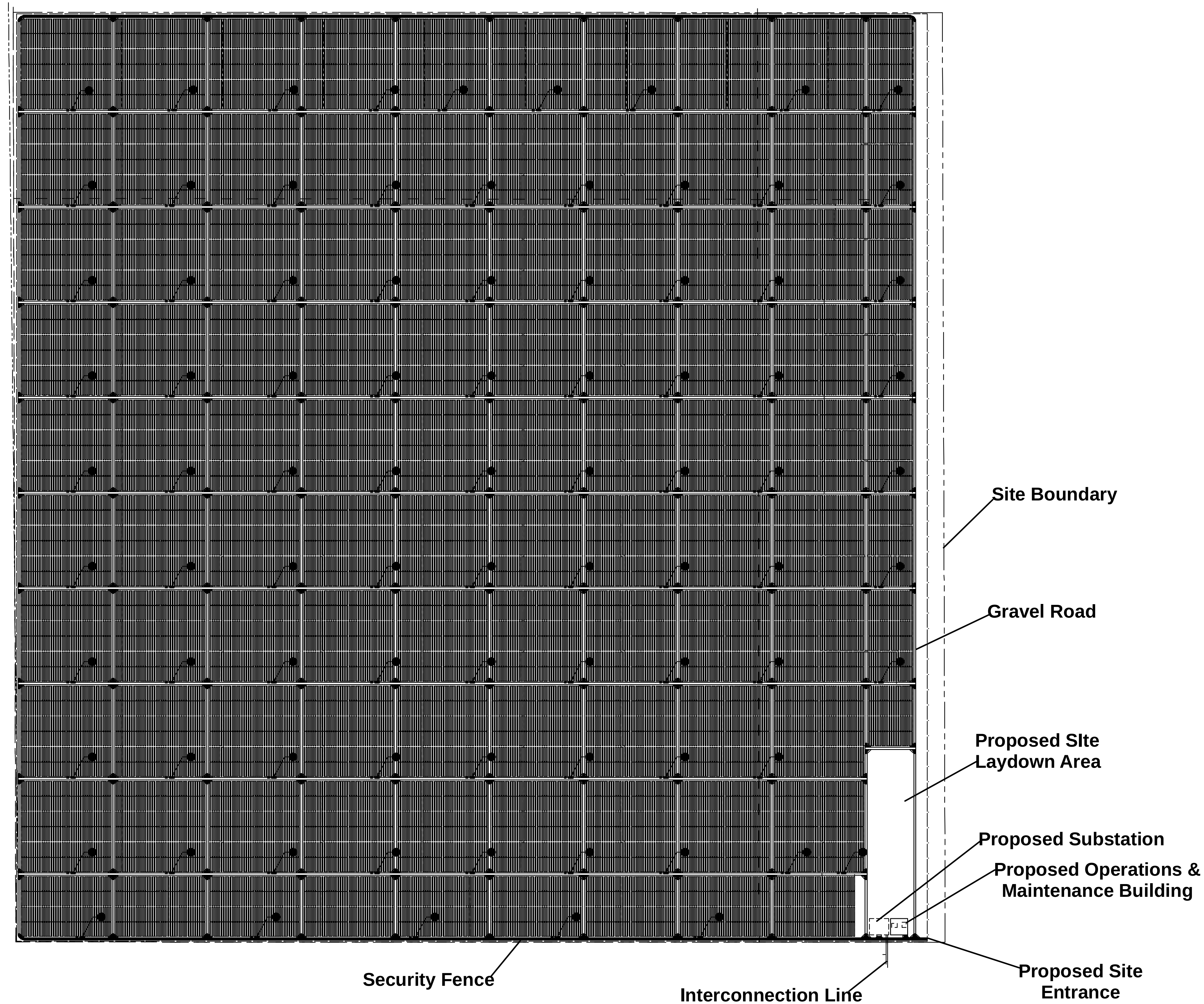

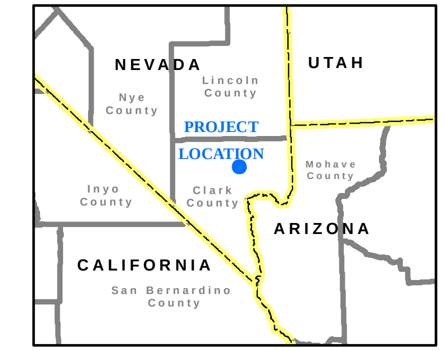

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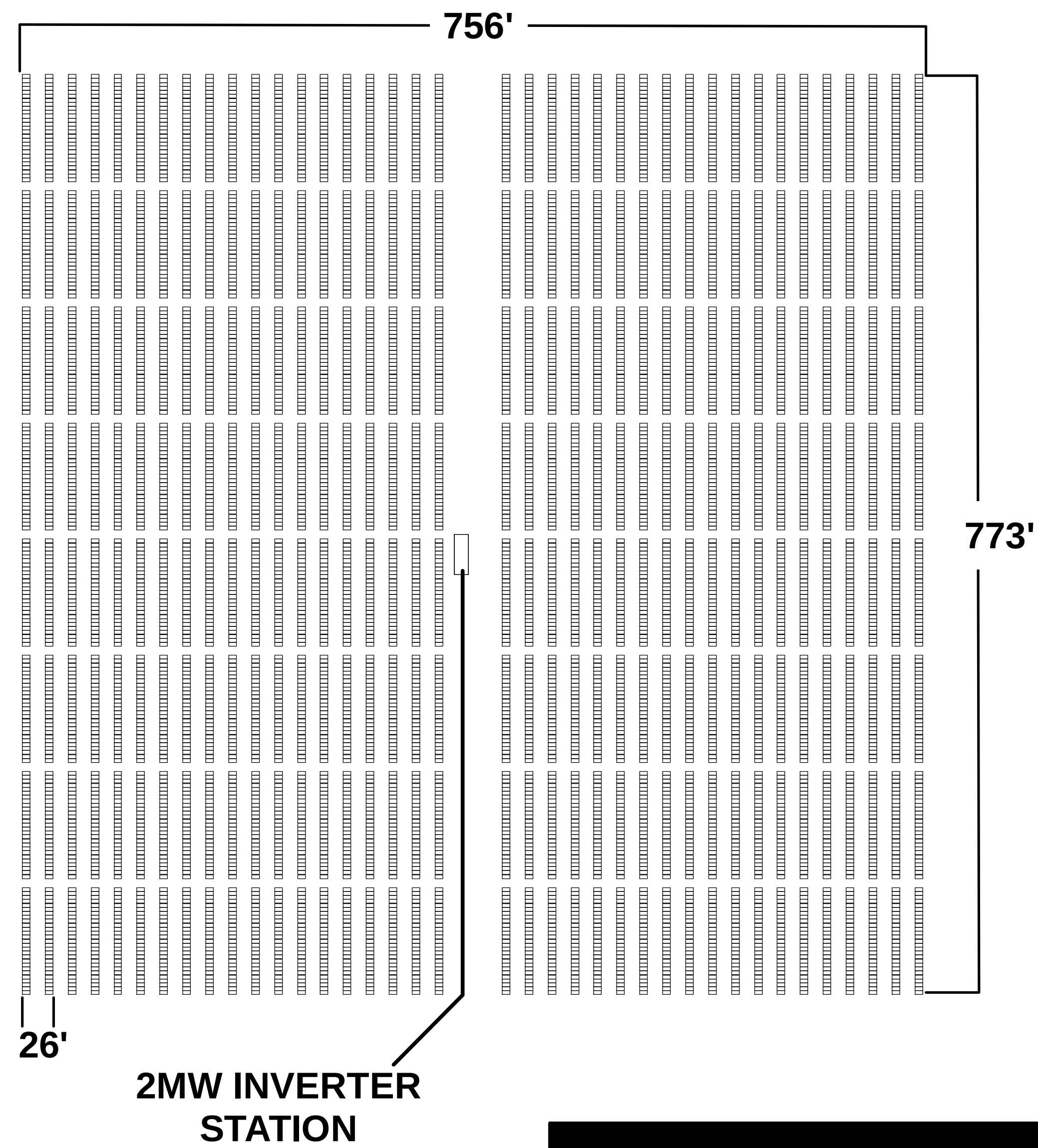
FIGURE 2-2
PV PROJECT SITE LAYOUT

Map Extent: Clark County, Nevada

Date: 04-01-13		Author: djb

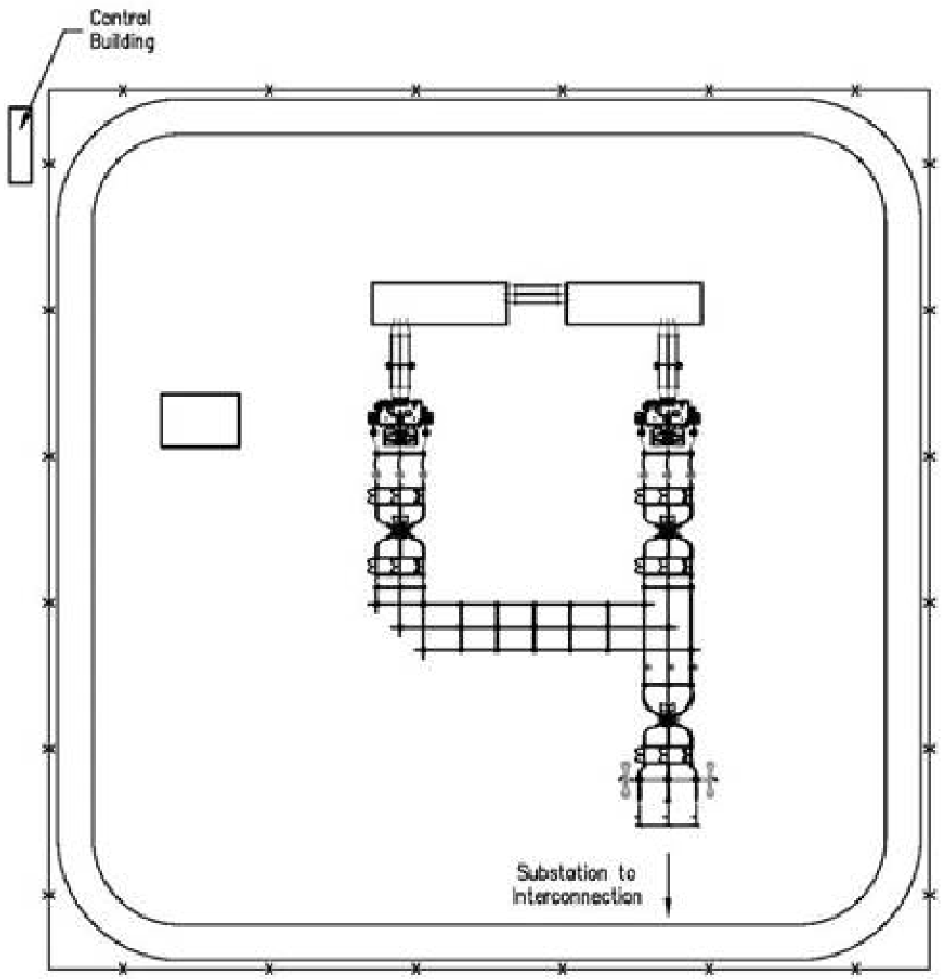


Moapa Solar Energy Center EIS

FIGURE 2-3
TYPICAL PV SOLAR ARRAY

Date: 03-22-13		Author: djb

I:\Moapa Solar/MXD's/Typical PV Block Layout 8.5x11 031613_EIS Figure 2-3.mxd



Moapa Solar Energy Center EIS

FIGURE 2-4
PROJECT SUBSTATION

Map Extent: Clark County, Nevada

Date: 05-31-13		Author: djb

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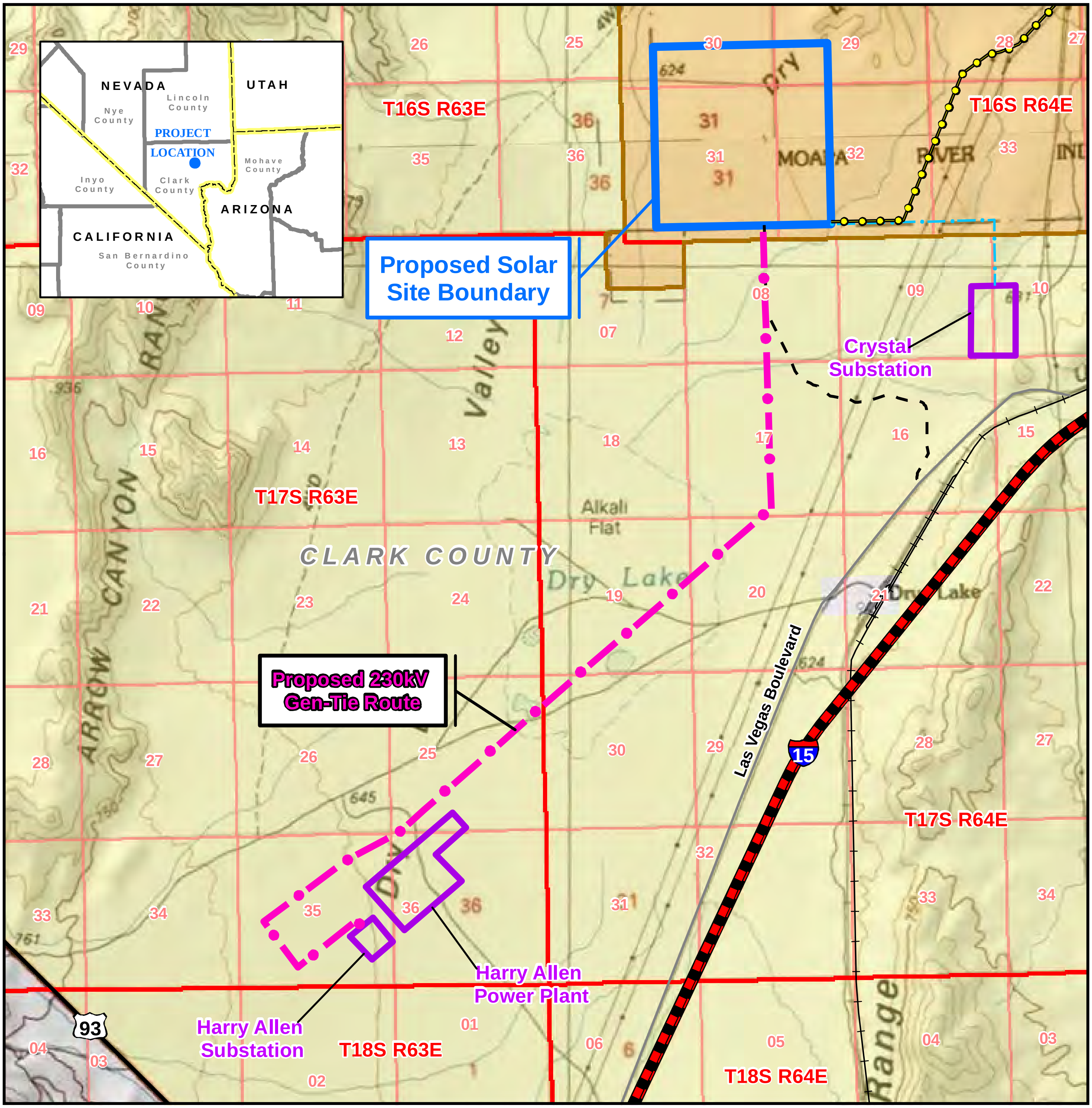

Legend

	Interstate		Township/Range Boundary
	US/State Highway		Section Line
	Local Road		Existing Substation Boundary
	Railroad		Proposed Solar Site Boundary
	Proposed Water Pipeline		Jurisdictional Land Ownership
	Proposed 230kV Gen-Tie		Bureau of Land Management Land
	Proposed 500kV Gen-Tie		Indian Reservation
	Proposed Access Road		

0 0.5 1

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE 2-5
PROPOSED 230kV GEN-TIE

Map Extent: Clark County, Nevada

Date: 05-31-13 | Author: djb

I:\Moapa Solar/MXD's/Proposed 230kV Gen-Tie 8.5x11 053113_EIS Figure 2-5.mxd

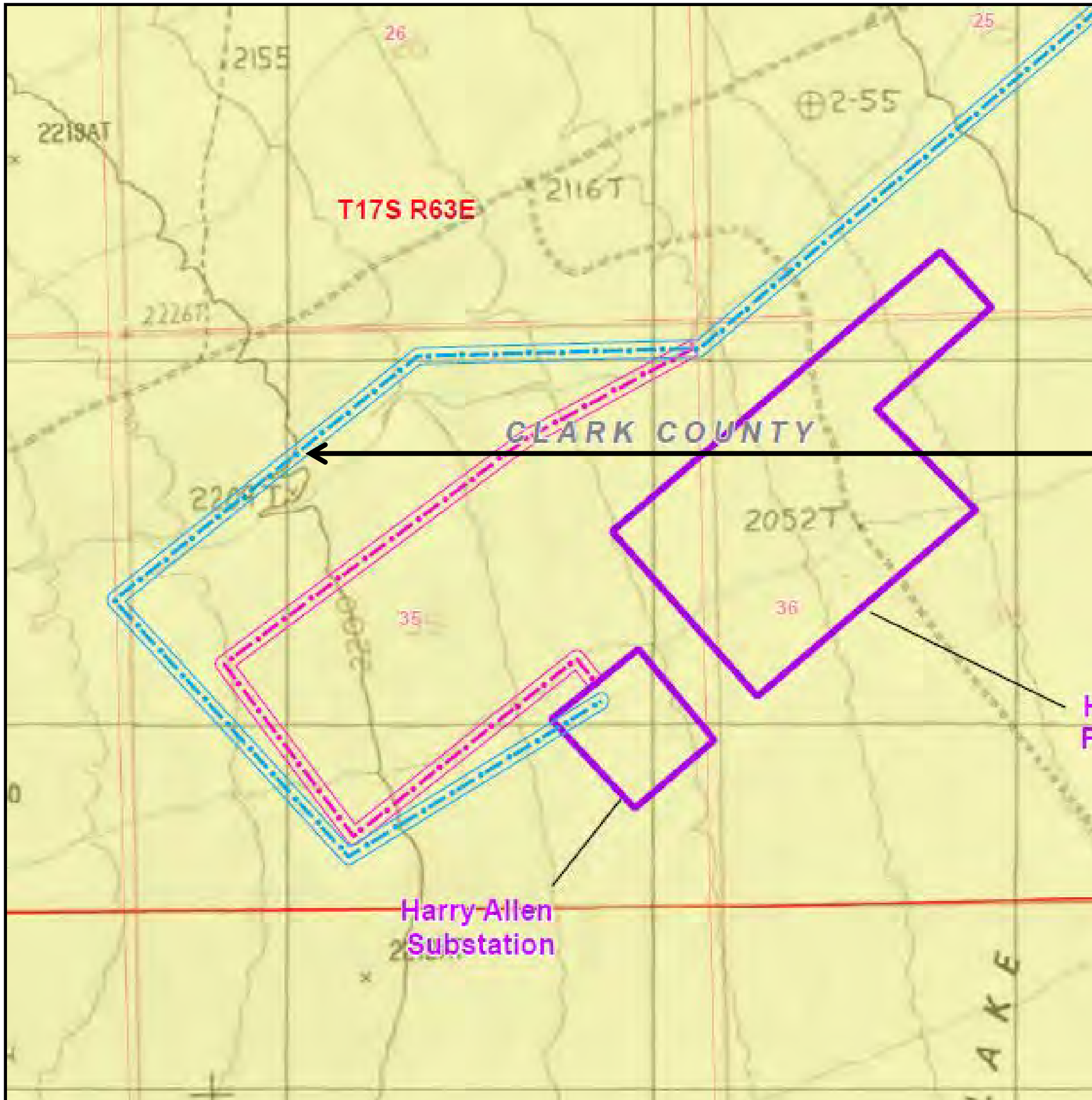

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FIGURE 2-5a

Map Extent: Clark County, Nevada

Date: 05-31-13 Author: djb

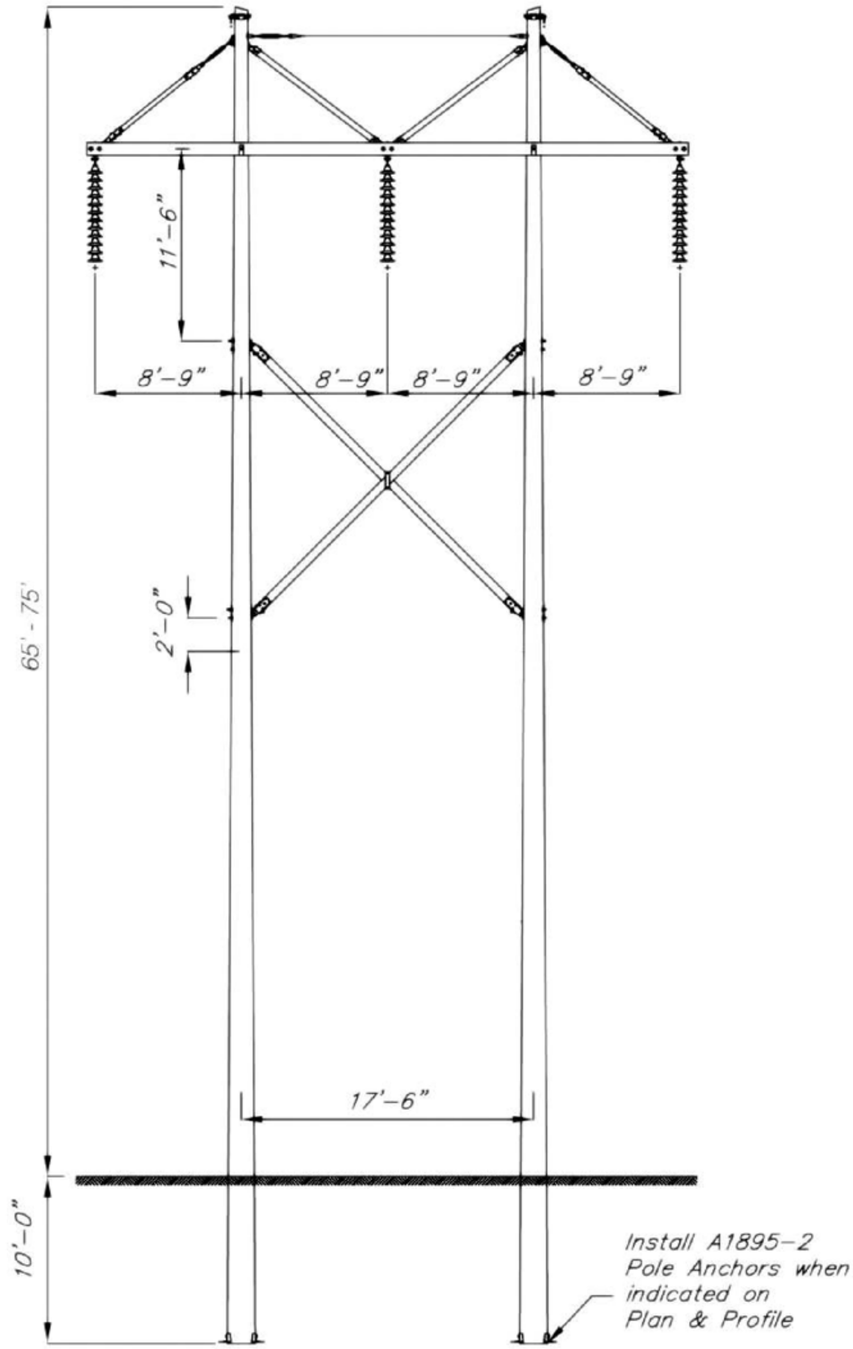

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FIGURE 2-6
TYPICAL 230 kV H-FRAME STRUCTURE

Date: 05-31-13		Author: djb

I:\Moapa Solar/MXD's/Typical 230kV H-Frame 8.5x11 053113_EIS Figure 2-6.mxd

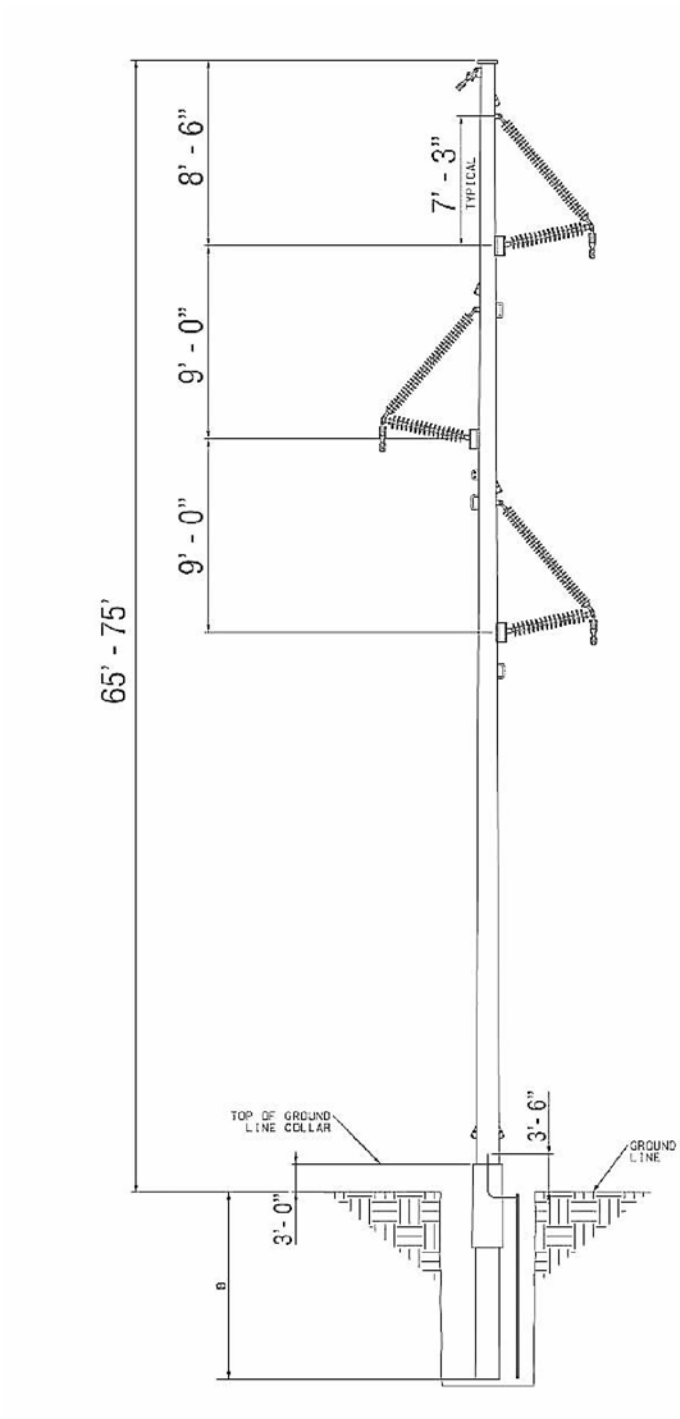

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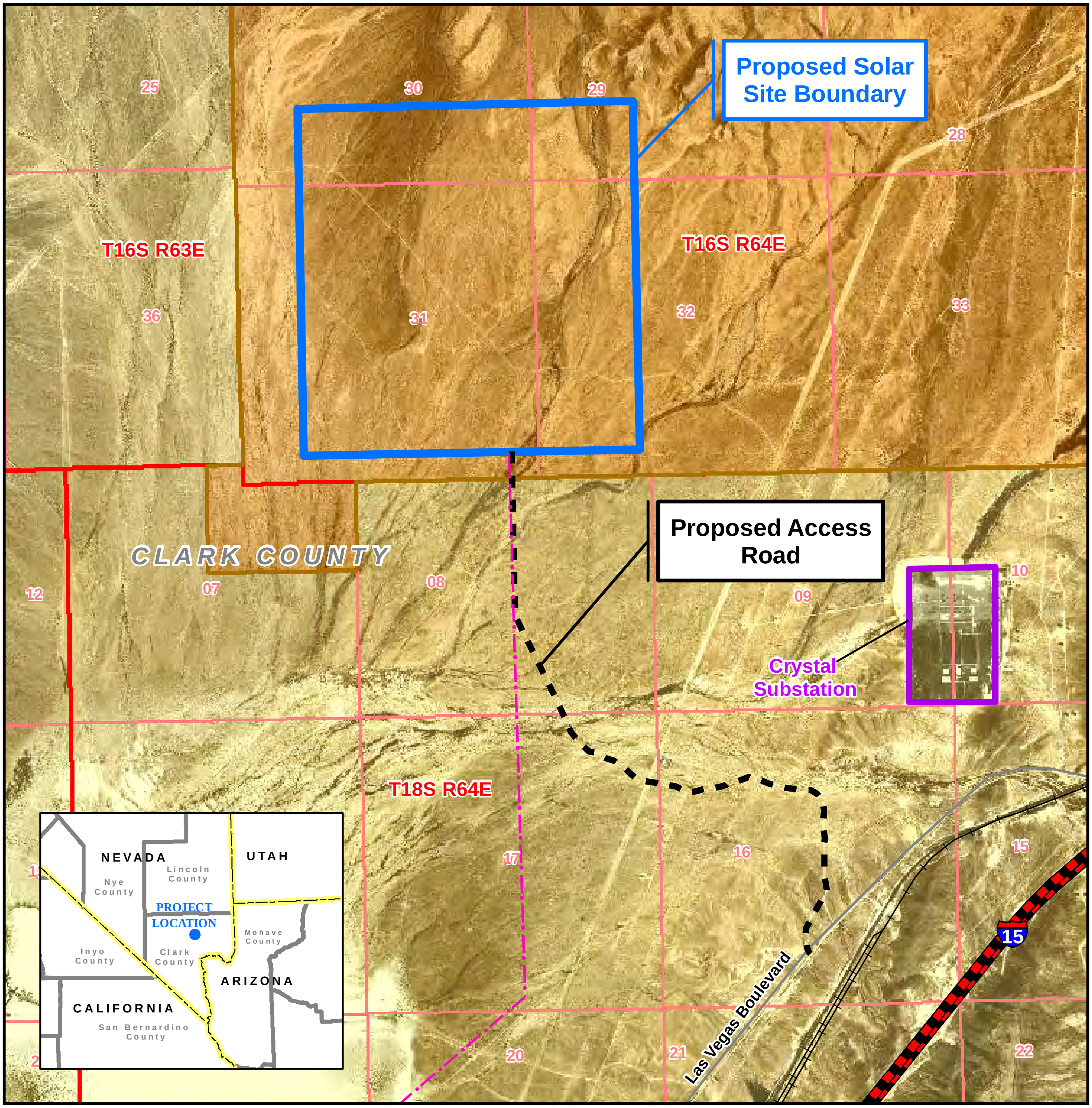
FIGURE 2-7
TYPICAL 230 kV MONOPOLE STRUCTURE

Date: 05-31-13		Author: djb

I:\Moapa Solar/MXD's/Typical 230kV Monopole 8.5x11 053113_EIS Figure 2-7.mxd



Legend

Interstate	Section Line
Local Road	Existing Substation Boundary
Railroad	Proposed Solar Site Boundary
Proposed 230kV Gen-Tie	Jurisdictional Land Ownership
Proposed Access Road	Bureau of Land Management Land
Township/Range Boundary	Indian Reservation

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Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

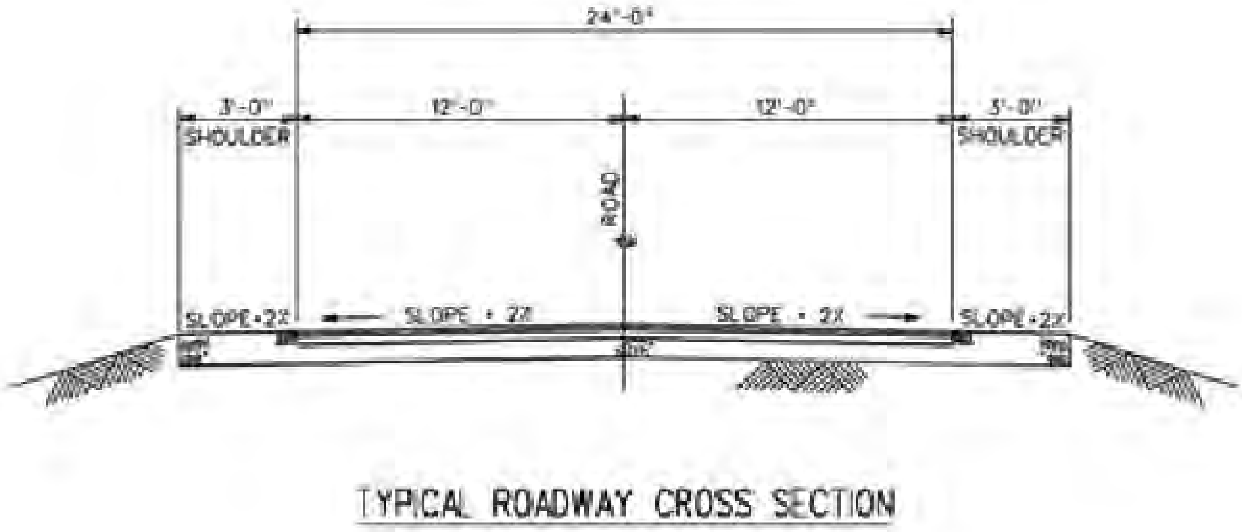
Moapa Solar Energy Center EIS

FIGURE 2-8
PROPOSED ACCESS ROAD

Map Extent: Clark County, Nevada

Date: 05-31-13 | Author: djb

I:\Moapa Solar/MXD's/Proposed Access Road 8.5x11 053113_EIS Figure 2-8.mxd

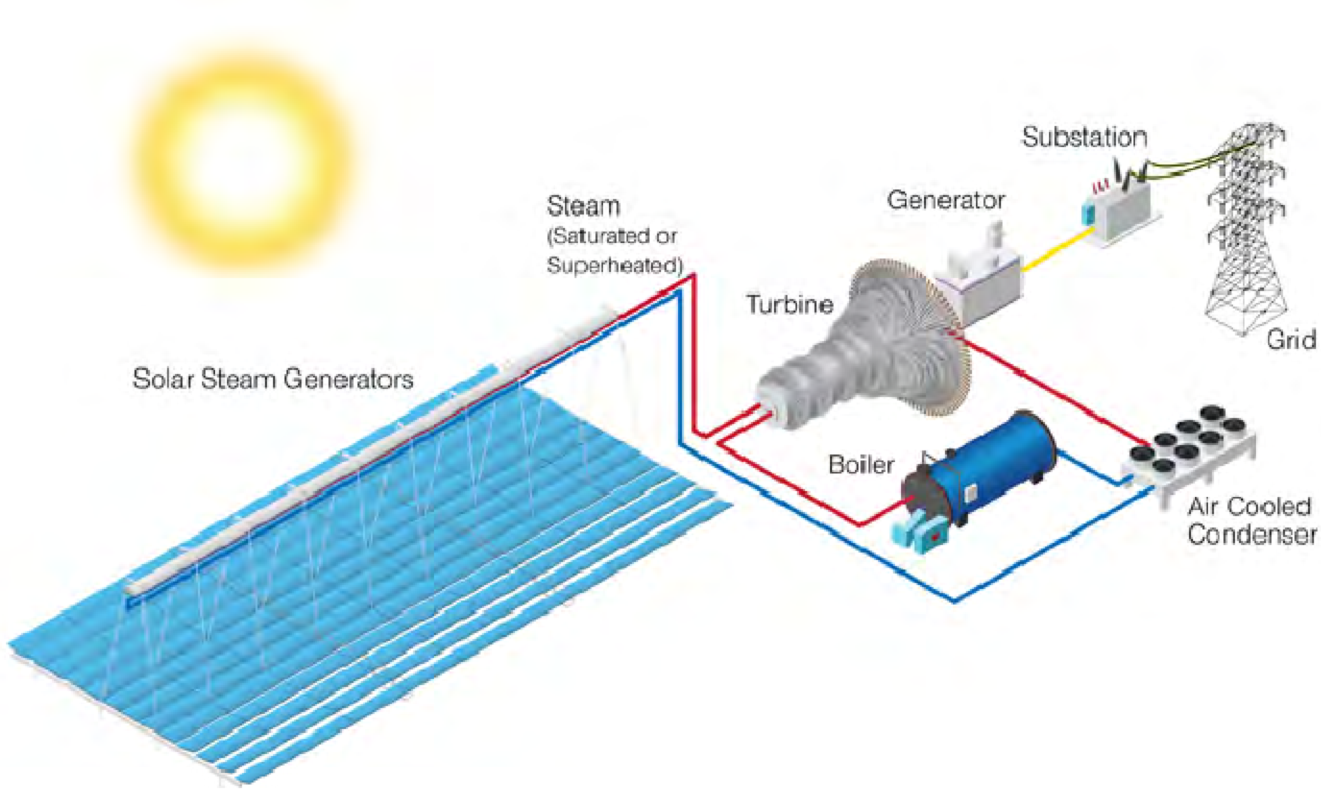


Moapa Solar Energy Center EIS

FIGURE 2-9
ACCESS ROAD CROSS-SECTION

Date: 05-31-13		Author: djb

I:\Moapa Solar/MXD's/Access Road Cross-Section 8.5x11 053113_EIS Figure 2-9.mxd



Moapa Solar Energy Center EIS

FIGURE 2-10
AREVA SOLAR CSP SYSTEM SCHEMATIC

Date: 06-10-13		Author: djb

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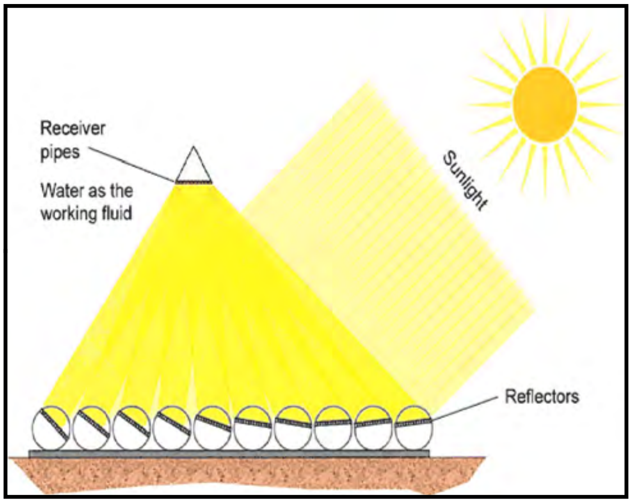

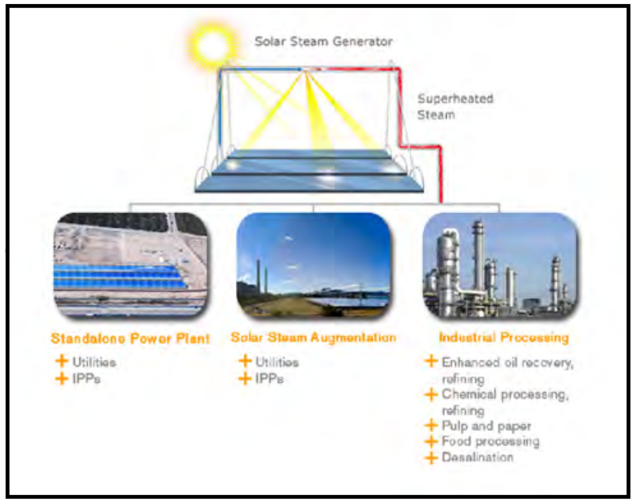

Moapa Solar Energy Center EIS

FIGURE 2-11
AREVA SSG SYSTEM

Date: 06-10-13		Author: djb

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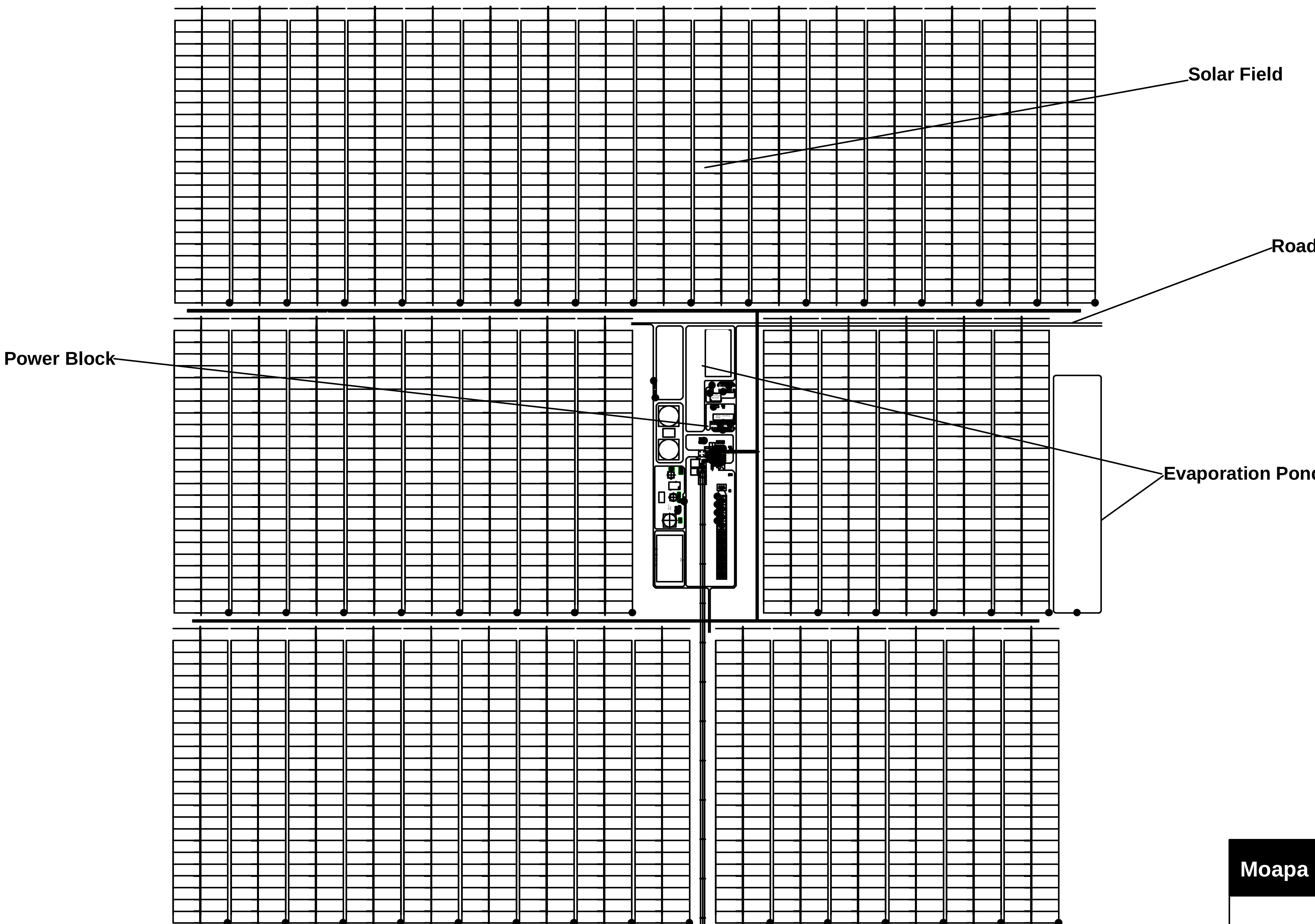

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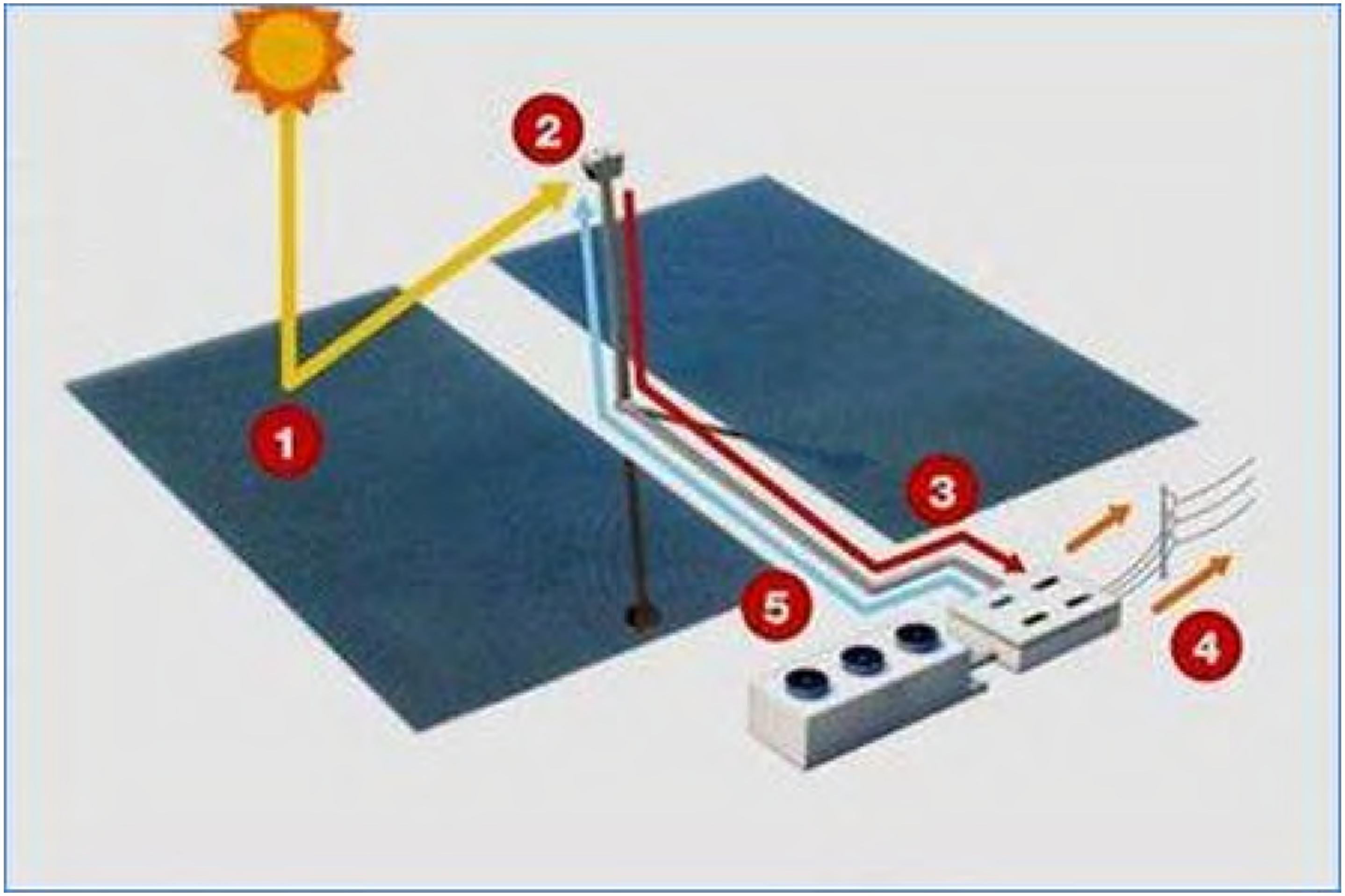
FIGURE 2-12
AREVA CSP SITE LAYOUT

Map Extent: Clark County, Nevada

Date: 06-10-13 | Author: djb

I:\Moapa Solar/MXD's/AREVA CSP Site Layout 8.5x11 061013_EIS Figure 2-12.mxd



Moapa Solar Energy Center EIS

FIGURE 2-13
eSOLAR CSP SYSTEM SCHEMATIC

Date: 04-01-13		Author: djb

I:\Moapa Solar/MXD's/eSolar CSP System Schematic 8.5x11 040113_EIS Figure 2-13.mxd

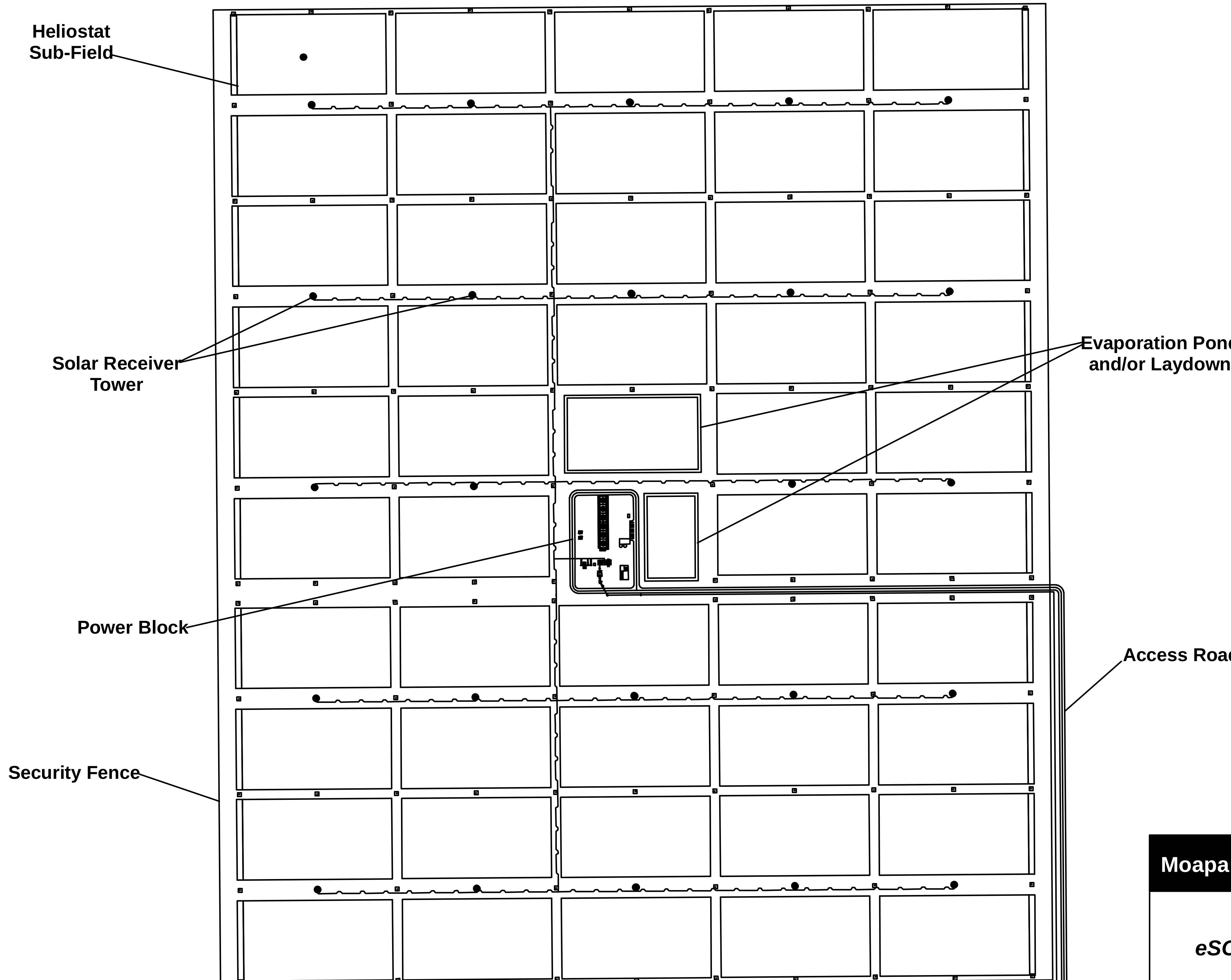
Moapa Solar Energy Center EIS

FIGURE 2-14
PHOTOS OF eSOLAR CSP TECHNOLOGY

Map Extent: Clark County, Nevada

Date: 04-01-13		Author: djb

I:\Moapa Solar/MXD's/Photos of eSolarr CSP Technology 8.5x11 040113_EIS Figure 2-14.mxd

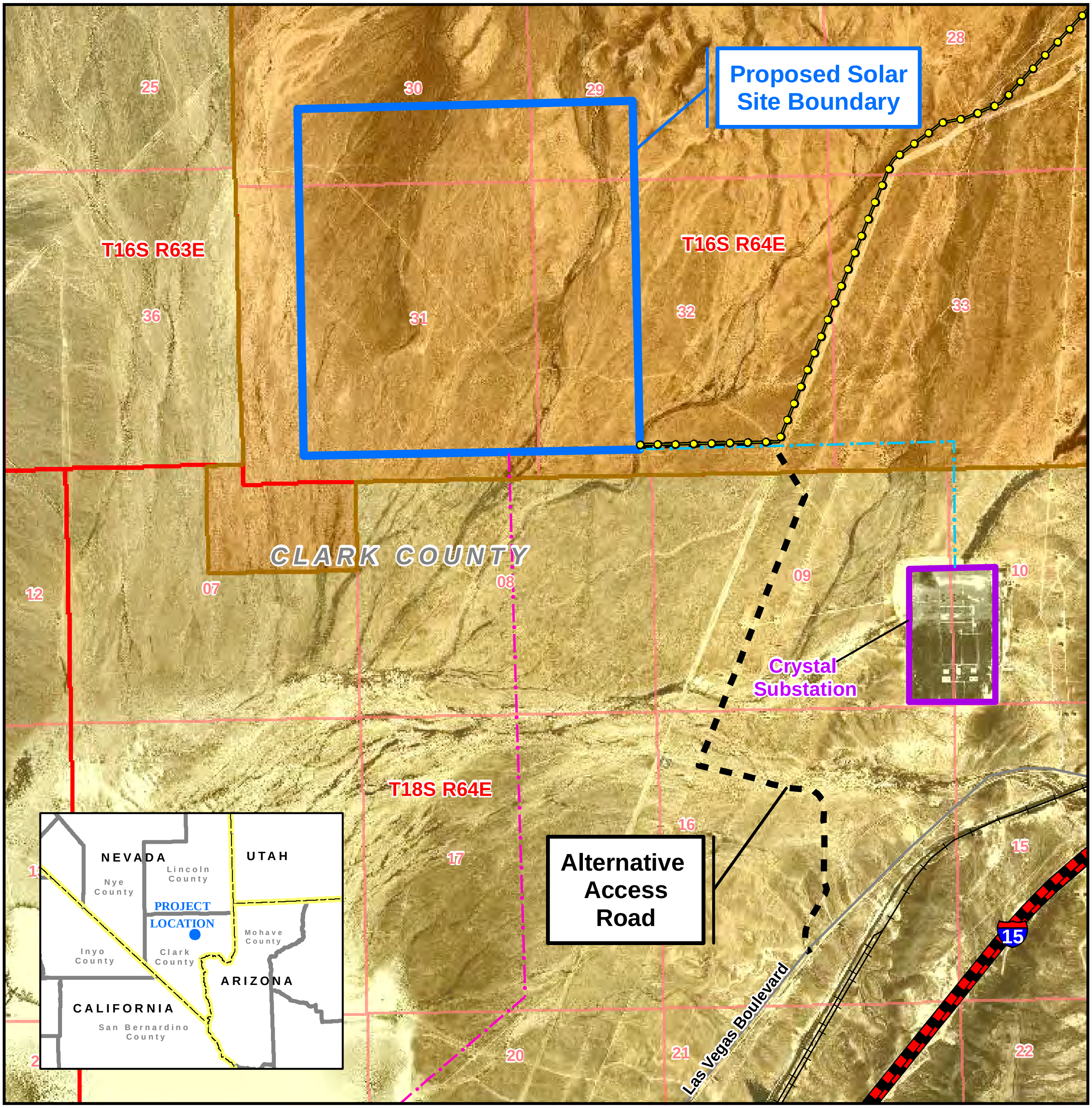


Moapa Solar Energy Center EIS

FIGURE 2-15
eSOLAR CSP Site Layout

Date: 04-01-13		Author: djb

I:\Moapa Solar/MXD's/Typical Block Array 8.5x11 040113_EIS Figure 2-15.mxd



Legend

	Interstate		Township/Range Boundary
	Local Road		Section Line
	Railroad		Existing Substation Boundary
	Proposed Water Pipeline		Proposed Solar Site Boundary
	Proposed 230kV Gen-Tie		Jurisdictional Land Ownership
	Proposed 500kV Gen-Tie		Bureau of Land Management Land
	Alternative Access Road		Indian Reservation

0 0.25 0.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

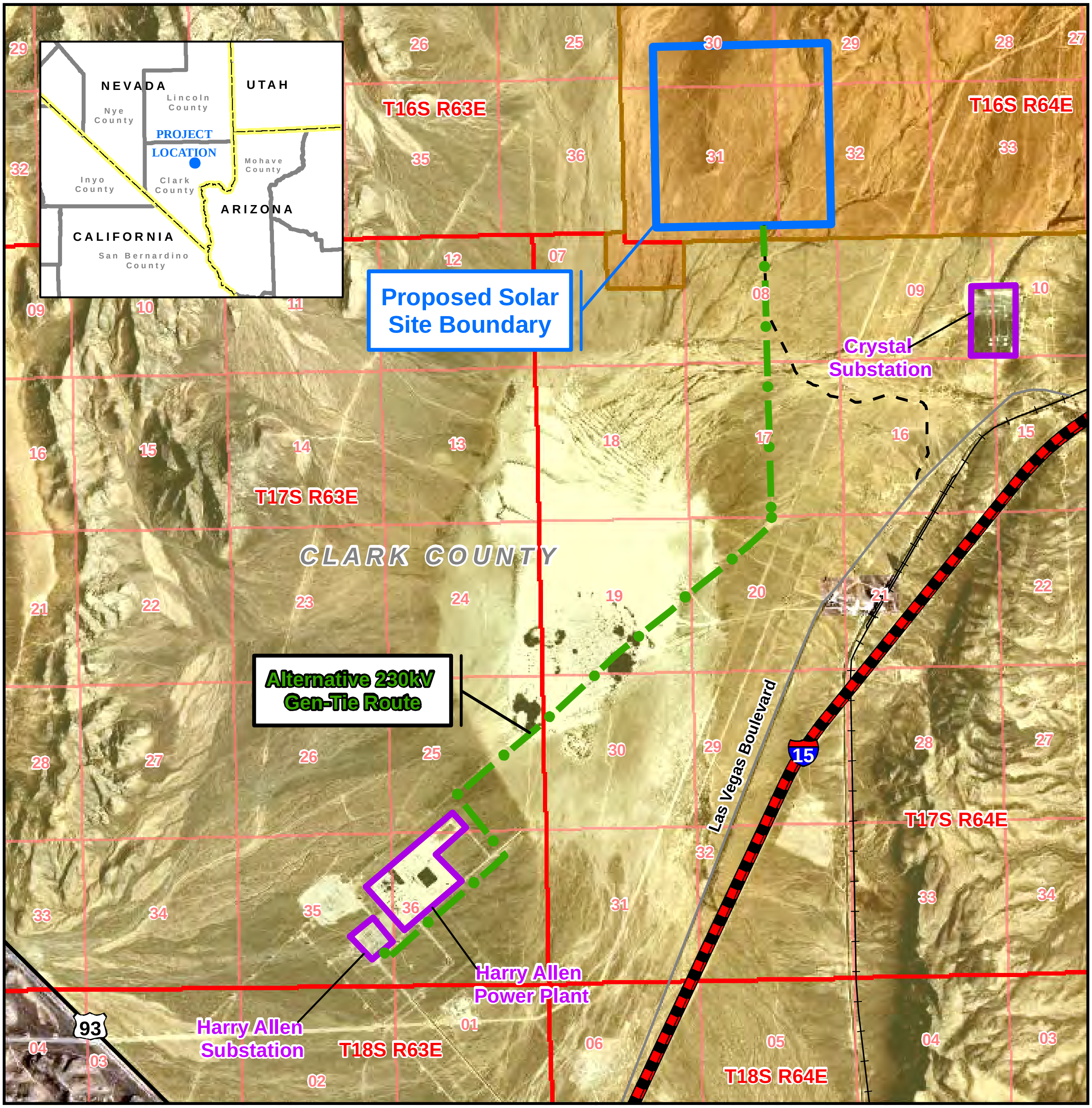
Moapa Solar Energy Center EIS

FIGURE 2-16
ALTERNATIVE ACCESS ROAD

Map Extent: Clark County, Nevada

Date: 04-30-13 | Author: djb

I:\Moapa Solar/MXD's/Alternative Access Road 8.5x11 043013_EIS Figure 2-16.mxd



Legend

	Interstate		Section Line
	US/State Highway		Existing Substation Boundary
	Local Road		Proposed Solar Site Boundary
	Railroad		Jurisdictional Land Ownership
	Alternative 230kV Gen-Tie		Bureau of Land Management Land
	Proposed Access Road		Indian Reservation
	Township/Range Boundary		

0 0.5 1

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE 2-17
ALTERNATIVE 230kV GEN-TIE

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

I:\Moapa Solar/MXD's/Alternative 230kV Gen-Tie 8.5x11 043013_EIS Figure 2-17.mxd

Chapter 3

Affected Environment

CHAPTER 3
AFFECTED ENVIRONMENT

This chapter describes the physical, biological, social and economic characteristics of the area that would be affected by implementation of the Proposed Project and alternatives. It focuses on current resource conditions as well as environmental trends based on current management. Information from the recent Final EIS for the K Road Moapa Solar Facility is utilized or referenced as appropriate for consistency (BIA, 2012).

For some resource values, the discussion will address conditions beyond the Project area to ensure an adequate analysis of off-site and cumulative impacts found in Chapter 4, Environmental Consequences. The information in this chapter is based on existing historical reports supplied by the Tribe, BIA, BLM, Applicant and field surveys conducted by the Applicant in 2010, 2012, and 2013. The data used and the surveys conducted are discussed in the respective resource discussions below.

3.1 Introduction

The Proposed Project will be located on both Reservation (86 percent) and BLM lands (14 percent) in Clark County, Nevada. Clark County covers over 8,091 square miles in southern Nevada and is bounded by Lincoln County, Nevada to the north; Nye County, Nevada to the northwest; the state of Arizona to the east, and the state of California to the southwest. The Colorado River, including the Hoover Dam and Lake Mead, is located to the southeast. Moapa Valley is the prehistoric flood plain of the Muddy River, which flows through the valley and eventually drains into Lake Mead.

The Reservation consists of 71,954 acres of land in Clark County located northeast of Las Vegas (**Figure 1-1**). The nearest incorporated community to the Proposed Project is Moapa Town, Nevada located north of the Reservation.

The Tribe’s primary business enterprise is the Moapa Paiute Travel Plaza located at exit 75 on I-15 and includes a casino, convenience store, cafe, gas station, and fireworks store. A new solar facility (K Road) is scheduled to be constructed on the Reservation in 2013 and will provide the Tribe with new sources of revenue.

3.2 Climate

The Proposed Project lies within the northeast portion of the Mojave Desert. The Mojave Desert is a transitional desert between the hot Sonoran Desert to the south and the cold Great Basin Desert to the north. The climate of the Mojave Desert is characterized by extreme fluctuations of daily temperatures, strong seasonal winds, and clear skies. Within Clark County, this region of the Mojave Desert exhibits typical subtropical arid climate. During the summer months of June through September, average daytime highs range from 94–104°F (34–40 degrees Celsius (°C)) with nighttime lows ranging from 69–78°F (21-26°C) (Western Regional Climate Center 2009). An average of 133 days per year exceeds 90°F (32°C) and 72 days that exceed 100 °F (38°C). Extreme temperatures occur most often during July and August. Humidity is often under 10 percent. On average, sunny days are recorded 85 percent of the time (Gorelow 2005).There are approximately 300 sunny days per year and annual rainfall is roughly 4.2 inches.

The winter season is generally mild and of shorter duration than summer. Average daytime highs are 60°F (16°C) with nighttime lows around 40 °F (4°C). Although temperatures can sometimes drop to freezing, 32°F (0°C), rarely do the nighttime temperatures dip below 30°F. Snowfall occurs in the surrounding mountains, but is rare in the valley. There are no wind data for this area, but data from Las Vegas International Airport (40 miles south) show winds average 7 miles per hour (mph) (Western Regional Climate Center 2009). Local summer storms during July and August are the source of most summer precipitation, and snow that falls west of the site at higher mountain elevations accounts for most of the winter precipitation.

3.2.1 Climate Change

The USEPA defines climate change as any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period of time (decades or longer) (EPA 2011). Climate change may be affected by a number of factors including natural cycles (e.g., changes in the sun's intensity or Earth's orbit around the sun); natural processes within the climate system (e.g., changes in ocean circulation); and human activities that change the atmosphere's composition (e.g., burning fossil fuels) or land surface (e.g., deforestation, reforestation, urbanization, and desertification).

Climate change is also the term typically used to describe the impact on the environment from Greenhouse Gas (GHG) emissions. GHGs are gases that trap heat in the atmosphere, causing a greenhouse effect. According to the Intergovernmental Panel on Climate Change, increased atmospheric levels of carbon dioxide (CO_2) are correlated with rising temperatures and concentrations of CO_2 have increased by 31 percent above pre-industrial levels since 1750. Climate models show that temperatures will probably increase by 1.4 °C to 5.8°C by 2100 (IPCC 2007).

The Intergovernmental Panel on Climate Change (IPCC) concluded in a statement released February 2, 2007, that "the 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" (IPCC 2007). Further, a recent report from the US Global Change Research Program (USGCRP) concludes, that the global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases (USGCRP 2009).

Deserts have a potential for carbon storage in soils rather than in their vegetation. While deserts generally store less carbon than forests on a carbon/unit area basis, the total amount of carbon that desert soils can store is potentially significant due to the extensive areas of these ecosystems.

3.2.2 Potential Effects of Climate Change

According to the Nevada Climate Change Advisory Committee (NCCAC) Final Report (NCCAC 2008), projected changes in climate would impact public health through: (1) the direct effects of heat and frequent heat waves; (2) exacerbated air pollution due to increased ground level ozone; (3) increases in infectious diseases, such as dengue fever and malaria; or (4) a decrease in general public health due to economic/social changes from climate change.

The NCCAC report indicates additional possible outcomes if greenhouse gases continue to increase in the atmosphere unabated. These include potential effects on water, wildfire, and other resources. The report also provides recommendations for minimizing the effects of climate change including supporting renewable energy development.

According to the EPA, scientists have already observed environmental changes due to climate change including a rise in sea level, shrinking glaciers, changes in the range and distribution of plants and animals, trees blooming earlier, lengthening of growing seasons, ice on rivers and lakes freezing later and breaking up earlier, and thawing of permafrost (EPA 2010). Scientists are also studying how societies and the earth's environment will adapt to or cope with climate change.

In the United States, scientists believe that most areas will continue to warm, although some will likely warm more than others. It remains very difficult to predict which parts of the country will become wetter or drier, but scientists generally expect increased precipitation and evaporation, and drier soil in the middle parts of the country.

3.2.3 Existing Greenhouse Gas Emissions

According to the Nevada Statewide Greenhouse Gas Inventory and Projections, 1990- 2020 (updated in December 2008) and EPA's Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2010, GHG emissions in Nevada accounted for approximately 38.05 Million Metric Tons (MMT) of gross CO_2 equivalent (CO_2e) emissions in 2010, an amount equal to

0.5 percent of total U.S. gross GHG emissions. Nevada's gross GHG emissions increased approximately 20 percent from 1990 to 2010, while total U.S. GHG emissions rose by only 10.5 percent during this period. Although GHG emissions increased in Nevada during this 20 year period, a peak level was reached in 2005, and GHG emissions then decreased over the next five years.

Electricity generation and transportation were the two sectors responsible for the majority of GHG emissions during the last twenty years both in Nevada and nationally. GHG emissions are expected to increase, to a total of 78.4 MMT CO2e by 2020, due to increased fossil fuel electricity production. The next largest contributors to emissions are the residential, commercial, and industrial fuel use sectors.

3.2.4 Federal Greenhouse Gas Guidance

The Council on Environmental Quality (CEQ) issued guidance to Federal agencies on February 18, 2010, regarding GHG emissions. The guidance states that in an agency's analysis of direct effects of GHG emissions, it would be appropriate to quantify cumulative emissions over the life of the Proposed Project, discuss measures to reduce emissions, including consideration of reasonable alternatives, and qualitatively discuss the link between such emissions and climate change. The CEQ recommends that if a Proposed Project would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2e GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision-makers and the public. The guidance also states that it is not currently useful for the NEPA analysis to attempt to link specific climatological changes to a particular project or emissions, as direct linkage is difficult to isolate and to understand.

3.3 Topography, Geology and Geologic Hazards

3.3.1 Topography

The Project Area is located in the Dry Lake Valley basin in the northeastern portion of the Mojave Desert. It lies within the Basin and Range Region of the southwestern U.S. with topography that is characterized by linear, north and south trending valleys and normal fault-block mountain ranges resulting from extension of the Earth's crust. The climate is typically semi-arid and deserts form in the rain shadows of linear mountain ranges. Precipitation, which drains to interior closed basins results in the formation of evaporite playa lakes, such as Dry Lake Playa in the southern portion of the Project area.

3.3.1.1 Land Forms

The mountains which border the Dry Lake Valley include the Arrow Canyon Range to the west, and the Dry Lake Range to the east. The Arrow Canyon Range is composed primarily of carbonate rocks of the Bird Spring Formation that are Ordovician to Permian in age. Elevations across the general Project area range from approximately 1,960 feet to 2,080 feet above mean sea level (**Figure 3-1**).

3.3.2 Geologic Setting, Mineral and Paleontological Resources

Overall the ground surface within the Project Area is composed of a thin layer of locally derived silty sand with gravel that forms a four- to 18-inch-thick cover within drainages and over portions of the calcium carbonate cemented alluvium (caliche) capped plateaus. Much of the exposed surface of the elevated or plateau-like portions of the Dry Lake Valley is also composed of caliche.

The southern part of the Project area on BLM-administered lands features Dry Lake playa and alkali flats covered with evaporite minerals and rocks. Evaporites tend to form in arid climates, like the Dry Lake Valley basin, where the rate of evaporation greatly exceeds rainfall, allowing lakes to form briefly and then evaporate in the desert. During the process of evaporation, water molecules change from the liquid phase to the gas phase, but atoms such as calcium, sodium, and chlorine are left behind. Site minerals have no economic value (Mifflin and Associated 2013).

3.3.2.1 Paleontological Resources

The Proposed Project is located in Quaternary alluvium (Longwell, et. al 1965) deposited by flowing water. Potential paleontological materials are unlikely to exist in the alluvial deposits, therefore the Proposed Project area is categorized as low potential for paleontological resources.

3.3.3 Geologic Hazards

3.3.3.1 Seismicity

Much of the Western United States is a region of moderate to intense seismicity related to movement of crustal masses (plate tectonics). By far, the most active regions, outside of Alaska, are in the vicinity of the San Andreas Fault system of western California. Other seismically active areas include the Wasatch Front in Salt Lake City, Utah, which forms the eastern boundary of the Basin and Range physiographic province, and the eastern front of the Sierra Nevada Mountains, which is the western margin of the province. The Proposed Project lies within Dry Lake Valley in the central portion of the Basin and Range physiographic province which is an area subject to periodic earthquake shaking. The USGS

(2007) reports 80 earthquakes of magnitude 4.0 or greater have occurred within 100 miles of the site since 1973. Of these, only 12 were of magnitude 5.0 or greater and none exceeded magnitude 5.6.

The Proposed Project lies within an area with a moderate to high potential for strong earthquake shaking. Seismicity within the area is considered about average for the central Basin and Range Province (Ryall and Douglas 1976). The USGS indicates there is a 40percent chance of a magnitude 5.0 or greater earthquake near the Proposed Project in the next 50 years.

3.3.3.2 Faults

An earthquake hazards map is not available for the Proposed Project. The closest mapped fault is the California Wash Fault that forms prominent scarps in Quaternary alluvial fan sediments along the western flank of the Muddy Mountains, approximately 10 miles northeast of the site (USGS 1991). The California Wash Fault is described as a “listric, concave to the west, northeast striking, down to the west normal fault,” which forms the structural separation between bedrock of the Muddy Mountains and Tertiary basin fill within Dry Lake Valley (Anderson 1999). The California Wash Fault has demonstrable Quaternary movement, but possible Holocene movement has yet to be investigated.

The Nevada Earthquake Safety Council (NESC 1998) has developed and adopted the criteria for evaluation of Quaternary age earthquake faults. Holocene Active Faults are defined as those with evidence of movement within the past 10,000 years (Holocene time). Those faults with evidence of displacement during the last 130,000 years are termed Late Quaternary Active Faults. A Quaternary Active Fault is one that has moved within the last 1.6 million years. An Inactive Fault is a fault without recognized activity within Quaternary time (last 1.6 million years). Holocene Active Faults normally require that occupied structures be set back a minimum of 50 feet (100-foot-wide zone) from the ground surface fault trace. An Occupied Structure is considered a building, as defined by the International Building Code, which is expected to have a human occupancy rate of more than 2,000 hours per year.

Recurrence intervals for Nevada earthquakes along faults that have been studied are estimated to be in the range of 6,000 to 18,000 years in western Nevada (Bell 1984). The very active eastern boundary faults of the Sierra Nevada Mountains may have a shorter recurrence interval of 1,000 to 2,000 years. Many of the smaller faults may be the result of one-time events in response to movement along a better developed and more active fault system a considerable distance away.

Based on the geologic map, the California Wash Fault, approximately 10 miles northeast of the site, is considered to be Quaternary Active. The set back from Quaternary Active Faults is left to the judgment of the geologist/engineer; however, no Critical Facility is permitted to be placed over the trace of a Late Quaternary Active Fault. A Critical Facility is defined as a building or structure that is considered critical to the function of the community or the project under consideration. Examples include, but are not limited to, hospitals, fire stations, emergency management operations centers and schools. Since no faults are mapped as crossing the site and none were suggested by the geotechnical investigation, adequate setbacks exist for the Proposed Project structures from known faults.

3.3.3.3 Ground Motion and Liquefaction

Mapping by the USGS (2007) indicates that there is a 2 percent probability that a bedrock ground acceleration resulting in very strong perceived shaking will be exceeded in any 50-year interval. Only localized amplification of ground motion would be expected during an earthquake. Because the site area is underlain by dense to very dense caliche soils and bedrock, liquefaction potential is negligible at the site (K Road EIS 2012).

3.4 Soils

Typical of soils in arid environments, local soils are poorly developed and shallow, almost completely absent in some areas. In general, the local soils are typically only four inches deep and rarely more than 18 inches in depth over an underlying caliche layer.

The 850-acre MSEC site contains two soil series - the Grapevine series which covers approximately 95 percent and the Ireteba series that makes up the remaining 5 percent (USDA NRCS 2006). Soils where the proposed transmission line corridors, and access road to support the project are located include the Anthony, Bard, Ireteba, Playas, St. Thomas, and Tonopah series (**Figure 3-2**).

3.4.1 Soil Series Descriptions

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey maps (USDA NRCS 2006) were used to determine the soil information for the proposed Project area. Engineering properties of the soils can be found in **Table 3-1**.

3.4.1.1 Anthony Series (Af)

The Anthony series consists of very deep well-drained soils formed in stratified alluvium. Anthony soils are on alluvial fans and floodplains and have slopes of 0 to 15 percent. Vegetation is creosotebush, bursage, cacti, paloverde, bush muhly, spike dropseed, Pima pappusgrass, fourwing saltbush and annual forbs and grasses. Irrigated crops are cotton and alfalfa.

3.4.1.2 Bard Series (BD, BHC, BMD, BNB, BRB)

The Bard series consists of shallow over cemented material, well-drained soils that formed in alluvium derived predominantly from limestone and dolomite with some sandstone and quartzite. The Bard soils are on dissected valley fill terraces, alluvial fans and fan remnants. Slope ranges from 0 to 15 percent. The vegetation is mainly creosotebush, white bursage, annual buckwheat, cholla, and other cacti.

TABLE 3-1
SOIL SERIES ENGINEERING PROPERTIES

Soil Series	Moist Bulk Density (g/cc)	Saturated Hydraulic Conductivity (um/sec)	Available water Capacity (In/in)	Erosion Factors			Wind Erodibility Group	Surface Runoff	Risk of Corrosion	
				Kw	Kf	T			Uncoated Steel	Concrete
Anthony (Af)	1.55-1.75	14-141	.04-.15	.28	.28	4	3	Very Low	Moderate	Low
Bard (BD,BHC,BMD,BNB, BRB)	1.30-1.75	4-705	.03-.13	.43	.49	5	6	Very High	Moderate	Moderate
Colorock-Tonopah (CTC)	1.35-1.75	4-705	.03-.12	.15	.43	5	6	Very High	High	High
Grapevine (Gv)	1.40-1.50	4-14	.12-.18	.43	.43	5	5	Low	High	Moderate
Ireteba (Ir, It)	1.45-1.70	4-14	.13-.18	.43	.43	5	4L	Low	High	High
Playas (PL)	1.50-1.80	.01-.42	.02-.04	.43	.43	n/a	8	Low	n/a	n/a
Rock land - St. Thomas (RTF)	1.15-1.35	4-42	.04-.10	.28	.55	1	5	Very High	Moderate	Moderate

Source: NRCS 2012. Available at http://soildatamart.nrcs.usda.gov/Report.aspx?Survey=NV608&UseState=NV. Accessed 3/9/2013.
n/a = not available

3.4.1.3 Grapevine Series (Gv)

The Grapevine series consists of deep, well-drained, fine sand soils that formed in mixed alluvium with some gypsum. Grapevine soils occur on fan piedmonts and alluvial flats.

Elevations are 1,700 to 3,600 feet and slopes range from 0 to 15 percent. The soil surface is covered by approximately 10 percent gravel. The present vegetation is mainly creosotebush, white bursage, and Indian ricegrass.

3.4.1.4 Ireteba Series (Ir, It)

Ireteba soils occur on the smooth, nearly level lower margins of alluvial fans and in flat basins. The slope gradients are commonly less than 0.2 percent, but may include slopes up to 1 percent. They have developed in loamy alluvium derived from mixed rock sources including assorted volcanic and sedimentary rocks. Vegetation consists mainly of creosotebush, white bursage, and desert sage. The plant density is about 2 percent.

3.4.1.5 St. Thomas Series (RTF)

The St. Thomas series consists of very shallow and shallow, well drained soils that formed in residuum and colluvium derived from limestone and dolomite. The St. Thomas soils are on hills and mountains. Slope ranges from 2 to 75 percent. The present vegetation is mainly creosotebush, white bursage, big galleta, and Indian ricegrass.

3.4.1.6 Tonopah Series (CTC)

The Tonopah series consists of very deep, excessively to well-drained soils that formed in mixed alluvium. Tonopah soils are on fan remnants and fan piedmonts. Slope ranges from 0 to 15 percent. The present vegetation is mainly creosotebush and white bursage.

3.5 Water Resources

The Proposed Project lies in a northeastern portion of the Mojave Desert in the internally drained Garnet Valley (Dry Lake Valley) groundwater basin within the watershed of the Colorado River. To the west and north, the area is bound by Paleozoic limestone outcrops that are the limits of the Arrow Canyon Range. The area is flanked to the west by the North Muddy Mountains that are the extent of the California Wash drainage basin. The Moapa Valley lies to the northeast. To the southeast, the main course of California Wash flows northeast to the Muddy River. The elevation within the SPGF site ranges from about 2000 to 2100 feet above mean sea level.

3.5.1 Surface Water

A field investigation conducted in May, 2010 identified seven ephemeral drainages and one playa in the Proposed Project area. No surface water was identified within the drainage features nor within the Dry Lake playa.

Ephemeral drainages provide natural distribution of water and sediments, recharge of groundwater in the area, and a sporadic but local water supply for wildlife. A playa is defined as a flat-floored bottom of an undrained desert basin that becomes at times a shallow lake. Playas collect water from drainages or precipitation and collected surface water typically evaporates leaving deposits of salt or gypsum on the soil surface (CH2M Hill 2010).The ephemeral drainages all drain into the Dry Lake playa located approximately 1.0 mile south of the Proposed Project site. The Proposed Project does not contain or drain to a wild and scenic river (Wild & Scenic River Council 2009). The Proposed Project site is not within the Federal Emergency Management Agency (FEMA) 100-year floodplain; however the transmission lines connecting to the Harry Allen Substation would cross a 100-year floodplain. **Figure 3-3** shows ephemeral drainages, playas, and 100-year floodplains.

3.5.1.1 Surface Water Quality

The EPA regulates water quality on Tribal lands under Section 401 of the Clean Water Act. The Nevada Department of Environmental Protection (NDEP) has set water quality standards contained in the Nevada Administrative Code (NAC) 445A defining the water quality goals for important water bodies by designating uses of the water and by setting criteria necessary to protect beneficial uses and prevent degradation. However, based on tribal sovereignty, state water quality standards are not applicable on Tribal lands. Additionally, Section 303(d) of the Clean Water Act (CWA) requires the NDEP to develop a list of impaired water bodies needing additional work beyond existing controls to achieve or maintain water quality standards.

There are no perennial waterbodies in the Proposed Project area and, consequently, there is no surface water quality data available. The Proposed Project area does not contain, nor is a direct tributary to, any waterbodies that are on Nevada's 303(d) list for exceeding state water quality standards (NDEP 2009). The Muddy River, located approximately 12 miles northeast of the Proposed Project, is fed by springs connected to the regional groundwater system. It is considered impaired and is on the 303(d) list.

For the Muddy River, NDEP developed site-specific numeric standards for pH, dissolved oxygen, maximum temperature, phosphorous, nitrite, nitrate, turbidity, total dissolved solids, color, and E. coli to protect the designated beneficial uses and to maintain existing water quality. From its spring source to Glendale, designated beneficial uses for the Muddy River include irrigation, stock watering, recreation not involving contact with the water, industrial supply, municipal or domestic supply, propagation of wildlife, and propagation of aquatic life.

California Wash is the closest major drainage to the Project area and is located east of I-15 in the vicinity of the Project. It is not an impaired 303(d) listed water body, and, therefore, does not have a numeric water quality standard. Instead, California Wash has a general narrative standard, which applies to all streams in Nevada (NAC 445A.121), that the waters be maintained to be free from various pollutants including those that are toxic.

3.5.2 Ground Water

The bedrock of the Project area is largely composed of Paleozoic carbonate rocks, ancient marine sediments that contain the minerals calcite and dolomite as their primary constituents. Fracture zones and associated solution cavities within these carbonate rocks provide highly transmissive aquifers where they are saturated and such transmissive zones can be continuous over large areas independent of surface topographic basins and ranges. "Regional" groundwater flow is the result of these large-scale groundwater interconnections and is readily demonstrated by uniformity of temperature and discharge at associated springs and by homogeneous chemical characteristics (Mifflin 1968).

Many of the carbonate aquifers throughout the general region are believed to be associated with groundwater flow systems that discharge at large springs. Therefore, development of the carbonate aquifers for water supplies has the potential for long-term impacts on spring flows.

There are three distinctive lithologies that determine the regional patterns of groundwater flow: Paleozoic carbonate rock, indurated Mesozoic sediments, and Cenozoic basinfill. Paleozoic terrain can be highly transmissive, particularly where affected by extensional faulting and subsequent dissolution. Mesozoic terrain is locally important as a hydraulic barrier particularly where large folds involving fine-grained sediments are present beneath Mesozoic thrust faults. Cenozoic basin fill is very heterogeneous, but volumetrically the fine-grained sediments (aquitards) are significant.

The study area incorporates the general framework described above, with lacustrine sediments of the Muddy Creek Formation the most widely exposed basin-fill unit. The Muddy Creek Formation also contains paludal (spring and marsh) deposits, but lithologically it is fine-grained except at basin margins and hydrologically can be considered an aquitard. Evaporites (salts) occur within the Muddy Creek Formation, making this unit poor for groundwater development from both quality and quantity standpoints. Mesozoic rocks are rich in evaporates and of low permeability, so are similarly unattractive for groundwater development.

Locally, alluvial aquifers inset into the Muddy Creek Formation occur in the basin along the Muddy River and lower Meadow Valley Wash. Alluvial gravels in upper Moapa Valley extend from about 2 miles northwest of the Muddy River springs area to the Glendale area, where they are joined by similar alluvial gravels associated with lower Meadow Valley Wash. The alluvial gravels attain thicknesses of about 100 feet beneath the narrow floodplains of these two drainages. Local heavy pumping from these transmissive gravels has degraded water quality as poorer-quality water has been drawn in from the subjacent Muddy Creek Formation.

The relationship between the carbonate aquifer and the alluvial gravels further complicates the hydrology in the Muddy River springs area. The Muddy Creek Formation generally separates these aquifers, but locally it can be missing or conduits provide a direct connection from the carbonate aquifer to the gravels. The gravel aquifer is recharged by the carbonate aquifer about 3 kilometers up-gradient from the Muddy River springs, where the alluvial aquifer discharges as base flow in the headwater channels of the Muddy River. In this same general area, several large springs issue directly from the carbonate aquifer with outflow channels to the Muddy River.

The entire flow of the Muddy River is derived from the discharge from the regional carbonate aquifer, except during infrequent precipitation events that increase river flows for up to a few days. Historic flow records indicate that about 51 cubic feet per second (cfs) of groundwater discharge sustain the spring and river flows. Currently, consumptive uses related to 1) natural evapotranspiration, 2) surface-water diversions, and 3) groundwater diversions reduce the Muddy River flows to about 25,000 AFY (35 cfs) at the Warm Springs Road gaging station, located about 3 kilometers downstream of the spring area. Thus, about 32 percent (12,000 AFY) of the regional flux to the area is consumptively removed from the system above the gage. Of this, about 3,600 AFY (~25%) is estimated to be lost by evapotranspiration from the well-vegetated areas of the headwater channels and springs, and the rest is removed through pipelines by Moapa Valley Water District (MVWD) and Nevada Energy Company (NVEnergy) for use elsewhere.

The Paleozoic limestones and dolomites of the Project area extend over a very large area to the north, south, and west of the Project area to establish a sub-region that has been named the Arrow Canyon Range Cell (ACRC) of the carbonate aquifer (Mifflin 1992; Johnson and Mifflin 2003). Within the ACRC, which underlies most of the Moapa Indian Reservation, hydraulic gradients are small-and large-scale aquifer anisotropy is poorly understood, so estimated directions of groundwater movement are imprecise. Since 2000, comprehensive water-level monitoring and a 7-day aquifer test on the Reservation, several new monitoring wells installed by the Southern Nevada Water Authority (SNWA) in Coyote Spring Valley, and studies conducted for the Calpine Project on the Reservation have provided aquifer parameter estimates and boundary information for the area. The carbonate aquifer of the ACRC has good hydraulic continuity over a vertical thickness of 5,000 feet (based on uniform temperature and heads in individual boreholes)so fluxes can be large in spite of the low lateral hydraulic gradients.

Figure 3-4 depicts the key conceptual model of the groundwater regime in the area of the Project. This shows the material-property domains, line sinks, prescribed-head boundaries, no-flow boundaries, a recharge area, and an inferred hydraulic barrier separating the area referred to as domain K1 (the Southern Flow Field) from domain K2+K3 (the Northern Flow Field). Including a hydraulic barrier (Johnson and Mifflin 2003) in the model was necessary to match simulated water levels to field observations. Where domain K0 underlies the eastern part of the Reservation (a result of faulting on the Hogan Springs Fault Zone) (Schmidt et al., 1996), exploratory drilling of up to 4,000 feet (Johnson et al., 1986) has not encountered Paleozoic carbonate rock. Details of these domains and their characteristics are included in the hydrogeology report in **Appendix F**.

Figure 3-5 depicts the potentiometric surface (water table) in the region of interest, with residuals (differences between computed and observed water levels) indicated. Inflow to the ACRC occurs from the north and west, and diffuse discharge occurs to the south and east. This shows that there are relatively flat hydraulic gradients in the Northern and Southern Flow Fields and the very small “step” (approximately 2.0 meters) between these flow domains resulting from a hydraulic barrier. All regional and local databases and testing analyses to date indicate that the Southern Flow Field in general and the Project area in particular are favorable for large-scale groundwater production without adverse effects on regional springs.

Present groundwater development in the Southern Flow Field consists of about 3000 AFY (4cfs) on an annualized basis for industrial uses near Apex (in the extreme southern-most extent of K1). Large-scale development in the Northern Flow Field is concentrated near the Muddy River springs and southeastern Coyote Spring Valley in the K3 domain, where up to 14,600 AFY (20 cfs) in summer is being withdrawn for irrigation, industrial and municipal uses with pumping strongly weighted to the summer months. Large-scale pumping in Coyote Spring Valley began in 2005, and has become less seasonal in overall character since pumping began at MX-5 in late 2010; the annualized rate has stabilized at about 8 cfs since mid-2012.

Comparison of the pumping histories with a composite hydrograph from Reservation monitoring wells shows that aperiodic water-level changes cannot be a response to pumping. There is a commonly-held misconception that recent water-level declines in several interconnected hydrographic basins have occurred in response to Order 1169 pumping; aquifer tests at ECP-1, MX-5 and RW-2, however, have provided clear physical evidence that cones of depression produced by pumping are undetectable beyond about 2 miles from the pumped well. The rise in regional water levels beginning in late 2004 and lasting into 2006 occurred without any cessation of pumping, and is better explained by the very wet winter of 2004-2005. Annually-periodic water-level fluctuations are less in northern Coyote Spring Valley than in the Reservation area, and absent 100 miles to the north in Dry Lake Valley and 100 miles west in the Amargosa Desert. These appear to be associated with seasonal loading and unloading in the Lake Mead Basin, given recent evidence of the magnitude of crustal deformation and the lag and attenuation of the seasonal signal between monitoring wells M2 and M3, the expected southeast-to-northwest propagation of the pressure signal. Water from Order 1169 testing is therefore not being derived from storage, as is widely believed; the evidence strongly indicates that waters that would otherwise discharge to the Muddy River are being intercepted by pumping in Coyote Spring Valley. Boundary conditions affecting the proposed production well for the MSEC Project are completely different, dominated by upwelling waters that have traversed the Muddy River headwaters area and do not contribute to the base flow of the River.

3.5.2.1 Ground Water Quality

Groundwater quality in the hydrologic basins of the Mojave Desert in California and Nevada is generally acceptable for most uses of groundwater; however, since many of the basin-fill aquifers have closed surface drainage and limited inter-basin flow, aquifers may contain poor quality, saline waters, elements from natural geothermal activity, and contaminants from mining or energy operations (BLM 2009a). Groundwater in the California Wash is generally high in salinity and the water from the Proposed Project well is also high in sulfate. The Total Dissolved Solids (TDS) range between 750 to mid-900 mg/L. The sulfate level from one of the well samples was at 290 mg/L.

3.5.3 Water Rights

The Tribe was issued a 2,500 AFY groundwater right in 1989 by the State Engineer (K Road FEIS 2012) and in a Memorandum of Agreement with Southern Nevada Water Authority and other parties in April 2006 (Moapa Paiute Water Settlement Agreement 2006). It is also permitted with 3,500 AFY of surface water from Muddy River. The Tribe’s water rights are permitted for “municipal” use. Usually in order to use Nevada State water rights for an energy project the permitted use must be industrial. Nevertheless, because the Tribe is a government it can act as a municipality and provide water throughout the Reservation much like a water district. Therefore, a change in use of the water is not required (K Road FEIS 2012).

3.5.4 Jurisdictional Waters, Drainages, and Riparian Areas

As stated earlier, the Proposed Project does not contain or drain to a wild and scenic river and there are no perennial water bodies within the Proposed Project area.

As mentioned above, seven ephemeral drainages were identified within the Project area and all drain into the Dry Lake playa located south of the site. These drainages were greater than 2 feet in width between their ordinary high water marks (OHWMs). No surface water was observed at the time of investigation and these drainages appear to flow only in response to storm events showing discontinuous and/or weak evidence of OHWM with gravel and silt substrate composition. Drainage morphology ranges from 2-foot-wide single channels to features up to 30 feet wide (bank to bank) with multiple small braided channels contained within their banks. Frequently, drainages lost identifiable flowpath organization as they went downslope. Channelized flow patterns observed at one location become disorganized and fanned into unconfined sheet flow when followed downgradient.

No drainages were identified to intersect with the playa boundary as confined channel flow. The OHWM for the Dry Lake playa was discontinuous and determined by landscape position, salt crust, polygon soil patterns, salt grass cover, and presence/absence of upland vegetation (less than 50 percent cover). The substrate of the playa was hard surface and became more consolidated toward its center and the surface showed weak evidence of cracking in a polygon formation. Playas are not typically federally regulated under the CWA as they have no surface connection to a Traditional Navigable Water of the U.S.

The Applicant requested a jurisdictional determination (JD) from the US Army Corps of Engineers (USACE) in August, 2010 (**Appendix G**). The Applicant received an approved JD from the USACE on February 16, 2011 and it was confirmed that the USACE will not assert jurisdiction over any of ephemeral drainages located within the solar facility boundary.

Waters outside of the solar facility and potentially impacted along the associated ROWs could be subject to permitting through the USACE under Section 404 of the Clean Water Act. However, the local drainages flow into the Dry Lake playa and are not connected to navigable waters so are not expected to be jurisdictional.

3.6 Air Quality

This section identifies existing air quality within and adjacent to the Proposed Project and the air quality standards that apply to the local area.

3.6.1 Existing Ambient Air Quality

Ambient air quality is primarily a result of the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin and the regional meteorological conditions. Degraded air quality in Clark County results from both localized industrial developments throughout the County, vehicle emissions from the local population, fugitive dust from exposed areas in addition to air pollution transported from the west coast.

Clark County is divided into separate airshed regions synonymous with hydrographic areas (HAs). Hydrographic areas represent natural and man-made stream drainage areas or basins. The Proposed Project is located within HA 218 (California Wash) as defined by the County. However the County does not regulate air quality on the Reservation. The EPA regulates air quality on Tribal lands. The County does regulate air quality off the Reservation.

Attainment areas are those areas meeting state and Federal air quality standards. Non-attainment areas do not meet the state and Federal air quality standards. EPA has designated parts of Clark County as Non-attainment for Particulate Matter 10 microns or less (PM_{10}) and Ozone (O_3). The County is developing a maintenance plan for PM_{10}. Clark County is in attainment for Particulate Matter 2.5 microns or less ($PM_{2.5}$), Nitrogen Dioxide (NO_2) and Carbon Monoxide (CO), and is unclassifiable for Lead (Pb) and Sulfur Dioxide (SO_2).

The Proposed Project area is located outside the CO and PM_{10} non-attainment areas but within the ozone non-attainment area. Therefore, the Proposed Project area is in attainment for all six criteria pollutants except ozone. However, as noted above, the ozone non-attainment area for HA 218 excludes the Moapa River Indian Reservation and would not include the SPGF site.

3.6.1.1 Significant Thresholds

Pursuant to the Federal Clean Air Act of 1970, the EPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: O_3, $PM_{2.5}$ and PM_{10}, Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2) and Lead (Pb) (EPA 2010a).

The NDEP, Bureau of Air Quality has air quality statutes that require the use of reasonably available methods to prevent, reduce or control air pollution throughout Nevada. Nevada has its own State Ambient Air Quality Standards (SAAQS), which are similar to the NAAQS but with some differences (NAC 445B.22097). The current State of Nevada and Federal ambient air quality standards and background concentration levels are shown on **Table 3-2**.

The Clark County Department of Air Quality and Environmental Management (DAQEM) is responsible for monitoring air and developing and monitoring control measures. DAQEM regulates all stationary and non-vehicular sources including construction sources, of fugitive dust. According to Section 17 of Clark County's Air Quality Regulations, a plan-specific permit is required for construction activities involving surface disturbances greater than 0.25 acre such as grading and trenching. This permit would apply to Project actions on BLM lands and would include conditions requiring control of fugitive dust emissions.

TABLE 3-2
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND BACKGROUND CONCENTRATION LEVELS 2004-2008

Pollutant	Averaging Time	Nevada Standards	Federal Standards (NAAQS)	Background Concentration Level	
				Concentration [b,c]	Measurement Location/Year
CO	8-Hour 1	9 ppm	9 ppm	3.9 ppm (43%)	Las Vegas 2005
	1-Hour 1	35 ppm	35 ppm	5.7 ppm (16%)	Las Vegas, 2004
Pb	NV Quarterly Mean, National Rolling3-month	1.5 µg/m3 N/A	0.15 µg/m3	N/A	N/A
NO_2	Annual	0.053 ppm	0.053 ppm	0.006 ppm (11%)	North Las Vegas 2007
	1-Hour 4	N/A	100 ppb[f]	N/A	N/A
PM_{10}	Annual	50 µg/m3	N/A	22 µg/m3(44%)	North Las Vegas 2008
	24-Hour	150 µg/m3	150 µg/m3	97 µg/m3(65%)	North Las Vegas 2006
$PM_{2.5}$	Annual	15 µg/m3	12µg/m3	4.1 µg/m3(27%)	North Las Vegas 2005
	24-Hour	35 µg/m3	35 µg/m3	10.2 µg/m3(29%)	North Las Vegas 2005
O_3	8-Hour	N/A	0.075 ppm	0.081 ppm (108%)	North Las Vegas 2007
	1-Hour	0.12 ppm	0.12 ppm[g]	0.104 ppm (87%)	North Las Vegas2005
SO_2	Annual	0.03 ppm	0.03 ppm	0.006 ppm (20%)	North Las Vegas 2005
	3-Hour	0.5 ppm	0.5 ppm	0.009 ppm (1.8%)	North Las Vegas 2005
	1-Hour	N/A	75 ppb[d]	N/A[e]	N/A

[a] Monitored concentrations are the second-highest for all averaging times less than or equal to 24-hour averages, except fourth-highest daily maximum for 8-hour O3and the 98th percentile for 24-hour PM2.5 and arithmetic mean for annual SO2, NO2, PM10, and PM2.5.
[b] Values in parentheses are background concentration levels as a percentage of NAAQS or SAAQS, respectively. Calculation of 1-hour SO2and NO2 to NAAQS was not made, because no measurement data based on new NAAQS are available.
[c] Effective August 23, 2010.
[d] NA = not applicable or not available.
[e] Effective April 12, 2010.
[f] The EPA revoked the 1-hour O3standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
[g] Effective January 12, 2009.
Sources: EPA (2010a,b); NAC 445B.22097, Clark County 2004

DAQEM uses the national ambient air quality standards to determine the potential impacts of a Proposed Project. Additional requirements for both construction and operation are in place to manage emissions of fugitive dust (including the subsets of PM_{10} and $PM_{2.5}$). Any approved construction or new significant source of stationary (point) air pollution in Clark County would be required by DAQEM to adhere to the prescribed best management practices (BMPs) and control measures in order to minimize dust emissions and control engine exhaust emissions.

Ozone (O_3)

EPA made the determination that Clark County is in attainment with the 1997 Ozone NAAQS in 2011. EPA will redesignate the area to attainment in the future upon approval of the Ozone Redesignation Request and Maintenance Plan submitted to EPA. The Ozone Redesignation Request and Maintenance Plan is a formal request by DAQEM to the EPA to redesignate the Clark County ozone nonattainment area to attainment for the 1997 8-hour ozone NAAQS.

An Ozone Early Progress Plan 8-hour Ozone nonattainment area was submitted to EPA in 2008, and approved in 2009. In 2012, EPA published the proposed rule for Approval of the Maintenance Plan and Redesignation of Clark County for the 1997 8-Hour Ozone Standard.

Particulate Matter (PM_{10})

The Las Vegas Valley (HA 212) within Clark County is classified serious nonattainment for PM_{10}. DAQ submitted a State Implementation Plan (SIP), which explains how the area will attain the NAAQS for PM_{10}. EPA made the determination that the Las Vegas Valley is in attainment with the PM_{10} NAAQS in, 2010 (75 FR 45485), and will redesignate the area to attainment in the future upon approval of the pending maintenance plan and request for redesignation.

Infrastructure SIP

The Federal Clean Air Act (CAA) requires the County to prepare Infrastructure SIPs (I-SIP) every time EPA promulgates a new, or revises an existing NAAQS. The purpose of the I-SIP is to demonstrate Clark County has the programs in place to implement, maintain, and enforce the NAAQS. In 2009, the Nevada Department of Environmental Protection (NDEP) submitted a consolidated I-SIP submittal for the 1997 8-hour O_3 NAAQS, and the 1997 and 2006 NAAQS for $PM_{2.5}$. EPA published a proposed rule for approval of the I-SIP in 2012.

3.6.2 General Federal Actions

The General Conformity Rule requires Federal agencies to ensure that their actions (including permitting of projects) conform to the applicable SIP. Given that the Proposed Project takes place almost entirely on Reservation land, the applicable SIP may only apply to that portion of the Proposed Project on BLM lands. The EPA has full authority over new sources constructed on Tribal lands. 40 CFR 49 and 51 “Review of New Sources and Modifications in Indian Country” provides a formal mechanism for requiring permitting of stationary sources throughout Indian Country. A discussion and summary of regulated air pollutant emissions from the Proposed Project is included in Section 4.1 of this EIS.

DAQEM conducts monitoring of regulated criteria air pollutants by utilizing ambient air quality measurements in an established air monitoring system located throughout Clark County. There are no monitors in the immediate vicinity of the Proposed Project.

3.6.3 Existing Sources of Air Pollutants

Air quality in a given area is affected by industrial, mobile sources (cars, trucks, buses, construction equipment, RVs, off-road vehicles, and lawn or garden equipment), agricultural, and commercial activities. The Proposed Project area is indirectly affected by these activities when air pollutants are transported via meteorological conditions. For example, CO occurs on calm cold days in the lowest elevations and ozone occurs on hot sunny days at higher elevations.

Two sources that can cause local air quality problems are windblown fugitive dust and mobile impacts from on-road and non-road vehicles. Windblown fugitive dust is a widespread issue in the arid and semi-arid regions of Clark County. Following disturbance by construction, industrial, agricultural, and/or recreational activities, desert lands are subject to wind-driven emissions of fugitive dust. Soil-derived particles can obstruct visibility, cause property damage, and/or contribute to violations of air quality standards for fine particles.

Non-road mobile sources are a subset of the area source category. They include trains, off-highway equipment including large earth-moving and construction equipment. On-road mobile sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on roadways.

Existing sources of air pollutants in the Proposed Project area include fugitive dust and mobile sources associated with I-15. In addition, the Reid Gardner coal fired plant which produces fly ash, fossil fuel combustion pollutants, and emissions is located in the northeast corner of the Reservation about 15 miles from the SPGF. The Harry Allen gas-fired power plant is about 5 miles south of the MSEC project site and the Reservation and is the southern terminus of one of the gen-tie options for the Project.

3.7 Noise

Noise is generally defined as unwanted or objectionable sound. Human response to noise is subjective and can vary greatly from person to person. Factors that can influence individual response include the loudness, frequency, and time pattern; the amount of background noise present before an intruding noise; and the nature of the activity (e.g., sleeping) that the noise affects.

The sensitivity of the human ear to sounds of different frequencies is measured by the A-weighted decibel scale (dBA). The smallest change in noise level that a human ear can perceive is about 3-dBA. Increases of 5-dBA or more are clearly noticeable. A 10-dBA change in noise levels is judged by most people as a doubling of sound level, while a 20-dBA change is considered a dramatic change in loudness. Normal conversation ranges between 44- and 65-dBA when the people speaking are 3 to 6 feet apart.

Table 3-3 shows sound levels for some common noise sources and compares their relative loudness to that of an 80-dBA source such as a garbage disposal or food blender. Noise levels in a quiet rural area at night are typically between 32 and 35 dBA. Quiet urban nighttime noise levels range from 40 to 50 dBA. Noise levels during the day in a noisy urban area are frequently as high as 70 to 80 dBA.

An individual's sound exposure is based on a measurement of the noise that the individual experiences over a specified time interval. A sound level is a measurement of noise that occurs during a specified period of time. A continuous source of noise is rare for long periods of time and is typically not a characteristic of community noise. Community noise refers to outdoor noise in the vicinity of a community and most commonly originates from transportation vehicles or stationary mechanical equipment.

A community noise environment varies continuously over time with respect to the contributing sources. Within a community, ambient noise levels gradually change throughout a typical day and the changes can be correlated to the increase and decrease of transportation noise or to the daytime/nighttime operation of stationary mechanical equipment. The variation in community noise throughout a day is also due to the addition of short-duration, single-event noise sources, such as aircraft and sirens, as well as various natural sources.

TABLE 3-3
SOUND LEVELS AND RELATIVE LOUDNESS OF TYPICAL NOISE SOURCES

Noise Source or Activity	Sound Level (dBA)	Subjective Impression	Relative Loudness (human judgment of different sound levels)
Jet aircraft takeoff from carrier (50 ft)	140	Threshold of pain	64 times as loud
Loud rock concert near stage, Jet takeoff (200 ft)	120	Uncomfortably loud	16 times as loud
Jet flyover(1,000 ft)	100	Very Loud	4 times as loud
Heavy truck or motorcycle (25 ft)	90		2 times as loud
Garbage disposal, food blender (2 ft), Pneumatic drill (50 ft)	80	Moderately Loud	Reference loudness
Vacuum cleaner (10 ft), Passenger car at 65 mph (25 ft)	70		½ as loud
Large store air-conditioning unit (20 ft)	60		1/4 as loud
Light auto traffic	50	Quiet	1/8 as loud
Bedroom or quiet living room, Bird calls	40		
Quiet library	30	Very quiet	
Quiet Rural Nighttime	20		
Acoustic Test Chamber	10	Just audible	
Lowest threshold of Hearing	0	Threshold of hearing	

Source: Beranek (1988) and EPA (1971) Caltrans Technical Noise Supplement, October 1998

The metrics for evaluating the community noise environment are based on measurements of the noise exposure over a period of time in order to characterize and evaluate the cumulative noise impacts. These metrics are time varying and are defined as statistical noise descriptors. The most common metrics for evaluating community noise are as follows:

- L_{eq}: The equivalent sound level, or the time-integrated continuous sound level, that represents the same sound energy as the varying sound levels, logarithmically averaged over a specified monitoring period.
- L_{max}: The instantaneous greatest noise level measured on a sound level meter during a designated time interval.
- L_{min}: The instantaneous lowest noise level measured on a sound level meter during a designated time interval.
- L_x: The base sound level that is exceeded x percent during a specified time.

- DNL: The Day-Night Average Sound Level (abbreviated as DNL or LDN) that represents a 24 hour, A-weighted sound level average from midnight to midnight, where sound levels during the nighttime hours of 10:00 PM to 7:00 AM have an added 10 dB weighting, but no added weighting on the evening hours (7:00 PM to 10:00PM).
- CNEL: The Community Noise Equivalent Level that represents a 24-hour A-weighted sound level average conducted from midnight to midnight, where sound levels during the evening hours of 7:00 PM to 10:00 PM have an added 5 dB weighting, and nighttime hours of 10:00 PM to 7:00 AM have an added 10 dB weighting.

3.7.1 Existing Noise Conditions

The Proposed Project area is mostly undeveloped and its overall character is considered rural. Noise sources around the Proposed Project include road traffic (I-15), railroad traffic (Union Pacific Railroad), aircraft flyover (primarily from Nellis Air Force Base in North Las Vegas), and industrial activities (Harry Allen Generating Station). On the basis of the rural nature of the area and low population density, the day–night average noise level (Ldn or DNL) is estimated to be within the range of 33 to 47 dBALdn typical of a rural area (Eldred 1982; Miller 2002).

The nearest residential receptor is located approximately 20 miles northeast of the Proposed Project in Moapa Town. There are no other identified human sensitive receptors located within the vicinity of the Proposed Project. Sensitive receptors are defined as any residential dwelling, hotel, health building, educational establishment, place of worship, or any facility or area requiring the absence of noise at nuisance levels (EPA 2006).

Noise measurements and analyses were conducted for the K Road Solar Project in 2011. Measurements (Ldn, A-weighted) of the existing ambient noise levels indicated an Ldn of 54.4 dBA and a 24 hour Leq of 50.4 dBA. Because the proposed MSEC Project site is located further away than the K Road solar project from most existing noise sources (highway, rail), it can be assumed that overall noise levels in the Project area are lower than those identified for the K Road Solar Project area.

3.7.1.1 Regulatory Framework

Neither the State of Nevada nor Clark County has established quantitative noise limit regulations that would be applicable to solar energy development. In addition, there are no Federal, state, or local laws or regulations directly regulating offsite (community) noise impact receptors on Tribal lands. However, the Tribe's Law and Order Code makes it a crime for a person to maintain a public nuisance, including the interference with the enjoyment of property by willfully or negligently permitting hazardous, unsightly or unhealthy conditions to exist on property under his possession or control. The BLM does not have noise regulations or standards.

The EPA (EPA 1974) has developed and published criteria for environmental noise levels with a directive to protect public health and welfare with an adequate margin of safety. The EPA criteria (Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety) were developed to be used as an acceptable guideline when no other local, county, or state standard has been established. However, the EPA criteria are not meant to substitute for agency regulations or standards in place by states or localities.

The EPA established its criteria using the day-night average sound exposure (Ldn) metric. This metric is a 24-hour average noise level calculated by obtaining the daytime noise level from the hours of 7:00 a.m. to 10:00 p.m. and applies a 10 dB penalty for the more restrictive and quieter nighttime noise levels between the hours of midnight and 7:00 a.m. and 10:00 p.m. to midnight.

According to the EPA guidelines, an Ldn of 45 dBA indoors and 55 dBA outdoors for residential areas in a rural setting is identified as the maximum allowable noise level for which no effects on public health and welfare occur due to interference with speech or other activities. These levels would also protect the vast majority of the population under most conditions against annoyance, in the absence of intrusive noises with particularly aversive content. **Table 3-4** was published by the EPA and summarizes the maximum allowable noise level for specified areas.

TABLE 3-4
SUMMARY OF NOISE LEVELS IDENTIFIED AS REQUISITE TO PROTECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY

Effect	Level	Area
Hearing loss	Leq(24) =< 70 dB	All areas
Outdoor activity interference and annoyance	Ldn =< 55 dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time other places in which quiet is a basis for use
	Leq(24) =< 55 dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	Ldn =< 45 dB	Indoor residential areas
	Leq(24) =< 45 dB	Other indoor areas with human activities such as schools, etc.

Source: EPA, 1974

The Proposed Project will be governed by Federal OSHA hearing conservation noise exposure regulations. These regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which a worker is exposed. The Federal OSHA Occupational Noise Exposure standard states that when employees are subjected to sound exceeding those listed in **Table 3-5**, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of **Table 3-5**, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.

TABLE 3-5
OSHA PERMISSIBLE NOISE EXPOSURES

Duration per day, hours	Sound level dBA slow response[1]
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

Source: OSHA, 2007 -29CFR Subpart H – Section 1910.95
Footnote[1]When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: C(1)/T(1) + C(2)/T(2) C(n)/T(n) exceeds unity, then the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

3.8 Biological Resources

Information on biological resources for the Proposed Project was gathered through literature review and field surveys. Field surveys were conducted for protected vegetation, Gila monsters (*Heloderma suspectum)*, desert tortoises (*Gopherus agassizii),* and burrowing owls (*Athene cunicularia)* in May of 2010 (NBC 2011). Surveys were also conducted for desert tortoise, Gila monsters and burrowing owls in May and October of 2012 (Heritage 2013). Data reviews were conducted by assessing current regional scientific literature and accessing public biological databases and resources: Nevada Department of Wildlife (NDOW) Diversity GIS Data, National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), U.S. Geological Survey (USGS) topographic maps, Nevada Natural Heritage

Program (NNHP) database, and aerial imagery as well as review of existing reports and studies that were conducted for similar projects at or near the Proposed Project site.

3.8.1 Ecosystems and Biological Communities

The climate of the Great Basin-Mojave Desert region is one of the most varied and extreme in the world (NDOW 2006). The harsh conditions and abundant xerophytic and halophytic vegetation types associated with Mojave Warm Desert Scrub, would, at first glance, give the impression of a somewhat inhospitable and uninviting habitat (NDOW 2006). However, a large complement of wildlife species, including many bird, small mammal and reptile species depend on or at least partially use Mojave Warm Desert Scrub habitat, as well as other nearby habitats (NDOW 2006).

Mammals, reptiles, and birds are among the wildlife found in the community. Common organisms found within the desert environment are: desert tortoise, coyotes (*Canis latrans)*, desert kit fox (*Vulpes macrotisarsipus),* snakes, lagomorphs, lizards, gophers, mice, bats, birds, and porcupines (*Erethizon dorsatum)*. There are myriad insects that are a vital resource for other wildlife as well as important pollinators for the variety of vegetation. General types of insects are moths, butterflies, ants, beetles, spiders, grasshoppers and crickets.

Throughout the Mojave Desert the native understory is being replaced with non-native species such as red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), Sahara mustard (*Brassica tournefortii)*, halogeton (*Halogeton glomeratus*), and Russia thistle (*Salsola collina*). Non-native annual grass species such as red brome, cheatgrass, and Mediterranean grass (*Schismus barbatus*) compete with native forage plants for which the desert tortoise depends (IWAC 2006). New concerns have arisen because these invasive plants have proliferated to an extent capable of significantly altering the Mojave scrub fire return interval from centuries (~500 years) to decades, causing a potentially irreversible shift in plant communities, and putting maintenance of the ecosystem at risk (NDOW 2006). High temperatures and oxygen depletion caused by these fires can kill individual tortoises, but it is habitat alteration that appears to have the most wide-ranging impact (IWAC 2006). The tortoises and other wildlife that do survive fires are forced to survive on non-native grasses, which is of decreased nutritional value as compared to the native vegetation. Furthermore, the consequence of loss of perennial shrubs leaves tortoises and other wildlife with very little shade to escape the desert sun.

The biggest challenge facing wildlife in the Mojave Desert is conversion of habitat through urban and suburban development (NDOW 2006). Human population growth, construction, mining, off-road vehicle use, and invasive species are all contributing factors that result in loss or degradation of habitat. Furthermore, overharvesting of highly desirable reptiles is of great concern. Susceptible reptiles include chuckwallas (*Sauromalus obesus)*, collared lizards (*Crotaphytus* spp.), and desert iguanas (*Dipsosaurus dorsalis*).

Vegetation within the Project area is composed primarily of Mojave Desert creosotebush scrub as defined by Holland's (1986) classification of plant communities. Disturbed areas, both within and adjacent to the Action Area, are associated with multiple dirt roads and less impacted off road vehicle trails, adjacent railroad and interstate highway (to the east) and adjacent transmission line and natural gas line corridors (to the north and west). **Table 3-6** lists the acreages of the various vegetative cover types occurring within the project area. **Figure 3-6** shows the distribution of those cover types in the Project area.

Creosotebush Series

Creosotebush-White Bursage

This community is dominated by creosotebush shrubs (*Larrea tridentata)* and white bursage (*Ambrosia dumosa)*, 0.5-3m tall, widely spaced, usually with bare ground between. Many species of ephemeral herbs may flower in late March and April if the winter rains are sufficient. This plant community is usually found on well drained secondary soils with very low water-holding capacity on slopes, fans, and valleys. Other, less numerous species of annuals appear following summer thundershowers. This creosotebush scrub is typical of the Mojave Desert. Nearly the entire SPGF and most of the gen-tie transmission routes, access road, and water pipeline are covered by this vegetation community.

White bursage is a pioneer species and provides a stable environment for creosote bush to establish a foothold. The typical growth height for creosote bush is four feet, although some may reach up to 12 feet with an adequate water supply.

Many desert animals use creosote bush for shelter. Burrows are dug around and under creosote bushes by both reptiles and amphibians. Roots of creosote bush stabilize the soil and support burrows of the desert tortoise. Large kit fox den complexes are often found in association with creosote habitat for the same reason (NDOW 2006). Most animals bed in or under the bushes as well as use them for perching or nesting. Creosote bush enables animals to escape the harsh sun and extreme temperatures as well as provides cover and escape from predators. Creosote bush is browsed, or consumed, by many small mammals. The foliage, twigs and seeds are readily consumed as a food source.

White bursage commonly grows on arroyos, bajadas, gentle slopes, valley floors, and sand dunes at elevations up to 3,000 feet throughout the Sonoran and Mojave Deserts (USDAFS 2010). White bursage is a desert shrub growing up to two feet tall and spanning three feet in width. White bursage is of intermediate forage value (USDAFS 2010). White bursage plants, seedlings, and seeds are a food source for black-tailed jackrabbits (*Lepus californicus)*. Desert rodents, such as the kangaroo rat (*Dipodomys sp.)*, also consume the seeds.

TABLE 3-6
VEGETATIVE COVERTYPES WITHIN THE PROJECT AREA SPGF AND ROWS

Project Component	Vegetation Covertype	Acreage
SPGF	Creosotebush-White Bursage	817.6
	Disturbed	2.5
	Xeroriparian	29.8
	TOTAL	**849.9**
230kV ROW	Creosotebush-Cactus/Yucca	52.8
	Creosotebush-White Bursage	37.4
	Disturbed	9.2
	Mesquite	2.8
	Playa Lake	22.1
	Saltbush	10.4
	Xeroriparian	6.3
	TOTAL	**143.2**
500kV ROW	Creosotebush-White Bursage	25.8
	Disturbed	1.6
	Xeroriparian	0.3
	TOTAL	**27.7**
Proposed Access ROW	Creosotebush-White Bursage	23.9
	Disturbed	3.5
	Xeroriparian	2.7
	TOTAL	**30.1**
Pipeline ROW	Creosotebush-White Bursage	21.4
	Disturbed	10.4
	Xeroriparian	0.7
	TOTAL	**32.5**
PROJECT AREA TOTAL		**1074.4**
Alt Access ROW	Creosotebush-White Bursage	26.4
	Disturbed	4.8
	Xeroriparian	0.8
	TOTAL	**32.0**

Cactus/Yucca

Cactus/yucca is present and concentrated near the south end of the 230-kV gen-tie option. Cactus species observed during the biological surveys were the barrel cactus (*Ferocactus acanthodes*), beavertail cactus (*Opuntia basilaris*), cottontop cactus (*Echinocactus polycephalus*), hedgehog cactus (*Echinocereus engelmannii* var. *chrysocentrus*), pencil cholla (*Opuntia ramosissima*), silver cholla (*Opuntia echinocarpa*), grizzlybear prickly pear (*Opuntia polyacantha*var.*erinacea*), and teddybearcholla (*Opuntia bigelovii*). Most cacti were concentrated in ephemeral washes as well as on a sloping bajada near the Harry Allen Substation.

Xeroriparian

Xeroriparian habitats were associated with the several small washes that cross the various portions of the project area. These habitats generally resembled the Creosotebush-white bursage habitats but had a higher overall density of vegetation as well as a greater abundance of big galleta grass. Other species included cholla, cheesebush (*Hymenoclea salsola*) and ephedra (*Ephedra* sp.).

Saltbush

Approximately 10.4 acres of saltbush occurs within the ROW of the 230-kV gen-tie option and is found at the margins of the playa lake. These areas include small but monotypic stands of saltbush (*Atriplex* sp.) and form the transition between the surrounding upland habitats and the playa lake.

Fourwing saltbush (*Atriplex canescens)* is a common occupant in early successional habitats. However, it is also found late in successions dominated by sagebrush. Saltbush growth can reach up to 15 feet high, depending on the amount of water available, though saltbushes commonly grow two to three feet high. Saltbush provides food and shelter for desert wildlife. Fourwing saltbush is a valuable forage shrub because it is abundant, palatable, provides large quantities of forage, is nutritious, and grows rapidly. Leaves, stems and fruits provide browse throughout the year.

Playa Lake

The 230-kV gen-tie transmission line crosses a large playa lake (Dry Lake playa). This habitat type consists of unvegetated habitats with highly compacted soils. This lake is likely subject to ephemeral flooding following large precipitation events. Playas are formed by intermittent flooding and evaporation that precipitates fine soils and mineral salts onto the lowest flat depressions until an impermeable layer of sodic clay is lain down. Dry playas are often barren of vegetation from their center out to their outer margins, where saltgrass, pickleweed, or stunted greasewood maintain a foothold on the fresher soils. When soils are kept moist but short of saturation over several weeks or months, Baltic rush, smartweed, sedges, and spikerushes emerge, in progressive order of wetness. Most playas in Nevada do not have permanent sources of water; therefore the value of playas to wildlife is largely ephemeral in nature. When playas are watered for the proper period of time, they can produce not only lush growth of emergent and submergent vegetation, but also prodigious volumes of aquatic invertebrates attracting a myriad of waterfowl, shorebirds, and small water birds (NDOW 2006).

Mesquite

Several small mesquite bosques are located within the perimeter of the Dry Lake playa. These areas represent monotypic stands of mesquite (*Prosopis*sp.) with no understory species.

Disturbed

Disturbed habitats include all areas with little or no native vegetation as a result of anthropogenic disturbance. These areas include existing roads, transmission line pole sites, pipeline right-of-ways and other areas that have been significantly altered.

3.8.2 Vegetation

The Mojave Desert hosts a wide variety of vegetation, including approximately 250 species of annual herbaceous plants, at least 80 of which are endemic (Randall et al. 2010). These plants are typically tolerant of low humidity, prolonged droughts, desiccating winds, high alkalinity or salinity, rocky or very sandy soils, and the periodic influx of high quantities of water in the form of surface flooding (NDOW 2006).

The most commonly found plant species in the Mojave Desert are creosote bush and white bursage. Approximately 70 percent of the Mojave Desert is covered by creosotebush-white bursage associations. Species associated with creosotebush-white bursage communities in the Mojave Desert include Shockley's goldenhead (*Acamptopappus shockleyi*), Anderson's wolfberry (*Lycium andersonii*), range ratany (*Krameria parvifolia*), Mojave yucca (*Yucca schidigera*), California joint fir (*Ephedra funerea*), spiny hopsage (*Grayia spinosa*), and winterfat (*Krascheninnikovia lanata*) Other associated species are desert senna (*Cassia armata*), Nevada ephedra (*Ephedra nevadensis*) and white burrobrush (*Hymenoclea salsola*) (USDAFS 2010). Grasses regularly found are big galleta (*Pleuraphis rigida*), Indian rice grass (*Oryzopsishymenoides*), bush muhly (*Muhlenbergiaporteri*), fluff grass (*Erioneuron pulchellum*), red brome (*Bromus rubens*), desert needle (*Stipa speciosa*), Arabian grass (*Schismus arabicus*), snakeweed (*Gutierrezia* spp), desert trumpet (*Eriogonum inflatum*), fourwing saltbush and desert grass (*Blepharidachne kingii*).

The Proposed Project site is situated within the Mojave Desert. The Proposed Project area is dominated by open stands of creosotebush and white bursage. Desert saltbush scrub, cactus-yucca, playa lake, mesquite, xeroriparian and disturbed habitats are also present. Cactus species observed during the biological surveys were the barrel cactus (*Ferocactus acanthodes*), beavertail cactus (*Opuntia basilaris*), cottontop cactus (*Echinocactus* *polycephalus*), hedgehog cactus (*Echinocereus engelmannii* var. *chrysocentrus*), pencil cholla (*Opuntia ramosissima*), silver cholla (*Opuntia echinocarpa*), grizzlybear prickly pear (*Opuntia polyacantha* var *erinacea*), and teddybearcholla (*Opuntia bigelovii*). Most cacti were concentrated in ephemeral washes as well as near the Harry Allen Substation. The majority of the proposed project area was homogeneous creosote bush – white bursage with sporadic inclusions of other species.

A list of plant species observed in the Proposed Project area is presented in **Table 3-7**

TABLE 3-7
PLANT SPECIES OBSERVED ON PROPOSED PROJECT SITE

Common Name	Scientific Name	Family
Goldenhead	*Acamptopappus shockleyi*	Asteraceae
Cooper's Dyssodia	*Adenophyllum cooperi*	Asteraceae
White Bursage	*Ambrosia dumosa*	Asteraceae
Desert-Marigold	*Baileya multiradiata*	Asteraceae
White Tack-Stem	*Calycoseris wrightii*	Asteraceae
Fremont Pincushion	*Chaenactis fremontii*	Asteraceae
Brittlebush	*Encelia virginensis*	Asteraceae
Wooly Sunflower	*Eriophyllum lanosum*	Asteraceae
Desert Sunflower	*Geraea canescens*	Asteraceae
Matchweed	*Gutierrezia sarothrae*	Asteraceae
Cheesebush	*Hymenoclea salsola*	Asteraceae
Velvet Turtleback	*Psathyrotes ramosissima*	Asteraceae
Paper Flower	*Psilostrophe cooperi*	Asteraceae
White Chicory	*Rafinesquia neomexicana*	Asteraceae
Annual Mitra	*Stephanomeria exigua*	Asteraceae
Brownplume Wirelettuce	*Stephanomeria pauciflora*	Asteraceae
Devil's Lettuce	*Amsinckia tessellata*	Boraginaceae
Narrow Leaf Cryptantha	*Cryptantha angustifolia*	Boraginaceae
Red Root Cryptantha	*Cryptantha micrantha*	Boraginaceae
Broadfruit Combseed	*Pectocarya platycarpa*	Boraginaceae
Curvenut Combseed	*Pectocarya recurvata*	Boraginaceae
Woody Crinklemat	*Tiquilia canescens*	Boraginaceae
Tansy Mustard	*Descurainia pinnata*	Brassicaceae
Modest Pepper Grass	*Lepidium lasiocarpum*	Brassicaceae
Bead-pod	*Lesquerella tenella*	Brassicaceae
African Mustard	*Malcolmia africana*	Brassicaceae
Silver Cholla	*Cylindropuntia echinocarpa*	Cactaceae
Pencil Cholla	*Cylindropuntia ramosissima*	Cactaceae
Cottontop Cactus	*Echinocactus polycephalus*	Cactaceae

TABLE 3-7 PLANT SPECIES OBSERVED ON PROPOSED PROJECT SITE		
Common Name	**Scientific Name**	**Family**
Strawberry HedgehogCactus	*Echinocereus engelmannii*	Cactaceae
Barrel Cactus	*Ferocactus cylindraceus*	Cactaceae
Beavertail Cactus	*Opuntia basilaris*	Cactaceae
Grizzlybear Pricklypear	*Opuntia polyacantha var. erinacea*	Cactaceae
Halogeton	*Halogeton glomeratus*	Chenopodiaceae
Winterfat	*Krascheninnikovia lanata*	Chenopodiaceae
Russian Thistle	*Salsola tragus*	Chenopodiaceae
Dodder	*Cuscuta* sp.	Cuscutaceae
Nevada Ephedra	*Ephedra nevadensis*	Ephedraceae
Ephedra	*Ephedra torreyana*	Ephedraceae
Rattlesnake Weed	*Chamaesyce albomarginata*	Euphorbiaceae
Catclaw	*Acacia greggii*	Fabaceae
Nye County Milk Vetch	*Astragalus nyensis*	Fabaceae
Desert Lupine	*Lupinus shockleyi*	Fabaceae
Breadroot	*Pediomellum castoreum*	Fabaceae
Indigo Bush	*Psorothamnus fremontii*	Fabaceae
Filaree, Storks Bill	*Erodium cicutarium*	Geraniaceae
Notch-leaf Phacelia	*Phacelia ambigua*	Hydrophyllaceae
Phacelia	*Phacelia fremontii*	Hydrophyllaceae
Range Rhatany	*Krameria erecta*	Krameriaceae
Bladder Sage	*Salazaria mexicana*	Lamiaceae
Small-flowered Androstephium	*Androstephium breviflorum*	Liliaceae
Mojave Yucca	*Yucca schidigera*	Liliaceae
Blazing Star	*Mentzelia albicaulis*	Loasaceae
White Bract Stickleaf	*Mentzelia involucrate*	Loasaceae
Globe Mallow	*Sphaeralcea ambigua*	Malvaceae
Trailing Windmills	*Allionia incarnata*	Nyctaginaceae
Nevada Wing-fruit	*Selinocarpus nevadensis*	Nyctaginaceae
Booth Evening Primrose	*Camissonia boothii*	Onagraceae
Yellow Sun Cups	*Camissonia brevipes*	Onagraceae
Gaura	*Gaura coccinea*	Onagraceae
Desert Golden Poppy	*Eschscholzia glyptosperma*	Papaveraceae
Woolly Plantain	*Plantago ovata*	Plantaginaceae
Indian Rice Grass	*Achnatherum hymenoides*	Poaceae
Purple Three-Awn	*Aristida purpurea*	Poaceae
Foxtail Chess	*Bromus rubens*	Poaceae
Cheat Grass	*Bromus tectorum*	Poaceae

TABLE 3-7
PLANT SPECIES OBSERVED ON PROPOSED PROJECT SITE

Common Name	Scientific Name	Family
Fluff Grass	*Erioneuron pulchellum*	Poaceae
Galleta Grass	*Pleuraphis rigida*	Poaceae
Split Grass	*Schismus sp.*	Poaceae
Gilia	*Gilia sp.*	Polemoniaceae
Bristly Langloisia	*Langloisia setosissima*	Polemoniaceae
Brittle Spine Plant	*Chorizanthe brevicornu*	Polygonaceae
Rigid Spine Plant	*Chorizanthe rigida*	Polygonaceae
California Buckwheat	*Eriogonum fasciculatum*	Polygonaceae
Desert Trumpet	*Eriogonum inflatum*	Polygonaceae
Little Trumpet	*Eriogonum trichopes*	Polygonaceae
Wild Rhubarb	*Rumex hymenosepalus*	Polygonaceae
Parish Larkspur	*Delphinium parishii*	Ranunculaceae
Lineleaf Whitepuff	*Oligomeris linifolia*	Resedaceae
Desert Almond	*Prunus fasciculate*	Rosaceae
Anderson Thornbush	*Lycium andersonii*	Solanaceae
Peach thorn	*Lycium cooperi*	Solanaceae
Thick-leaf Ground Cherry	*Physalis crassifolia*	Solanaceae
Mistletoe	*Phoradendron californicum*	Viscaceae
Creosote Bush	*Larrea tridentata*	Zygophyllaceae

CH2M Hill 2010

3.8.2.1 Riparian Habitats

The site contains seven ephemeral desert washes that supported slightly higher densities of big galleta grass than adjacent upland areas; these represent xeroriparian habitat, though there are no xeroriparian tree species present.

3.8.2.2 Federally–Listed and Candidate, Threatened or Endangered Plant Species

3.8.2.2.1 Las Vegas Buckwheat

In April 2008, the Center for Biological Diversity (CBD) petitioned the U.S. Fish and Wildlife Service (USFWS) to protect the Las Vegas buckwheat (*Eriogonum corymbosum nilesii*) under the federal Endangered Species Act (ESA). The Las Vegas buckwheat was designated as a candidate for ESA listing on December 10, 2008. The Las Vegas buckwheat is also designated as a sensitive species by the BLM.

The Las Vegas buckwheat is native to Las Vegas and is found in Clark and Lincoln counties. Soils with high gypsum levels are preferred and only 859 acres of habitat remain that are not yet slated for development (CBD 2010).

Human population growth and urban development have resulted in the loss of over 95 percent of the potential historical habitat for the Las Vegas buckwheat in the Las Vegas Valley (USFWS 2013b). Loss of habitat has also resulted from off-road vehicle recreation, gypsum mining, and energy corridors. The Las Vegas buckwheat was not observed on the Proposed Project site or ROWs during biological surveys. The Proposed Project site does not contain suitable habitat for this species and none were detected during botanical surveys of the Project area (NBC 2011).

3.8.2.3 State Protected, Regulated, Listed and BLM Special Status Vegetation Species

3.8.2.3.1 Mojave Yucca

Mojave yucca is a common inhabitant of the creosote desert flats. This plant provides browse for a number of wildlife species during spring, summer, and fall. The flowerstalks and foliage of Mojave yucca are palatable to Merriam kangaroo rats (*Dipodomys merriami*), white-tailed antelope squirrels (*Ammospermophilus leucurus)*, woodrats (*Neotoma* spp*.)*, desert cottontails (*Sylvilagus auduboni)*, black-tailed jackrabbits, and some wild ungulates during much of the year (USDA 2012). The Mojave yucca provides shelter and shade for many mammals, birds and reptiles. There is an obligate, mutualistic relationship between the Mojave yucca and the small white yucca moth (*Tegeticula yuccasella*). The sale and transport of Mojave yucca is protected and regulated by the State of Nevada under Nevada Revised Statute (NRS) and Nevada Administrative Code (NAC) Chapter 527. During the biological surveys, 1,670 Mojave yucca were recorded on the Proposed Project site (NBC 2011).

3.8.2.3.2 Blue Diamond Cholla

The blue diamond cholla (*Cylindropuntia multigeniculata*) is on the Nevada state list of fully protected species of native flora (NAC 527.010), also known as the Critically Endangered Species List (NNHP 2010). No member of its kind may be removed or destroyed at any time by any means except under special permit issued by the state forester fire warden (NRS 527.270) (NNHP 2010).

Blue diamond cholla occurs in a variety of locations and soil types. The blue diamond cholla often occurs on dry, open carbonate ledges, in crevices, and on rocky colluvium on gentle to steep slopes of all aspects, but predominantly on northerly exposures, canyon walls, or other cooler or more protected exposures, in close proximity to overlying gypsum beds up-slope, and associated with numerous other succulent and shrub species of the creosote bush vegetation communities (NNHP 2010).

The blue diamond cholla is impacted by mining, though most populations are now protected. It still remains vulnerable to illegal collecting and fugitive dust along unpaved roads (NNHP 2010). Blue diamond cholla was not observed on the Project site and suitable habitat for this species is not present.

3.8.2.3.3 State Protected and Regulated Cacti Species

Cacti are another type of vegetation common to the Proposed Project site. Cacti and yuccas, which are protected under Nevada state law (NRS 527 – Protection and Preservation of Timbered Lands, Trees and Flora), were found throughout the upland portions of the Proposed Project site (**Table 3-8)**. The highest densities were found on the Proposed Project site and the Harry Allen Substation (of the terminus of the 230 kV gen-tie line). A total of 6,162 cacti and yuccas were recorded throughout the Proposed Project site. This included 1,502 beavertail pricklypear, 234 silver cholla, 55 Mojave yucca, and 57 specimens representing 5 other species.

3.8.2.3.4 Three Corner Milkvetch

Three-corner milkvetch (*Astragalus geyeri* var. *triquetrus*) is a short, spindly, but upright annual forb with pinnately divided leaves that is listed as a State of Nevada Fully Protected Species. The small pea-flowers are white, but the defining character is the three-cornered seedpod (NNHP 2010). This species is known to occur in the immediate vicinity of the Proposed Project site (NNHP 2013). Three-corner milkvetch was found outside the Proposed Project site along the frontage road where low hills catch windblown sand. No plants and no suitable habitat for this species (i.e., areas of wind-blown sand) were found in the Proposed Project site (NBC 2011).

TABLE 3-8 STATE PROTECTED AND REGULATED CACTI OBSERVED ON PROPOSED PROJECT SITE		
Scientific Name	**Common Name**	**Protection Status**
Mammillaria tetrancistra	common fishhook	CY
Opuntia echinocarpa	silver cholla, golden cholla	CY
Echinocactus polycephalus	cottontop cactus	CY
Echinocereus engelmannii var. chrysocentrus	strawberry hedgehog cactus	CY
Ferocactus cylindraceus	California barrel cactus	CY
Opuntia basilaris	Beavertail prickly pear cactus	CY
Opuntia ramosissima	pencil cactus, pencil cholla	CY
Yucca schidigera	Mojave yucca	CY
Opuntia polyacantha var.*erinacea*	Grizzlybear prickly pear	CY

Source: Nevada Natural Heritage 2010.
CY = Protected as a Cactus, Yucca, or Christmas tree

3.8.2.3.5 Beaverdam Breadroot

Beaverdam breadroot (*Pediomelum castoreum*) is not designated a sensitive species by the BLM or protected by the State of Nevada, though the species was placed on the NNHP At-Risk Tracking List (G3S3 [NNHP 2010]). It was found in three distinct clusters on the Proposed Project site, plus a few stray individuals, and it is widely distributed southward towards the Dry Lake playa. A total of 212 individual plants were recorded on the Proposed Project site, 301 were recorded along the access road ROW, and 232 were recorded along the transmission line ROWs for the 230 kV options to Harry Allen substation. In addition, 223 plants were recorded on the transects along the linear ROWs immediately outside of the Proposed Project site.

Beaverdam breadroot was not found south of the playa. Five plants growing in or along roadways outside the project area were recorded, indicating that the species may be widely distributed in the area east of the Proposed Project site (NBC 2011).

3.8.2.3.6 Nye Milkvetch

Nye milkvetch (*Astragalus nyensis*) is not designated a sensitive species by the BLM or protected by the State of Nevada, though it is on the NNHP At-Risk Tracking List (G3 S3 [NNHP 2010]). It was found widely distributed in the southeast quarter of the Proposed Project site and southward towards the Dry Lake playa. Thirty plants were recorded on the SPGF site, 67 were recorded along the access road ROW, and 42 were recorded along the transmission line ROW. In addition, 24 plants were recorded on the ZOI transects along the linear feature ROWs (230 kV gen-tie transmission and access road). Nye milkvetch was not found south of the playa (NBC 2011).

3.8.2.3.7 Rosy Twotone Beardtongue

The rosy twotone beardtongue (*Penstemon bicolor* ssp. *roseus*) is a perennial herb known in Nevada from Clark and Nye counties. This species is found on rocky, calcareous, granitic, or volcanic soils in washes, roadsides, scree at outcrop bases, rock crevices, or similar places receiving enhanced runoff in creosote-bursage, blackbrush, mixed-shrub, Joshua tree woodland, and Mojave desert communities from 1,800 to 4,839 feet. Surveys did not detect this species within the Proposed Project site although the species is known to occur in the vicinity of the Proposed Project site (NBC 2011).

3.8.2.3.8 White Bearpoppy

The white bearpoppy (*Arctomecon merriamii*) is an evergreen perennial herb that blooms from April through July. This species is found in Nevada from Clark, Nye, and Lincoln counties on wide variety of dry to sometimes moist basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops in chenopod scrub and rocky Mojave desert communities from 1,600 to 6,280 feet. The white bear poppy is listed as a special status species in Nevada by the BLM (NNHP 2001). Surveys did not detect this species within the Proposed Project site (NBC 2011).

3.8.3 Wildlife

3.8.3.1 Terrestrial

The Mojave Desert is principally inhabited by heat-tolerant organisms with specialized adaptations for thriving in an inhospitable environment. Species inhabiting the Proposed Project site and observed during the biological surveys included numerous species of birds, mammals, and a variety of reptiles. Commonly observed avian species include: turkey vultures (*Cathartes aura*), mourning doves (*Zenaida macroura*), and common ravens (*Corvus corax*). Small mammal residents include, Merriams's kangaroo rats (*Dipodomys merriami*), long-tailed pocket mice (*Chaetodipus formosus*), desert woodrats (*Neotoma lepida*), cactus mice (*Peromyscus eremicus*), and white-tailed antelope squirrels (*Ammospermophilus leucurus*). Common larger mammals include coyotes, kit foxes, and black-tailed jackrabbits (*Lepus californicus*). Reptiles include western whiptail lizards (*Aspidoscelis tigris*), side-blotched lizards (*Uta stansburiana*), long-nosed leopard lizards (*Gambelia wislizenii*), and desert tortoises (*Gopherus agassizii*).

3.8.3.1.1 Bats

No bats are currently listed by the USFWS or the NNHP as threatened or endangered in Clark County, Nevada (USFWS 2013c, NNHP 2010). The BLM has designated twelve species of bat as sensitive species. BLM policy is to provide these species with the same level of protection as is provided for candidate species in BLM Manual 6840.06 C, that is to “ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed.” The sensitive species designation is used for species that occur on BLM-administered lands for which BLM has the capability to significantly affect the conservation status of the species through management. The twelve protected bat species are: California leaf-nosed bat (*Macrotus californicus*), California myotis (*Myotis californicus*), Townsend’s big-eared bat (*Plecotus townsendii*), western red bat (*Lasiurus blossevillii*), big free-tailed bat (*Nyctinomops macrotis*), fringed myotis (*Myotis thysanodes*), Allen’s lappet-eared bat (*Idionycteris phyllotis)*, spotted bat *(Euderma maculatum),* Western pipistrelle *(Pipistrellus hesperus*), Brazilian free-tailed bat (*Tadaroda brasiliensis),* pallid bat *(Antrozous pallidus)* and cave myotis (*Myotis velifer*). They are only expected to be present within the Proposed Project during nocturnal foraging events. There are no known or expected roosting locations or hibernacula within or in the immediate vicinity of the Proposed Project site.

3.8.3.1.2 Wild Burros

The nearest Herd Management Area (HMA) is approximately 20 miles southeast of the Proposed Project. The Muddy Mountain HMA is located in southern Nevada, approximately 40 miles east of Las Vegas in Clark County. The BLM Las Vegas District and NPS have joint administrative responsibilities for wild burro management within these public lands. The HMA consists of a total of 140,699 acres, with 61,226 acres managed by the BLM and 79,473 acres managed by the NPS.

3.8.3.2 Aquatic

No permanent aquatic features capable of supporting aquatic wildlife are present on the Proposed Project site. The nearest perennial water source is the Muddy River, located approximately 12 miles northeast of the Proposed Project, is considered impaired and is on the 303(d) list as required by the Clean Water Act.

Several small ephemeral drainages cross the Project area and contain marginal xero-riparian habitats. Species along ephemeral washes include big galleta grass, saltbush, and cheesebush.

Dry Lake playa is an unvegetated playa lake south of the SPGF and would be crossed by the gen-tie transmission option to the Harry Allen substation.

3.8.3.3 Federally-Listed Candidate, Threatened or Endangered Animal Species

The U.S. Fish and Wildlife Service lists sixteen federally listed or candidate threatened or endangered species (**Table 3-9**) in Clark County, NV (USFWS 2013c). The Applicant has conducted surveys of federally protected species for any species deemed possible to be present in or near the Proposed Project site, this included desert tortoise in May and October of 2012 (Heritage 2013) and Las Vegas buckwheat and desert tortoise in May of 2010 (NBC 2011). Desktop analysis of the geographic range of the Mt. Charleston blue butterfly (*Icaricia shasta charlestonensis)* and the Lahontan cutthroat throat (*Oncorhynchus clarkii henshawi)* revealed that the Proposed Project does not remotely encroach or infringe on the distribution of those species and eliminated the need to conduct field surveys. Other species with broader geographic distributions were not surveyed because the lack of suitable habitat in or near the Proposed Project site reduced the likelihood of occurrence to practically zero.

TABLE 3-9
FEDERALLY-LISTED AND CANDIDATE THREATENED OR ENDANGERED ANIMAL SPECIES IN CLARK COUNTY, NV

Common Name	Scientific Name	Potential for Occurrence
Relict leopard frog	*Rana onca*	No
Southwestern willow flycatcher	*Empidonax traillii extimus*	No
Yellow-billed cuckoo	*Coccyzus americanus*	No
Yuma clapper rail	*Rallus longirostris yumanensis*	No
Bonytail chub	*Gila elegans*	No
Colorado pikeminnow	*Ptychocheilus lucius*	No
Humpback chub	*Gila cypha*	No
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*	No
Moapa dace	*Moapa coriacea*	Yes
Pahrump poolfish	*Empetrichthys latos*	No
Razorback sucker	*Xyrauchen texanus*	No
Virgin River chub	*Gila seminuda*	No
Woundfin	*Plagopterus argentissimus*	No
Desert tortoise	*Gopherus agassizii*	Yes
Mt. Charleston blue butterfly	*Icaricia shasta charlestonensis*	No

Source: USFWS 2013c

3.8.3.3.1 Desert Tortoise

The desert tortoise is protected by both by the Endangered Species Act and the State of Nevada. The Mojave desert tortoise is a covered species under Clark County's Multiple Species Habitat Conservation Plan and it is considered sensitive by the BLM. The desert tortoise is a large, herbivorous reptile that occurs in the Mojave Desert in the southwestern

United States. The Mojave desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS 2011b).

The Mojave desert tortoise has been divided into five Recovery Units (USFWS 2011b). Each Recovery Unit was delineated based on variations in genetic, morphological, ecological, physiological, and behavioral traits (USFWS 1994). Some of the five recovery units were further subdivided into Desert Wildlife Management Areas (DWMAs). A total of 6.4 million acres of critical habitat was designated in 1994 (59 FR: 5820-5866). DWMAs were identified where populations of tortoises facing similar threats would be managed with the same strategies (59 FR: 5820-5866).

Among the most important recovery actions implemented pursuant to the 1994 Recovery Plan has been formalizing DWMAs through Federal land-use planning processes. Particularly on BLM lands, DWMAs are administered and designated as Areas of Critical Environmental Concern (ACECs). These ACECs define specific management areas based on the general recommendations for DWMAs in the 1994 Recovery Plan. Boundaries of the ACECs were refined slightly from the critical habitat designation based on various management and biological considerations. The BLM's DWMAs/ACECs, together with NPS lands, designated wilderness areas, other lands allocated for resource conservation, as well as restricted-access military lands, provide an extensive network of habitats that are managed either directly or indirectly (e.g., wilderness areas outside desert tortoise ACECs) for desert tortoise conservation (USFWS 2011b).

The Proposed Project is partially contained within the boundary of the Moapa Indian Reservation near the middle of the north end of the Dry Lake Valley west of I-15. The nearest DWMA (Mormon Mesa) to the Proposed Project is on the west slope of the Arrow Canyon Range, over 10 miles west of the Proposed Project (Clark County 2007). The Proposed Project is within the Northeastern Mojave Recovery Unit for desert tortoise as designated by the USFWS's "Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*)" (USFWS 2011b).

Desert tortoises occupy a variety of habitats from flats and slopes typically characterized by creosote bush scrub dominated by creosote bush and white bursage at lower elevations, to rocky slopes in blackbrush scrub and juniper woodland ecotones (transition zone) at higher elevations. Throughout most of the Mojave Desert, tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and where there is sparse cover or low-growing shrubs, which allows establishment of herbaceous plants. Soils must be soft enough for digging burrows, but firm enough so that burrows do not collapse. Typical habitat for the desert tortoise in the Mojave Desert has been characterized as creosote bush scrub below 5,500 feet, where precipitation ranges from 2 to 8 inches, and the diversity of perennial plants is relatively high (USFWS 2011b).

Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential. Growth rates are greater in wet years with higher annual plant production. The number of eggs (1-10) as well as the number of clutches (0-3 sets of eggs laid each year) that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition. Success rates of clutches have proven difficult to measure, but predation appears to play an important role in clutch failure (USFWS 2011b).

Desert tortoises are herbivores that consume a wide variety of plant materials including dicot annuals, grasses, herbaceous perennials, trees, shrubs, subshrubs/woody vines, and succulents. A study of their food habits in the Mojave Desert found that they used 43 plant species, including 37 annuals and 6 perennials (Jennings 1997). Some of the preferred plants were dwarf white milkvetch (*Astragalus didymocarpus*), widow's milkvetch (*A. zayneue*), Booth’s evening primrose (*Camissonia boothii*), rattlesnake weed (*Camissonia* [*Euphorbia*] *albomarginata*), foothill deervetch (*Lotus humistratus*), Bigelow four o'clock (*Mirabilis bigelovii*), and brightwhite (*Prenanthella exigua*). Desert tortoise diet in this study showed a very strong preference for native plants (95.3 percent of plants eaten), and some of their preferred food plants were uncommon to rare (Jennings 1997).

A study on juvenile tortoises (Spangenberg 1995) found a preference for non-native, invasive plant species such as Mediterranean grass (*Schismus barbatus*) and filaree (*Erodium cicutarium*). These two species comprised 64 percent of the juvenile tortoise diet. This study also revealed a difference in diet between wet and dry summers. During a very dry summer, tortoises were observed foraging on only three species while they used 15 species during a wet summer (Spangenberg 1995).

Protocol desert tortoise surveys were performed on the proposed SPGF, transmission line ROW options and potential access roads in late April/early May of 2012. Additional desert tortoise surveys were conducted along the proposed water pipeline ROW in October of 2012. An additional survey took place in October of 2013 and covered the route modification of the 230kV transmission line near the Harry Allen 230kV substation. Most of the Proposed Project site represents potentially suitable habitat for the desert tortoise. The portion of the transmission interconnection (approximately 1.7 miles in length) that traverses Dry Lake playa is not suitable desert tortoise habitat and was not surveyed. This area was almost completely unvegetated with hard-packed soils, often with an alkali crust. Based on the lack of vegetation, there is no forage or cover present for desert tortoises. This portion of Dry Lake is also occasionally completely inundated, precluding tortoises from occupying burrows. Small portions of this area were spot sampled – suitable burrows were not found, nor were soil conditions conducive for burrow excavation. The vegetated margins of the lake bed were surveyed since these areas represented potentially suitable foraging areas; though soils in these areas were still extremely hard packed.

Near the south end of the transmission interconnection, the habitat becomes steeper with rockier soils and greater components of cholla, Mojave yucca, and prickly pear. This area is crossed by several small ephemeral drainages that extend from a large sloping bajada extending from the southwest.

Table 3-10 describes desert tortoise observations and the associated locations in the Proposed Project Area from the May and October 2012 surveys by Heritage Environmental Consulting.

TABLE 3-10
DESERT TORTOISE OBSERVATIONS IN THE PROPOSED PROJECT AREA

Project Component	Desert Tortoise Observations
Solar Power Generating Facility	19 suitable burrows and 1 desert tortoise
500 kV Gen-tie	2 suitable burrows and 1 desert tortoise
230 kV Gen-tie	23 suitable burrows, 3 desert tortoise carcass fragments, and 1 adult desert tortoise
Water Pipeline	14 suitable burrows, 2 adult and 1 sub-adult desert tortoise and 1 desert tortoise carcass fragments
Access Road	1 suitable burrow

Heritage 2013

Desert tortoise population estimates were generated based on recommended methodologies contained in USFWS (2010). These estimates were generated for all Project components for which there were detections of adult desert tortoise. Corrected estimates are reported here with 95% confidence intervals (CI) per USFWS (2010). Confidence intervals consist of a range of values (interval) that act as estimates of the unknown population parameter.

Results from the May 2012 surveys estimated 2.0 (95 percent CI: 0.36-10.64) desert tortoises occupy the SPGF area, excluding the water pipeline and transmission line corridors. The October 2012 survey estimated 6.8 (95 percent CI: 1.98-23.11) desert tortoises occupy the pipeline ROW (Heritage 2013). The October 2013 surveys estimated that approximately 2.0 desert tortoises are expected to occupy the rerouted portion of the 230 kV transmission line ROW (95% CI: 0.37-10.77).

Accurate estimates of numbers of juvenile tortoises or tortoise eggs are difficult to make and involve uncertainty. Turner et. al (1987) estimated that juvenile and hatchling tortoises accounted for 19- to 81-percent of the overall population. If this assumption is used, the expected number of juvenile and/or hatchling tortoises expected on the SPGF would be between 0.44 and 56.00; the expected number of juvenile or hatchling tortoises within the water pipeline ROW would be between 2.44 and 121.63; and the expected number of juvenile and/or hatchling tortoises along the rerouted portion of the 230-kV transmission line ROW would be between 0.46 and 56.68.

During May through September, the Project area would be expected to contain desert tortoise eggs. Assuming a 1:1 sex ratio, there are between 0.18 and 5.32 female tortoises in the SPGF; between 0.99 and 11.56 female tortoises in the pipeline ROW; and between 0.19 and 5.39 female tortoises in the rerouted portion of the 230-kV transmission line ROW. Female tortoises lay an average of 1.6 clutches per year (Turner et. al 1984) and each clutch contains an average of 5.8 eggs (Turner et. al 1986). Thus, between 1.55 and 45.79 eggs would be expected within the SPGF; between 8.52 and 99.50 eggs would be expected within the pipeline ROW; and between 1.64 and 46.40 eggs would be expected within the rerouted portion of the 230-kV transmission line ROW..

Desert tortoises are expected to be present along the proposed access road and all transmission alternatives (500-kV route as well as 230-kV routes) based on the presence of sign and/or suitable burrows, though population estimates are not possible because adult desert tortoises were not detected. An adult desert tortoise was observed in the buffer area that was surveyed outside the 500-kV transmission line ROW; however, tortoises located in buffer areas are not used to generate relative abundance estimates. The Desert Tortoise Survey Report compiled by Heritage Environmental Consultants (Heritage 2013) contains a full explanation of the survey results, methodologies and analysis (**Appendix H**).

3.8.3.3.2 Moapa Dace

The Moapa dace (*Moapa coriacea*) occurs in the Muddy River system and is listed as endangered under the ESA. Since the Moapa dace represents a monotypic genus, this species was assigned a recovery priority of 1 (highest ranking) by the USFWS in 1995. The original recovery plan for this species was prepared in 1983 and subsequently revised in 1995.There is currently no critical habitat designated for the Moapa dace (USFWS 2013a). Moapa dace do not occur within the Project area but are being analyzed because groundwater withdrawals have the potential to affect the Warm Springs area and the Muddy River.

Moapa dace occupy a variety of habitats in the Warm Springs area, including spring pools, tributaries (spring outflows) and the main stem Muddy River. The Moapa dace prefers habitat within local headwaters where water temperatures are between 28°C and -32°C and turbidity is low. Native waters for the Moapa dace are clear with variable bottom types in pool habitats and may be spring deposited gravels or flocculent organic/silt.

This species substantially declined with the introduction of the shortfin molly (*Poecilia mexicana*) in 1963, and extensive habitat modification that occurred 20 to 30 years ago. The greatest threat is physical destruction or alteration of habitat. Most or all of the springs originally containing Moapa dace still flow; however, the spring systems have been altered for recreation, irrigation, industrial, and municipal use.

In addition to the introduction of the shortfin molly, other fishes including the common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), fathead minnow (*Pimephales promelas*), and black bullhead (*Ameiurus melas*) have been introduced into the Moapa dace habitat and may affect the decline of the Moapa dace population in the future (USFWS 1995). Prior fish introductions have introduced fish parasites including tapeworms (*Bothriocephalus acheilognathi*), nematodes (*Contracaecum* spp.), and anchor worms (*Lernaea* spp.) which have adversely affected native fishes of the Muddy River (USFWS 1995).

3.8.3.4 State Listed Wildlife, BLM Sensitive Wildlife Species, and Selected Birds Protected under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

3.8.3.4.1 Burrowing Owl

Burrowing owls inhabit the Mojave Desert portions of Clark County and are protected under the Migratory Bird Treaty Act (MBTA). Burrowing owls in Southern Nevada are active year-round, do not hibernate, and tend to be year-round residents as opposed to migratory (NDOW 2008).

Burrowing owls are found in open dry shrub/steppe grasslands, agricultural and range lands, and desert habitats associated with burrowing animals (NDOW 2010). They consume an assortment of prey items consisting of beetles, grasshoppers, scorpions, small mammals, reptiles, other birds and bats. These owls primarily reside and nest in the abandoned burrows of the desert tortoise, although the burrows of kit foxes and other mammals are used as well. As there is a decline in desert tortoises, the burrowing owl may also be affected by the loss of suitable burrows (NDOW 2008). These owls will also use man-made burrows, as well as pipes or small culverts, which are often found on construction sites (NDOW 2008).

Burrowing owl numbers are declining despite protection under the MBTA (USFWS 2007). These owls are not listed as threatened or endangered in Nevada, but biologists are starting to see a range-wide decline due to loss of habitat and collisions with vehicles (NDOW 2008).

Loss of habitat from development and construction as well as high mortality rates from collisions with automobiles has caused range-wide decline of this species.

During the May 2010 desert tortoise site survey, a total of four active or recently used burrowing owl burrows, as evidenced by scat, feathers, and pellets, were located during surveys on the site though no burrowing owls were observed (NBC 2011). No burrowing owls were observed during the 2012 or 2013 surveys (Heritage 2013). The entire site is considered suitable foraging habitat for burrowing owls and the species is expected to occur on the site, though in very low densities.

3.8.3.4.2 Le Conte’s Thrasher

The Le Conte’s thrasher (*Toxostoma lecontei*) is protected under the MBTA. The Le Conte's thrasher is an Evaluation Species under the Clark County Multiple Species Habitat Conservation Plan (MSHCP). Habitat consists of sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills having high proportion of one or more species of saltbush or shadscale and/or cholla cactus 3-6 feet high. Other desert habitats with similar structural profiles but lacking saltbush/shadscale or cholla cactus also are used. This species rarely occurs in habitats consisting entirely of creosote bush. The majority of shrubs rarely exceed 8 feet in height, except for isolated desert trees, yuccas, or tall, thin shrubs (NatureServe 2009a).

The Proposed Project site is dominated by creosote bush/white bursage habitat and the Le Conte’s thrasher is not likely to occur within the area as there is little suitable present. Le Conte’s thrashers were not observed in the Proposed Project site and are not known to occur in the vicinity.

3.8.3.4.3 Loggerhead Shrike (*Lanius ludovicianus*)

Loggerhead Shrike is a BLM Sensitive Species, protected by the MBTA, and is a year-round resident in Clark County. The Loggerhead Shrike prefers open habitat with perches for hunting and fairly dense shrubs for nesting. Loggerhead Shrikes were observed north of the Dry Lake playa within the project area (CH2M Hill 2010). The creosotebush-white bursage, xeroriparian, and saltbush habitats in the project area provide suitable foraging habitat for this species; mesquite habitats provide suitable nesting habitat. No Loggerhead Shrike nests were identified during biological surveys, though the species may nest in mesquite habitats in the vicinity.

3.8.3.4.4 Phainopepla (*Phainopepla nitens*)

Phainopepla is a BLM Sensitive Species, protected by the MBTA, and is a nesting resident in Clark County between February and April. Phainopepla prefers similar habitats as

Loggerhead Shrike (described above), though in the desert, Phainopeplas depend on fruiting desert mistletoe (*Phoradendron californicum*), which parasitizes the same trees used for nesting, and produces a stable, long-lasting supply of berries (Chu et. al 1999). No Phainopepla nests were identified during biological surveys, though the species may nest in the xeroriparian and mesquite habitats in the vicinity.

3.8.3.4.5 Golden Eagle

The golden eagle (*Aquila chrysaetos)* is protected under the Bald and Golden Eagle Protection Act as well as the MBTA (USFWS). Golden eagles generally inhabit open and semi-open country such as prairies, sagebrush, arctic and alpine tundra, savannah or sparse woodland, and barren areas, especially in hilly or mountainous regions, in areas with sufficient mammalian prey base and near suitable nesting sites. In Nevada, the only habitats routinely avoided by golden eagles are forests, large agricultural areas, and urban areas

Nests are most often on rock ledges of cliffs but sometimes in large trees on steep hillsides, or on the ground. Nesting cliffs may face any direction and may be close to or distant from water (NatureServe 2009b). Periodic helicopter surveys by NDOW indicate that two nests of unknown activity status occur approximately 4.4 to 6.6 miles west of the Proposed Project. These data are from a query of NDOW's compiled wildlife survey database (NDOW 2013).

The entire Proposed Project site is considered suitable foraging habitat for golden eagles and the species is likely to occasionally forage within the Proposed Project site. No suitable nesting habitat is present in the Proposed Project site, and no nests are known to be present within the project area.

3.8.3.4.6 Gila Monster

The BLM has recognized the Gila monster as a sensitive species since 1978. Most recently, the Gila monster was designated as an Evaluation species under Clark County's Multiple Species Habitat Conservation Plan (MSHCP). The evaluation designation was warranted because inadequate information exists to determine if mitigation facilitated by the MSHCP would demonstrably cover conservation actions necessary to insure the species' persistence without protective intervention as provided under the ESA.

The banded Gila monster (*Heloderma suspectum cinctum*) is the subspecies that occurs in Clark, Lincoln, and Nye counties of Nevada. Found mainly below 5,000 feet, its geographic range approximates that of the desert tortoise and is coincident to the Colorado River drainage. Gila monster habitat requirements center on desert wash, spring, and riparian habitats that inter-digitate primarily with complex rocky landscapes of upland desert scrub. They will use and are occasionally encountered out in gentler terrain of alluvial fans (bajadas). Hence, Gila monster habitat bridges and overlaps that of the desert tortoise. Gila monsters are secretive and difficult to locate, spending greater than 95 percent of their lives underground (USFWS 2011a).

The NNHP lists the entire Proposed Project site as suitable habitat for this species. Surveys conducted for the desert tortoise during May and October of 2012 and October of 2013 did not detect any Gila monsters, but did confirm that the Proposed Project site represents suitable habitat for this species (Heritage 2013).

3.9 Cultural Resources

This section briefly discusses the past cultural resource investigations that have been conducted in the area and the known cultural resource sites that have been documented in the general area of the Proposed Project. The next chapter will discuss potential impacts to current cultural or religious properties and prehistoric or historic cultural sites that may qualify as historic properties. **Appendix I** contains the Cultural Resource report citation, letters to tribes, and consultation letters with the State Historic Preservation Office. Historic properties are districts, sites, buildings, structures, or objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that are currently listed on the National Register of Historic Places (NRHP) or are potentially eligible for listing. Districts, sites, buildings, or structures that are listed or eligible for listing may include components that do not support or contribute to that eligibility. These non-contributing components may be associated with or may be parts of a historic property, but are not considered significant and are not considered historic properties. Under the regulations implementing Section 106 of the National Historic Preservation Act (36 CFR 800), any Federal undertaking (an undertaking involving federally administered lands, funds, approval, permits, or oversight) must consider potential impacts to historic properties.

Compiled information on previous investigations in the study area includes 51 previous cultural resource investigations of varying sizes. These provide baseline and comparative information on the types of sites that have been found in the area. The entire area of potential effect (APE) for the Proposed Project (the area that may be disturbed) has been covered by an intensive pedestrian inventory documented in BLM Cultural Resource Report No. 5-2703 in 2013.

3.9.1 Historic, Cultural, and Religious Properties

Most of the Proposed Project is located on the Reservation, which was established in1872 in response to Southern Paiute conflicts with the Mormons and the United States, and a flurry of mining claims around Pioche and Panaca in the 1860s. The portions of the Reservation containing the Proposed Project do not contain sites or resources identified by the Tribe as having historic, cultural or religious significance. There are no documented extant historic buildings in the Project area. Extant historic structures in the APE are limited to the historic Union Pacific-Southern Pacific Railroad (26CK5685); a historic segment of US Highway 91 (26CK5020); and an unnamed historic road segment (26CK8532). None of these resources will be affected by the Proposed Project. A segment of the Old Spanish Trail/Mormon Road crosses near the project area to the north and the Old Spanish National Historic Trail, managed jointly by the BLM and NPS, as defined by 16 USC 1251, is located on the south side of I-15.

3.9.2 Tribal Consultation

Prior to a cultural resource survey of the Proposed Project area, the project team coordinated with the Moapa Paiute Tribe to discuss proposed survey methods and arrangements for tribal members to accompany the archaeologists during the survey.

The BIA sent letters to eight Tribes in the region inquiring if there were any concerns about the effects of the Proposed Project on historic properties or areas of traditional or cultural importance. These Tribes included the Las Vegas Paiute Tribe, Kaibab Band of Paiute Indians, Hualapai Indian Tribe, Fort Mojave Indian Tribe, Hopi Tribe, Colorado River Indian Tribes, Chemehuevi Indian Tribe, and Paiute Indian Tribe of Utah.

The Hopi and Hualapai tribes responded. The Hopi indicated that they would be interested in further consultation if the Proposed Project would potentially have an adverse effect on prehistoric sites eligible for the NRHP. The Hualapai Tribe indicated that they would like to defer to the Moapa Band of Paiutes in all matters pertaining to development of the Project.

3.10 Socioeconomic Conditions

This section describes the existing socioeconomic conditions and environmental justice populations within the Proposed Project area. These conditions focus on population and employment/unemployment, demographics, housing supply, social and public services, and recreation opportunities. General population and employment conditions were obtained from the 2010 US Census Data (USCB 2010). Demographic data were obtained from the U.S. Census Bureau (USCB 2000 and 2010).

The Proposed Project would be located on an undeveloped section of the Reservation approximately 17 miles southwest of the residential epicenter of the Reservation. For the purposes of evaluating existing conditions with respect to environmental justice, the study area is the census geographies (census tract [CT] and block groups [BG]) encompassing all potential project construction and operation activities. The identified census tract and block groups are partially or fully incorporated into the study area. All of the Reservation is within CT 59.02, as is the Proposed Project. The Proposed Project is near CT 56.13, BG 59.02, BG 2 and CT 56.13, BG 1 in Clark County (**Figure 3-7**).

The nearest incorporated community to the Proposed Project is Moapa Town, Nevada located just north the Reservation about 17 miles from the proposed MSEC site. Moapa Town is a census-designated place (CDP) in Clark County. A CDP is a concentration of population that lacks separate municipal government but is identified by the United States Census Bureau for statistical purposes as counterparts of incorporated places such as cities, towns, and villages.

Data is also provided for Clark County since it physically borders the Reservation. Some of the labor and materials employed in the construction of the Proposed Project will be sourced from the surrounding Clark County area.

A socioeconomic analysis looks at impacts on local finances from taxes as well as potential adverse impacts on public services. Environmental justice looks at whether Federal programs, policies, and activities have a disproportionately high and adverse impact on minority and/or low-income populations. For the purposes of environmental justice, minority refers to anyone who is racially classified as African American, Asian American, Native American or Alaskan Native, or Pacific Islander, anyone who self- classifies as “other” race, or two or more races, or anyone classified as Hispanic. Hispanic is considered an ethnicity, not a separate race; Hispanics are considered minorities regardless of their racial self-affiliation. A minority population is identified when the minority population of the potentially affected area is greater than 50 percent or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis. Low income is determined by a set of money-income thresholds that varies by family size and composition. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as low-income, or “below the poverty level,” at the time of the census.

3.10.1 Employment and Income

As of the census of 2010, there were 1,025 people, 266 households, and 167 families residing in the Moapa Town CDP and there were 915 people, 374 households, and 240 families residing in CT 59.02 (Reservation). The population density was 6.8 people per square mile -. There were 483 housing units at an average density of 3.2/ square mile. In Moapa Town there were 266 households out of which 37.6 percent had children under the age of 18 living with them, 62.8 percent were married couples living together, there were no households with female householder with no husband present, and 37.2 percent were non-families. Approximately 29.7 percent of all households were made up of individuals and 12.8 percent had someone living alone who was 65 years of age or older. The average household size was 2.46 and the average family size was 3.18.

In CT 59.02 there were 374 households out of which 36.1% had children under the age of 18 living with them, 59.5 percent were married couples living together, 6.7 percent had a female householder with no husband present, and 35.8% were non-families. 27.3 percent of all households were made up of individuals and 11 percent had someone living alone who was 65 years of age or older. The average household size was 2.45 and the average family size was 3.06.

In the CDP the population was spread out with 27.5 percent under the age of 18, 5 percent from 15 to 19, 2.1 percent from 20 to 24, 26.4 percent from 25 to 44, 32.2 percent from 45 to 64, and 11.8 percent who were 65 years of age or older. The median age was 42 years. There were 50.4 percent females and 49.6 percent% males overall. There were 51.2 percent% females and 48.8 percent males for those 18 or older.

Table 3-11 shows the median household income and percentage of the population living in poverty according to estimates for 2010 for the geographic comparison areas. In 2010, the estimated median household incomes for the United States, Nevada, and Clark County were similar at $52,762, $55,726, and $56,258, respectively. The median income for a household in the Moapa Town was $42,019, and the median income for a household in the CT 59.02 was $34,855.

CT 59.02 had 10.4 percent living below poverty level, Moapa Town had 3.8 percent below poverty line, Clark County had 11.7 percent living below poverty level, and the State of Nevada had an 11.9 percent poverty rate. These are all lower than the national poverty status of 14.3 percent. Within the study area income data supports the conclusion that there are no environmental justice communities defined by income. Native American persons residing on the Reservation and within the Proposed Project area are considered an eligible environmental justice community as defined by Executive Order 12898.

Data from the U.S. Census Bureau's 2010 Census of Population and Housing as presented in the U.S Census Bureau's American Fact Finder were used to determine minority and impoverished populations. Clark County median and per capita incomes exceed the US. average, although 11.7 percent of the individuals within the county have incomes that are below the poverty level threshold. According to the US Census Bureau, an impoverished community is defined as one in which more than 20 percent of the population is below the poverty level. For a single person (not a family) the poverty income threshold is $10,830. For a family of four with two children under the age of 18, the poverty income threshold is $22,050. Moapa Town, CT 59.02 Moapa Indian Reservation, CT 56.13, and Clark County's mean incomes are above the current 2009 Department of Health and Human Services poverty threshold.

The Clark County economy is heavily dependent on the leisure and hospitality sector, as well as closely linked supporting sectors in arts, entertainment, and retail trade establishments. In addition, hotel and resort renovation, development, and expansion within Las Vegas have traditionally been a mainstay of the Clark County economy. The recession has had a major negative impact on construction employment and has also affected most industries within the county. **Table 3-12** shows the distribution of employment by industry within Clark County, FY 2009.

TABLE 3-11
POVERTY LEVEL AND MEDIAN HOUSEHOLD INCOME (ESTIMATES) IN 2010

Geographic Area	Median Household Income In	Population*	Income Below Poverty Level	Percent Below Poverty Level
United States	52,762	306,603,772	43,844,339	14.3%
State of Nevada	55,726	2,594,953	308,426	11.9%
Clark County, Nevada	56,258	1,870,566	219,116	11.7%
Moapa Town	42,019	655	25	3.8%
CT 56.13	66,953	3,722	343	9.2%
CT 59.02 Moapa Indian Reservation	34,855	939	98	10.4%

Source: U.S. Census 2010 2007-2011 American Community Survey
*Population for whom poverty status is determined

TABLE 3-12
EMPLOYMENT BY INDUSTRY

Industry	Nevada	Clark County	Moapa Town	CT 56.13	Moapa Reservation, CT 59.02
Total All Industries	933,280	637,339	360	1,596	571
Agriculture, forestry, fishing, and hunting, and mining	14,938	1,724	7	38	63
Construction	86,327	62,115	119	252	129
Manufacturing	45,794	23,478	22	34	40
Wholesale trade	25,121	15,064	8	22	9
Retail Trade	105,382	71,237	3	127	13
Transportation and warehousing, and utilities	48,102	32,410	25	134	36
Information	20,969	14,464	6	31	6

TABLE 3-12 EMPLOYMENT BY INDUSTRY					
Industry	**Nevada**	**Clark County**	**Moapa Town**	**CT 56.13**	**Moapa Reservation, CT 59.02**
Finance, insurance, real estate, and rental and leasing	60,216	43,631	0	91	8
Professional, scientific, management, administrative, and waste management	82,172	58,783	11	79	11
Education, health and social services	119,967	74,923	76	253	105
Arts, entertainment, recreation, accommodation and food	245,679	191,596	45	313	67
Other services (except public administration)	36,742	24,656	34	75	34
Public administration	41,871	23,258	4	147	50

3.10.2 Unemployment

According to 2000 Census Bureau data the unemployment rate for the Reservation is approximately double that for Clark County and the State of Nevada (note, 2010 Census data was not available). **Table 3-13** shows the comparison between the various state, regional and local unemployment rates as well as total reported labor force. The unemployment rate for Nevada in October 2012 was 11.5 and for Clark County was 11.1 percent (Bureau of Labor Statistics).

TABLE 3-13 UNEMPLOYMENT RATES						
	Nevada	**Clark County, Nevada**	**Moapa Town CDP, Nevada**	**Census Tract 56.13,Clark County, Nevada**	**Census Tract 59.02,Clark County, Nevada**	**Tribal Census Tract 59.02; Moapa River Indian Reservation**
Labor Force	1,003,293	688,917	377	1,696	641	96
Employed	933,280	637,339	360	1,596	571	85
Unemployed	61,920	44,734	17	100	41	11
Unemployment Rate	6.17	6.49	4.51	5.90	6.40	11.46

Source: Census Bureau 2000

3.10.3 Demographic Trends

Between 2000 and 2009 the region grew rapidly, in line with the growth experienced by the metropolitan Las Vegas area. However, due to recent economic downturns, growth has slowed dramatically in the past few years with population growth rate projections decreasing from the previous 2 percent per year to approximately 1 percent per year. Nevada demographers expect that Clark County's population will increase to 2.3 million by 2025 and rise to 2.4 million persons by 2031 (Nevada State Demographer's Office 2012).

3.10.3.1 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) requires all Federal agencies to assess whether their programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority and low-income populations in the United States. The criteria for a finding of possible environmental justice issues is the occurrence of more than 50 percent of the population affected by the Proposed Action being minority or low-income. Data was collected on the income and poverty status of the populations within the census tracts traversed by the Proposed Project.

The percent Hispanic or Latino of total population of the United States, Nevada, and Clark County is 16.1 percent, 26.5 percent, and 29.1 percent, respectively. Of the minority population in the United States, Nevada, and Clark County, the percent of the minority population that is American Indian or Alaska Native alone is 0.8 percent, 0.12 percent, and 0.7 percent, respectively.

The residents on the Reservation represent the closest environmental justice population to the Proposed Project. As Native Americans, the residents on the Reservation meet the criteria of a minority population and thus are subject to environmental justice consideration under the Executive Order.

Reference areas were identified to compare larger geographic areas with census blocks groups for the Proposed Project vicinity to determine whether populations residing in the affected area constitute a potential environmental justice population. The reference area is north Clark County. The most current data available at the census block level were from Fiscal Year 2010. Data for the census tract block groups were compared with the data for Clark County, the State of Nevada, and the nation to assess whether minority, elderly, low-income, disabled, or female head-of-household populations are disproportionately represented in the Proposed Project vicinity. **Table 3-14** summarizes the racial/ethnic populations in each of these areas.

The Project is located on the Reservation, and the Reservation community is 68.9 percent minorities.

3.10.3.2 Indian Trust Assets

Federally-recognized Indian tribes are domestic, sovereign nations, and the relationship between the Federal government and those tribes is characterized as one of trustee. As part of this role, the Federal government is obligated to protect tribal interests, a duty that is referred to as trust responsibility. This trust doctrine is defined through treaties, laws, executive orders, judicial decisions, and agreements.

Indian Trust Assets (ITA) are legal interests in property held in trust by the United States for federally recognized Indian tribes or individual Indians, or property the United States is charged to protect by law. Examples of resources that are ITAs include lands, minerals, hunting and fishing rights, and water rights. Department of the Interior Order 3175 requires that (1) agencies are to consult with Indian tribes when trust property may be affected, and (2) environmental and planning documents should “clearly state the rationale for the recommended decision will be consistent with the Department’s trust responsibilities.” ITAs should be considered and identified early in the NEPA process. ITA identification should involve consultation with (1) potentially affected tribes, Indian organizations or individuals, and (2) the BIA, the Office of American Indian Trust, the Solicitor’s Office, BLM, or the Regional Native American Affairs Coordinator, all of which are in the Department of the Interior.

TABLE 3-14
POPULATION BY RACE 2010 CENSUS

	Total	White	Hispanic Or Latino	Black or African American	American Indian/ Alaska Native	Asian	Native Hawaiian/ Other Pacific Islander	Other	Two or more Races	Percent Minority
United States	306,603,772	227,167,013	49,215,563	38,395,857	2,502,653	14,497,185	500,592	15,723,818	7,816,654	21.5
Nevada	2,700,551	1,786,688	716,501	218,626	32,062	195,436	16,871	324,793	126,075	60.4
Clark County	1,951,269	619,468	568,644	204,379	14,422	168,831	13,628	262,506	99,391	68.3
Moapa Town	1,025	727	368	3	35	5	1	226	28	29.3
Tract 59.02	1,433	446	431	5	262	6	2	240	41	68.9
Tract 59.13	4,657	3,828	448	14	43	22	15	169	118	17.8

2007-2011 American Community Survey 5-Year Estimates.

3.10.4 Lifestyle and Cultural Values

The Moapa People were a culturally well-adapted people who combined farming with hunting and gathering. They used the resources of the land with great ingenuity. Most of the domestic objects of their ancestors were various forms of intricately designed basketry, including water jars, winnowing and parching trays, cradle boards, cooking baskets, and seed beaters. They had great skill in the use of animal skins and plants. Their knowledge of nutritional and medicinal uses of plants was extensive (Moapa Paiutes, n.d.).

Today the Tribe's primary business enterprise centers on the Travel Plaza, which includes a casino, convenience store, cafe, gas station, and firework store. An opportunity to expand economic development and hold fast to historical beliefs through low-impact projects and respect for the care and longevity of tribal land is consistent with Tribal values.

3.10.5 Limited English Proficiency

Executive Order 13166 "Improving Access to Services for Persons with Limited English Proficiency" requires all recipients of Federal funds to provide meaningful access to persons who are limited in their English proficiency (LEP). The US Department of Justice defines LEP individuals as those "who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English" (67 FR 41459). Data about LEP populations were gathered from the 2007-2011 American Community Survey 5-Year Estimates.

Within census tracts, cities and counties, the census records the presence of persons who describe their ability to speak English as less than "Very Well." **Table 3-15** shows the number of adults who speak English less than "Very Well" by language category for Nevada, Clark County CT 56.13 BG 1, Moapa Reservation CT 59.02, and Moapa Town. Additionally, Moapa Reservation CT 59.02 has 48 individuals (over the age of 5) or 9.7 percent and Moapa Town has 87 individual (over the age of 5) or 14 percent that reported to the census that they spoke English less than "Very Well." Thus, Census data indicate the presence of LEP populations.

Seventeen percent of the people living in Moapa Town CDP in 2007-2011 were foreign born. Eighty-three percent were native, including 27 percent who were born in Nevada. Among people at least five years old living in Moapa Town CDP in 2007-2011, 30 percent spoke a language other than English at home. Of those speaking a language other than English at home, 100 percent spoke Spanish and 14 percent reported that they did not speak English "very well."

TABLE 3-15
CENSUS DATA: NUMBER OF ADULTS WHO SPEAK ENGLISH LESS THAN VERY WELL*

Household Language	Nevada	Clark County	CT 56.13 BG 1	Moapa Reservation, CT 59.02	Moapa Town
Total Adults over 5	2,538,136	1,831,695	3,880	848	606
English only	1,783,605 70.3%	1,217,070 66.4%	3,679 94.8%	62 73.7%	421 69%
Speak English less than “very well”	318,541 12.6%	264,867 14.5%	58 1.5%	100 11.8%	87 14%
Spanish:	529,391 20.9%	423,841 23.1%	193 5%	190 22.4%	185 30.5%
Other languages	225,140 8.8%	190,784 10.5%	8 0.2%	33 3.9%	0

Data Source: 2007-2011 American Community Survey 5-Year Estimates.
* The data on ability to speak English represent the Census respondent's own perception about his ability to speak English (United States Census 2000 Metadata).

A review of the area did not reveal the use of any language but English on billboards, signs or placards.

Even though the Proposed Project is not scheduled to receive Federal funding, since English and Spanish are the dominant language within the local area any notices for public involvement will be in English and Spanish translation will be provided if needed

3.10.6 Community Infrastructure / Public Services

This section describes the existing public infrastructure resources in the Project area. Topics include libraries, parks and recreation, schools, public health and safety (police, fire, and emergency medical services), solid waste, and water/septic.

Libraries
The Las Vegas-Clark County Library District provides library services for northeast Clark County. The library district is funded through property taxes, sales taxes, and user fees. The Library District serves northeast Clark County with three libraries, one of which is located in Moapa Town.

Parks and Recreation

Clark County Department of Parks and Recreation provides a system of public parks, recreation and open space facilities throughout Clark County. Ron Lewis Park and the Moapa Community Center are located in Moapa Town.

Schools

Clark County School District provides public education services to the county. Northeast Clark County is served by two high schools, two middle schools, and three elementary schools. Ute Perkins Elementary School is located in Moapa Town.

Fire Protection

The Clark County Fire Department provides fire protection and emergency medical response to northeast Clark County with five fire stations manned by volunteer firefighters. The closest of the five stations is Fire Station 72, located in Moapa Town.

Police

Las Vegas Metropolitan Police Department is responsible for providing police protection in northeast Clark County. The Police Department has a Resident Officer Program serving the communities of Bunkerville, Moapa Town/Glendale, and Moapa Valley with approximately eight officers. A command station is located in Overton. The Police Department works cooperatively with other law enforcement agencies in and around northeast Clark County. The Nevada Highway Patrol enforces traffic regulations on state routes in northeast Clark County and BLM rangers patrol Federal lands in the Bureau's jurisdiction.

Moapa Tribal Police Department stationed on the Reservation patrols Reservation lands, roads, and all activities within the Reservation twenty-four hours a day. A staff of six - one dispatcher and five officers - are employed at the station.

Hospitals

Health care is offered within the Reservation business area. Care is offered in cooperation with Indian Health Services. The health-care facility offers immunization, women and infant care, routine health screening, and a rabies clinic. Some emergency care can also be provided. Mesa View Regional Hospital in Mesquite, NV and North Vista Hospital in North Las Vegas, NV (both approximately 30 miles north and south, respectively) are the closest acute and critical care hospitals that can provide emergency services.

Solid Waste Disposal

In Moapa Town, solid waste is collected curbside weekly by Republic Services. The waste goes to the APEX Regional Waste Management Center located in the northeast portion of Clark County. Twenty-one facilities are currently engaged in commercial disposal of RCRA Subtitle C hazardous waste in the nation. The nearest hazardous waste facility to the Proposed Project is located 110 miles due west in Beatty, NV.

The Tribe also has a mulching facility near the southern Reservation boundary. This facility handles organic wastes and has been in operation for the past 3 to 4 years.

Water and Septic

The Moapa Valley Water District provides water service to Moapa Town, Warm Springs, Logandale, and Overton. Properties outside a service provider's areas may apply for individual water well permits from the Nevada Division of Water Resources (NDWR).

Most areas in northeast Clark County with development rely on septic tank systems for waste water treatment. The Southern Nevada Health District regulates individual residential and commercial sewage disposal systems.

3.11 Land/Resource Use

3.11.1 Planned Land Uses

The Proposed Project uses portions of two utility corridors containing several electrical transmission lines (230kV NVE Harry Allen-Reid Gardner #1 and #2, 345kV NVE Harry Allen-Red Butte, 500kV NVE Crystal-Navajo, and 500kV IPP HVDC Intermountain), and two natural gas pipelines owned by Kern River Gas Transmission. In addition, the nearby I-15 transportation corridor includes I-15, a frontage road (North Las Vegas Boulevard), and the Union Pacific railroad.

Multiple power plants are located within a 20-mile radius including the Apex Generating Station, the Chuck Lenzie Generating Station, the Harry Allen Generation Station, the Reid Gardner Generating Station, and the proposed Harry Allen Expansion. The Proposed Project would interconnect to the Crystal Substation or Harry Allen Substation.

The utility corridor is a "planned use" for utilities and is managed by the BLM for portions of the corridor on BLM and on the Reservation. The Proposed Project site is located in an area predefined by the Tribe for economic development. Some of the BLM lands south of the Reservation have been designated as the Dry Lake Solar Energy Zone (SEZ) where solar renewable energy development is encouraged. **Figure 3-8** shows the locations of the corridors and SEZ relative to the Proposed Project.

Clark County has implemented land use plans for private lands within the Northeast County which includes the area around the Reservation. Northeast County is an unincorporated planning area administered by Clark County that includes the communities of Bunkerville, Glendale, Logandale, Moapa, Moapa Valley, Mesquite and Overton. These plans were adopted on September 6, 2006 and indicate the land uses surrounding the Reservation are Open Lands, Industrial and Heavy Industrial.

3.11.2 Hunting, Fishing, Gathering

Given the industrial nature of the utility corridor and vicinity of the Proposed Project to I-15, no hunting, fishing or gathering is assumed or reported by the Tribe in the vicinity of the Proposed Project.

3.11.3 Grazing Allotments

The site is located on the Reservation which has no grazing allotments. The proposed 500 kV and 230 kV ROWs cross BLM managed property. The BLM administers and manages the grazing allotments on public lands in the vicinity of the Proposed Project. The Proposed Project's gen-tie lines and access road ROWs would cross through the Dry Lake (Allotment Number 15416) and Roach Lake (Allotment Number 02007) grazing allotment.

3.11.4 Mining

The Proposed Project is located within the Moapa Mining District. The Nevada Bureau of Mines and Geology lists the historical commodities in this district to be gypsum, volcanic ash, tin, silica, sand and gravel, and uranium (Stewart and Carlson 1978). Three mining claims are located within five miles of the Proposed Project. The first is north of the Proposed Project and is a surface stone quarry, the second is due west of the Proposed Project and is a surface quarry for limestone, and the third one is east across I-15 from the Proposed Project and is a surface quarry for Gypsum-Anhydrite. None of the three mining claims are listed as active. In addition, the Lewis Concrete Sand plant, Las Vegas Gypsum plant and the Logandale Cement plant are located 12.7 miles, 14.9 miles, and 15.2 miles away from the Proposed Project, respectively.

3.11.5 Transportation Networks

This section identifies existing transportation and motorized vehicle access conditions in the Proposed Project area. The Proposed Project is located in a largely undeveloped area; therefore, major transportation routes are limited. Traffic routes within the Proposed Project are limited to unpaved off-highway vehicle (OHV) roads, trails, and dry washes. I-15 and associated frontage roads would provide access to the Proposed Project from the urban center of Las Vegas from the south. A summary of relevant transportation information is summarized below and a more detailed discussion is presented in the K Road EIS (2012).

3.11.5.1 Major Traffic Routes Within or Adjacent to the Proposed Project

I-15 would provide direct access to the Proposed Project from Las Vegas to the south and Salt Lake City, Utah to the north (**Figure 1-2**). US-93 provides east-west direct access from I-15 and North Las Vegas Boulevard.

Peak Hour Volume is defined as the volume of vehicle traffic during the maximum- volume hour of the day and there is typically an A.M. and P.M. peak hour volume on most roadways (Traffic Research Board 2005).

3.11.5.2 Existing Traffic Volumes

Annual Average Daily Traffic (AADT) is defined as the total volume of traffic passing a point or a segment of a highway facility in both directions for one year divided by the number of days in the year (Traffic Research Board 2005). AADT figures are calculated by the Nevada Department of Transportation (NDOT) to assist in the determination of average traffic volumes at particular points along state roads throughout Clark County and the State of Nevada. The closest points to the Proposed Project (that have AADT figures published by NDOT from Annual Traffic Report) are summarized in **Table 3-16**.

TABLE 3-16
AADT SUMMARYNEARTHE PROPOSEDPROJECT

Location	AADT
I-15,1.5 Mile North of Apex Interchange SR-604 (Exit 58)	28,424[2]
I-15,3.2 Miles North of US-93 (Exit 64)	23,786[2]
US-93, 0.6 Mile West of I-15 Interchange (Exit 64)	2,200[1]
North Las Vegas Boulevard (Frontage Road)	317[a]
US-93 Northbound Off-Ramp at I-15 (Exit 64)	2,900[1]
US-93 Northbound On-Ramp at I-15 (Exit 64)	810[1]
US-93 Southbound Off-Ramp at I-15 (Exit 64)	740[1]
US-93 Southbound On-Ramp at I-15 (Exit 64)	2,186[2]

Source:[1]NDOT 2011 Annual Traffic Report, [2] NDOT 2010 Annual Traffic Report
Notes:[a] Estimated AADT based on the NDOT 2010 traffic data for adjacent road ways

3.11.6 Airports

There are nine registered airfields within 50 miles of the Proposed Project (see **Figure 3-9**). These include Perkins Field Airport, Echo Bay Airport, Nellis Air Force Base, North Las Vegas Airport, McCarran International Airport, Henderson Executive Airport, Mesquite Airport, Boulder City Municipal Airport, and Creech Air Force Base. Each is discussed below.

Perkins Field Airport in Overton, NV is located 20 miles northeast of the Proposed Project and was built to provide an emergency landing area for aircraft departing Nellis Air Force Base. Perkins averages 100 flights a week, with the majority of the flights being local.

Echo Bay Airport is located 25 miles east of the Proposed Project within the Lake Mead National Recreation Area and averages 42 private flights per month.

Nellis Air Force Base is located 22 miles south of the Proposed Project. The base itself covers more than 14,000 acres, while the total land area occupied by Nellis and its restricted ranges is about 5,000 square miles. An additional 7,700 square miles of airspace north and east of the restricted ranges are also available for military flight operations. Nellis Air Force Base averages 89 flights a day with 100 percent of them being military operations.

North Las Vegas Airport is located 34 miles southwest of the Proposed Project. North Las Vegas Airport averages 384 flights per day with 53 percent local general aviation, 40 percent transient general aviation, and 7 percent air taxi services.

McCarran International Airport is located 39 miles southwest of the Proposed Project. McCarran International Airport averages 1,399 flights a day with 70 percent commercial, 22 percent air taxi, and 6 percent transient general aviation.

Henderson Executive Airport is located south of Las Vegas and 48 miles southwest of the Proposed Project. Henderson Executive Airport averages 195 flights per day with 56 percent transient general aviation, 31 percent local general aviation, and 14 percent air taxi services.

Mesquite Airport in Mesquite, NV is located 69 miles northeast of the Proposed Project. Mesquite Airport averages 41 flights per day with 86 percent transient general aviation, and 13 percent local general aviation.

Boulder City Municipal Airport in Boulder City, NV is located 57 miles south of the Proposed Project. Boulder City Municipal Airport averages 274 flights per day with 70 percent air taxi, 20 percent local general aviation, and 10 percent transient general aviation.

Creech Air Force Base in Indian Springs, Nevada is located 23 miles west of the Proposed Project. Creech Air Force Base was being used as a divert field and base for air-to-air gunnery training for Nellis; however, now it is home to the 432d Wing that conducts Remotely Piloted Aircraft Systems (RPA) training. Creech Air Force Base averages 77 flights per week with 100 percent of them being military operations.

3.11.7 Railroads

The Proposed Project would be located approximately 1.7 miles northwest of the Union Pacific Railroad ROW, which runs through Dry Lake Valley and into Las Vegas near I-15. This rail line connects Los Angeles-Long Beach with Salt Lake City and Union Pacific's transcontinental line to eastern destinations.

3.12 Special Management Areas

Managed natural areas in the vicinity include Valley of Fire State Park, located nine miles southeast of the Proposed Project. The 106-acre Moapa Valley National Wildlife Refuge, established to protect the thermal spring habitat of the Moapa dace, is located 12 miles northwest of the Proposed Project. Inventories for Lands with Wilderness Characteristics

(LWCs) were conducted by the BLM and resulted in findings adjacent to Arrow Canyon Wilderness and the Muddy Mountains Wilderness. There are no LWCs within the Proposed Project area.

3.12.1 Wilderness

Wilderness is a legal designation designed to provide long-term protection and conservation of Federal public lands. Wilderness is defined by the Wilderness Act of 1964 as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. 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 conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value." The closest wilderness areas are Arrow Canyon Wilderness (designated in 2002) located 11-14 miles west of the Proposed Project, the Muddy Mountains Wilderness located seven miles south of the Proposed Project, and the Meadow Valley Range Wilderness and Mormon Mountain Wilderness Areas (designated in 2004) located approximately 21 miles north of the Proposed Project.

3.12.2 Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACECs) are areas designated by BLM where special management attention is needed to protect and prevent irreparable damage to unique natural values, or to protect human life and safety from natural hazards. Natural values include, but are not limited to, historic, cultural, scenic, and wildlife resources. The southern boundary of the 151,360-acre Mormon Mesa ACEC is located 12.5 miles northeast and nine miles north of the Proposed Project. The Coyote Springs ACEC is located 17 miles to the west, and the Gold Butte ACEC is located 20 miles to the east. All three ACECs were established specifically for the management of desert tortoise habitat and recovery of the desert tortoise (BLM 1998).

3.12.3 Recreation

The Proposed Project would be constructed entirely on lands owned by the Tribe or managed by the BLM. No recreation areas or dispersed recreational opportunities were identified within five-miles of the Proposed Project.

3.13 Visual Resources

This section identifies existing visual resources in the vicinity of the Proposed Project and discusses applicable policies. The baseline visual setting was developed based on the BLM guidelines for visual resource management (VRM) with input from agencies and members of the public during the scoping process. The BLM's VRM system provides a framework for describing visual resources, establishing appropriate management goals for those resources, assessing the impact of an action on those resources, and determining whether such an action would conflict with established management goals.

Neither the Tribe nor the BIA has a visual resource management policy for tribal lands. The BLM visual resource management guidelines are being utilized for all portions of the Project to provide a consistent analysis for the NEPA process. The VRM assessment and proposed mitigation apply to this Proposed Project only and in no way implies a formal, permanent VRM classification of any land managed or owned by the BIA or Tribe, respectively.

3.13.1 Visual Resources Inventory

A Visual Resource Inventory (VRI) was completed by the BLM for the BLM lands in the Project area using the BLM Manual H-8410-1. While the BLM protocol is not applicable to tribal lands, a VRI for the portion of the Project area on the Reservation was completed using the BLM system so a consistent analysis could be conducted for those Project components on the Reservation and adjacent BLM lands.

VRI evaluates the landscape for its scenic values and then assigned to one of four VRI classes. The VRI classes are determined through inventorying and assessing scenic quality, public sensitivities and distance zones/visibility. The VRI class for the landscape in this area is Class IV, having the least visual value, as described below.

The Proposed Project area is located in the Basin and Range physiographic province. The area contains vegetation characteristic of the Mohave Desert dominated by low, widely spaced shrubs such as creosote, sagebrush, brittlebush, and cholla, with scattered occurrences of yucca on flat terrain. Most of the foothills and mountainous areas are vegetated along their slopes with scattered creosote-bursage and other desertscrub, which become smaller and scarcer near the peaks.

The Proposed Project (the solar project, gen-tie lines, access roads, and water pipeline) would be located very near or adjacent to BLM-designated utility corridors that contain multiple extra-high voltage transmission lines, pipelines, and substations. As a result, the natural landscape setting has been heavily modified in the immediate vicinity. The utility corridor contains portions of a number of existing utility facilities, including 500 kV, 230 kV, and voltages less than 230 kV transmission lines on lattice, H-frame, and single-pole structures and a number of underground pipelines. The Crystal and Harry Allen substations and the Harry Allen Power Plant are also visible from the Proposed Project site.

The Proposed Project is located approximately 1.8 miles west of I-15. The terrain is relatively flat west of I-15 and rises east of I-15 to the higher elevations of the Dry Lake Range. The Arrow Canyon Range Mountains are visible in the background beyond the Proposed Project from I-15.

Views of the Project from I-15 will include the other existing man-made features in the viewshed including the multiple power lines ranging from 230 kV to 500 kV in size and substations and power plants depending on the viewpoint.

The scenic quality rating of the Project area is characterized as low (C) because the landforms within the unit are relatively flat (though adjacent scenery in the form of tall mountain ranges add visual interest to the unit, there is little variety and contrast in the local vegetation, and the landscape color variations are subtle. The landscape is common within the physiographic province and the manmade modifications detract from the natural visual harmony. The scenic quality rating unit data within the VRI is consistent with the site-specific scenic quality conditions.

The visual sensitivity level rating unit that the Project falls within is also characterized as low in the VRI. This low sensitivity level in the VRI is based on the limited non-industrial uses in the area. At a site-specific scale, the primary viewers of the Project area would be travelers on I-15 and US 93 and the relatively small number of people who work on the local power facilities (power plants, substations, and linear utilities). The local area has been designated for utility uses and these facilities dominate the existing adjacent uses in the foreground / middleground distance zone that viewers from the highways would see. The distance zone(s) that the Project area lies within is the foreground and middleground of most views.

3.13.2 Visual Resource Management Classes

The visual resource management classes are categories assigned to public lands that portray the relative value of the visual resources and the associated visual management objectives. One of four VRM classes, (I, II, III, IV) is assigned to an area with Class I having the most valuable visual resources and Class IV being the least. The VRM classes guide future land management actions and subsequent site-specific implementation decisions. The visual management objectives of each class are described below:

- Class I Objective. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

- Class II Objective. The objective of this class is 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 of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

- Class III Objective. The objective of this class 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.

- Class IV Objectives. The objective of this class 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.

Figure 3-10 shows the VRM classes in the Project area. The VRM classifications do not apply to Reservation lands, but like the adjacent and surrounding BLM lands, the SPGF site would be classified as Class IV. Generally, nearly all of the lands that would be affected by the Project are designated as Class IV because of the high level of modification to the landscape in this area. The proposed SPGF site and the water pipeline on the Reservation, all of the proposed 230 kV gen-tie line on BLM lands, and most of the 500 kV gen-tie route on the Reservation are located within VRM Class IV. The portions of the access road and 500 kV gen-tie line located on BLM lands and closest to I-15 are located within VRM Class III.

3.13.3 Visibility

Due to the local topography, the Proposed Project site and infrastructure cannot be seen from many locations in the area. To identify the areas from which the project could be seen, the Proposed Project features were plotted on a Digital Elevation Model (DEM) of the area. These maps were overlain with the locations of communities, travel routes, historic landmarks, and recreation areas (for example, historic trails, and travel routes). A viewshed analysis was conducted at a height of 15 feet above site grades to determine the areas from which Proposed Project solar facility (PV solar modules and associated facilities) could be visible. In addition, a separate viewshed analysis was conducted to determine the locations from which the elevated receivers of the eSolar CSP alternative (250 feet in height) could be visible. These analyses covered large areas around the Project as a conservative approach to identify locations from which the Proposed Project and alternatives could be seen. The transmission structures were not evaluated in the visibility analysis because they would occur in areas near or adjacent to existing transmission lines that are equal or larger in size.

Figures 3-11 and **3-12**show the areas from which the Proposed Project could be seen. Figure 3-11 shows the analyses developed using an assumed project height of 15 feet which would be representative of the PV technology and also the AREVA CSP technology. While the AREVA technology has receiving tubes mounted at a higher elevation, their small diameter would make them indiscernible from the lower profile solar field. **Figure 3-12** shows the area from which the Project could be seen using a 250-foot height for the eSolar CSP technology. These heights were used to develop a block model applied to the entire solar site to ensure that all areas from which the Project could be potentially seen were identified. These visibility figures also show the locations of the project features as related to the surrounding landscape features.

As shown on these figures, the areas from which either configuration of the Project could be seen are limited to locations relatively close to the Project area because of intervening topography. The Old Spanish National Historic Trail is a sensitive resource in the area located approximately 5 miles east of the proposed Project site at its closest point. As **Figures 3-11** and **3-12** show, the 250-foot eSolar CSP alternative structures could be potentially visible along about 5 miles of the Trail while the 15-foot Project structures could be potentially visible along about 1.5 miles of the Trail. A more detailed discussion of the visibility of the Project from the Trail is provided in Chapter 4.

3.13.4 Key Observation Points

Key Observation Points (KOPs) represent a critical or typical viewpoint within, or along, an identified location. They are used to provide representative views to assess and mitigate visual impacts of a proposed action and to evaluate compliance with designated visual management objectives. KOPs were identified in coordination with the agency personnel, to identify representative views from recreation areas, and travel routes.

There are no residences in the area, and being located on the Reservation, access to the vicinity of the Proposed Project is restricted. Therefore, five KOP locations were selected through consultation with BLM and NPS along nearby public travel routes and from the Old Spanish National Historic Trail from which the Project could be seen. **Figure 3-13** shows the five KOP locations. These KOPs provide views that are representative of many locations around the area because of the general uniformity of the local vegetation and topography.

Appendix J contains the visual contrast rating sheets for the key observation points.

3.13.4.1 KOP 1

This viewpoint is located on Highway 93 approximately 3.5 miles northwest of Highway 93/ I-15 intersection. This KOP provides a potential view of the MSEC site from a distance of about 6.5 miles looking northeast towards the Proposed Project. Highway 93 is a main travel route in the area, but is less traveled than I-15 and has a posted speed limit of 70mph. Potential views of the Project to travelers on this highway would be nearly perpendicular to the direction of travel so would not be in the normal line of sight for drivers but possibly more visible to passengers.

The Proposed Project could potentially be seen from Highway 93 for the approximately 3.5 miles from its intersection with I-15 westward. The view from this portion of Highway 93 is dominated by existing industrial uses and features including transmission lines and many lattice and H-frame transmission structures visible in the distance. The horizontal and vertical lines associated with the existing transmission facilities and the Harry Allen power plant and substation are visible in the foreground (1 to 3 miles) and middleground (3 to 5 miles) of views on Highway 93 between this KOP and I-15.The Arrow Canyon mountain range is in the background distance. The vegetation is creosote/scrub desert displaying dotted colors of browns, tans, and yellows. The scenic quality is low, the sensitivity level is low, and VRI is Class IV. The VRM classification for the area seen in the view is primarily VRM Class IV and VRM Class III.

Figure 3-14 shows the existing view from KOP 1 looking northeast to the Proposed Project site.

3.13.4.2 KOP 2

This viewpoint is located on I-15 approximately 3.5 miles nearly due south of the MSEC Project site. I-15 is the main travel route in the area and has a speed limit of 75 mph. This KOP provides a view of what northbound travelers on I-15 would see.

This view is dominated by existing industrial uses and features. The horizontal lines and colors associated with I-15 dominate the view in the foreground. From this KOP, the vertical and horizontal lines associated with several transmission lines and many towers are visible in the foreground and middleground .The Crystal Substation is in the middleground. Mountain ranges are in the distance. The vegetation is creosote/scrub desert displaying colors of browns, tans, and yellows. The scenic quality is low, the sensitivity level is low, and VRI is Class IV. The VRM classification for the area seen in the view is VRM Class IV and III.

Figure 3-15 shows the existing view from KOP 2 looking north to the Proposed Project site.

3.13.4.3 KOP 3

This viewpoint is located on I-15 approximately two miles southeast of the MSEC Project site. This KOP provides a view of what northbound travelers on I-15 would see intermittently for up to nine miles.

This view is dominated by the presence of the horizontal lines and colors associated with I-15 in the foreground. From this KOP, the horizontal and vertical lines associated with the several transmission lines, many towers, and the Crystal Substation are visible in the foreground/middleground just beyond the highway. The vegetation is creosote/scrub desert displaying colors of browns, tans, and yellows. Mountain ranges are visible in the distance. The scenic quality is low, the sensitivity level is low, and VRI is Class IV. The VRM classification for the area seen in the view is VRM Class IV and III.

Figure 3-16 shows the existing view from KOP 3 looking northeast to the Proposed Project site.

3.13.4.4 KOP 4

This viewpoint is located on a portion of the Old Spanish National Historic Trail near Route 40 (Valley of Fire Highway). This KOP is located approximately 6.75 miles east - southeast of the of the MSEC site. Route 40 is not a major route and this part of the Old Spanish Trail is assumed to be infrequently visited by the public.

From this viewpoint along the Old Spanish National Historic Trail, part of the Valley of Fire Road is visible in the foreground. The foreground and middleground contains a flat desert landscape with varying light and dark colors associated with the native vegetation displaying colors of browns, tans and yellows. Existing industrial uses and features (transmission, substation, highway) are present in the far distance but not readily visible. Mountain ranges are in the far background distance. The scenic quality is low, the sensitivity level is low, and VRI is Class IV. The VRM classification for the area seen in the view is VRM Class III and IV.

Figure 3-17 shows the existing view from KOP 4 looking west to the Proposed Project site.

3.13.4.5 KOP 5

This viewpoint is located on a portion of the Old Spanish National Historic Trail. This KOP is located approximately 5.75 miles southeast of the of the MSEC site. There are no significant roads in this area and this part of the Old Spanish National Historic Trail is assumed to be infrequently visited by the public.

From this viewpoint along the Old Spanish National Historic Trail, a flat desert landscape is in the foreground. The vegetation and exposed soil surface display colors of browns, tans and yellows. Existing industrial uses and features (transmission, substation, highway) occur in the far background but are not readily visible. Mountain ranges are in the far background distance. The VRM classification for the area seen in the view is VRM Class III and IV.

Figure 3-18 shows the existing view from KOP 5 looking northwest to the Proposed Project site.

3.14 Public Health and Safety

This section describes existing conditions relative to human health and safety. The Proposed Project is located on undeveloped lands held in trust for the Tribe and would be potentially affected by existing hazards in the Project area including fire, earthquakes, flooding, existing soil or groundwater contamination, and other potential natural and infrastructure hazards.

3.14.1 Potential Hazardous Waste/Contaminated Soil and Groundwater

Exposure to hazardous materials or wastes could occur from both existing conditions at the Proposed Project and from Proposed Project activities. However, the potential for encountering hazards and hazardous material at the Proposed Project during construction and operation would be low because of the undeveloped nature of the Project site and surrounding areas and the proposed plans for handling such materials during the construction and operation of the Project.

An Environmental Hazardous Radius Report was obtained for the site and surrounding area (**Appendix K**) to determine if historical or current hazardous material may be present in the Proposed Project area. No sites were adjacent to the site and there is no reported hazardous site within theProposed Project site.

3.14.1.2 Hazardous Materials Management

Fuels, oils, lubricants, and solvents would be the primary hazardous and flammable materials that would be on-site during construction and operation. Small quantities of additional common hazardous materials would be used on-site during construction, including antifreeze and used coolant, latex and oil-based paint, paint thinners and other solvents, cleaning products, and herbicides.

All hazardous waste will be segregated, sorted, and stored in a designated location. Properly sized secondary spill containments will be provided for each type of waste.

Substation transformers typically contain moderate quantities of oil, but the oils currently used are non-hazardous. All transformers would comply with SPCC requirements, which mandate that transformers have secondary containment sufficient to contain a release of the entire volume of oil in a transformer.

3.14.2 Fire Hazards

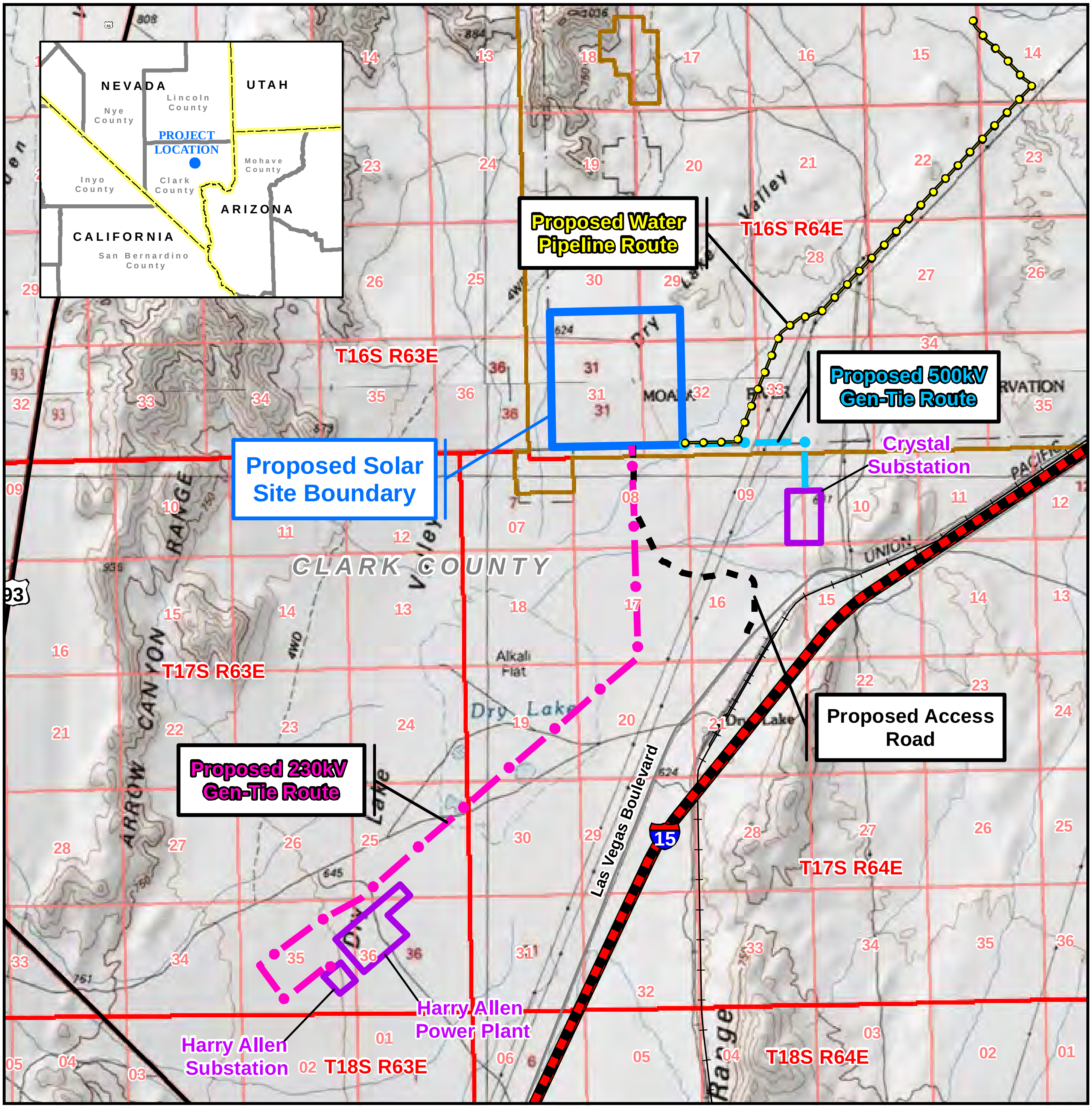
The Nevada Fire Safe Council commissioned the Clark County Community Wildfire Risk/Hazard Assessment Project that was published in 2005. This assessment included communities at risk within the vicinity of Federal lands that are most vulnerable to the threat of wildfire and was based on five primary factors that affect potential fire hazard:

- Community design,
- Construction materials,
- Defensible space,
- Availability of fire suppression resources, and
- Physical conditions such as the vegetative fuel load and topography.

The Project site is located in the southwest corner of the Reservation. The closest fire service is a volunteer fire department in Moapa Town, approximately 20 miles to the north. Water availability for fire suppression in Moapa Town includes community wells and two tanks with a combined capacity of four million gallons. Moapa Town also has access to the Muddy River and several ponds for drafting and helicopter dip sites.

3.14.3 Worker Safety

During Proposed Project construction, standard health and safety procedures would be implemented in accordance with OSHA standards to minimize the risk of accidents or injuries. Safety planning and regular training sessions would occur to ensure that workers were adequately prepared to address any anticipated site-specific hazards, such as electrocution, fires, and accidents (such as slips, trips, or falls). In addition, workers would be trained on the appropriate use of safety equipment and personal protective equipment (PPE). The EPC contractor will be responsible for submitting an adequate Health & Safety Plan prior to construction.



Legend

Interstate	Proposed Access Road
US/State Highway	Existing Substation Boundary
Local Road	Proposed Solar Site Boundary
Railroad	Township/Range Boundary
Proposed Water Pipeline	Section Line
Proposed 230kV Gen-Tie	Indian Reservation
Proposed 500kV Gen-Tie	

0 0.5 1 1.5

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

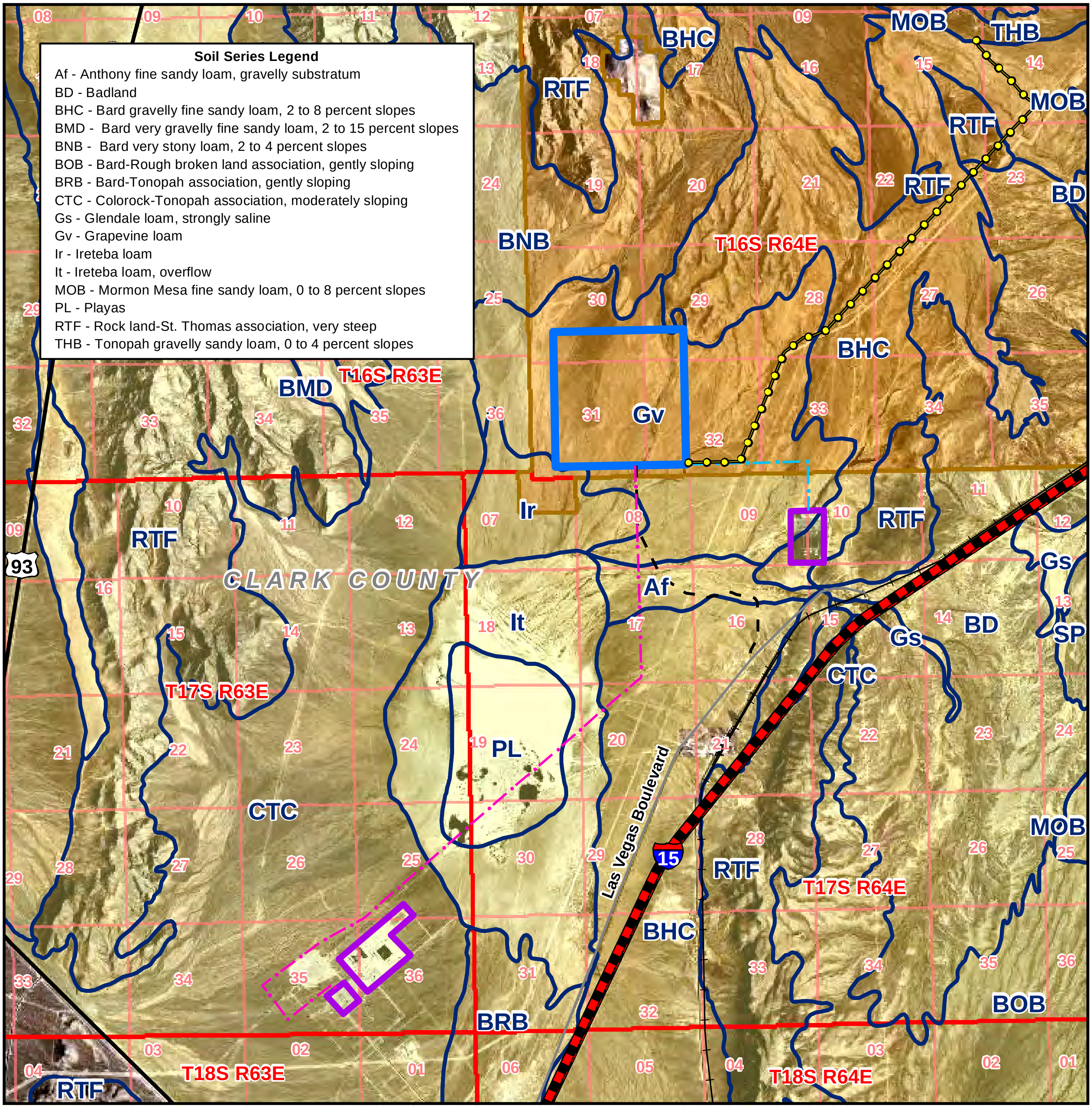
Moapa Solar Energy Center EIS

FIGURE 3-1
LOCAL TOPOGRAPHY

Map Extent: Clark County, Nevada

Date: 04-30-13 | Author: djb

I:\Moapa Solar\MXD's\Elevations 8.5x11 043013_EIS Figure 3-1.mxd



Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary
- Soil Series

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Reservation

0 0.5 1 1.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

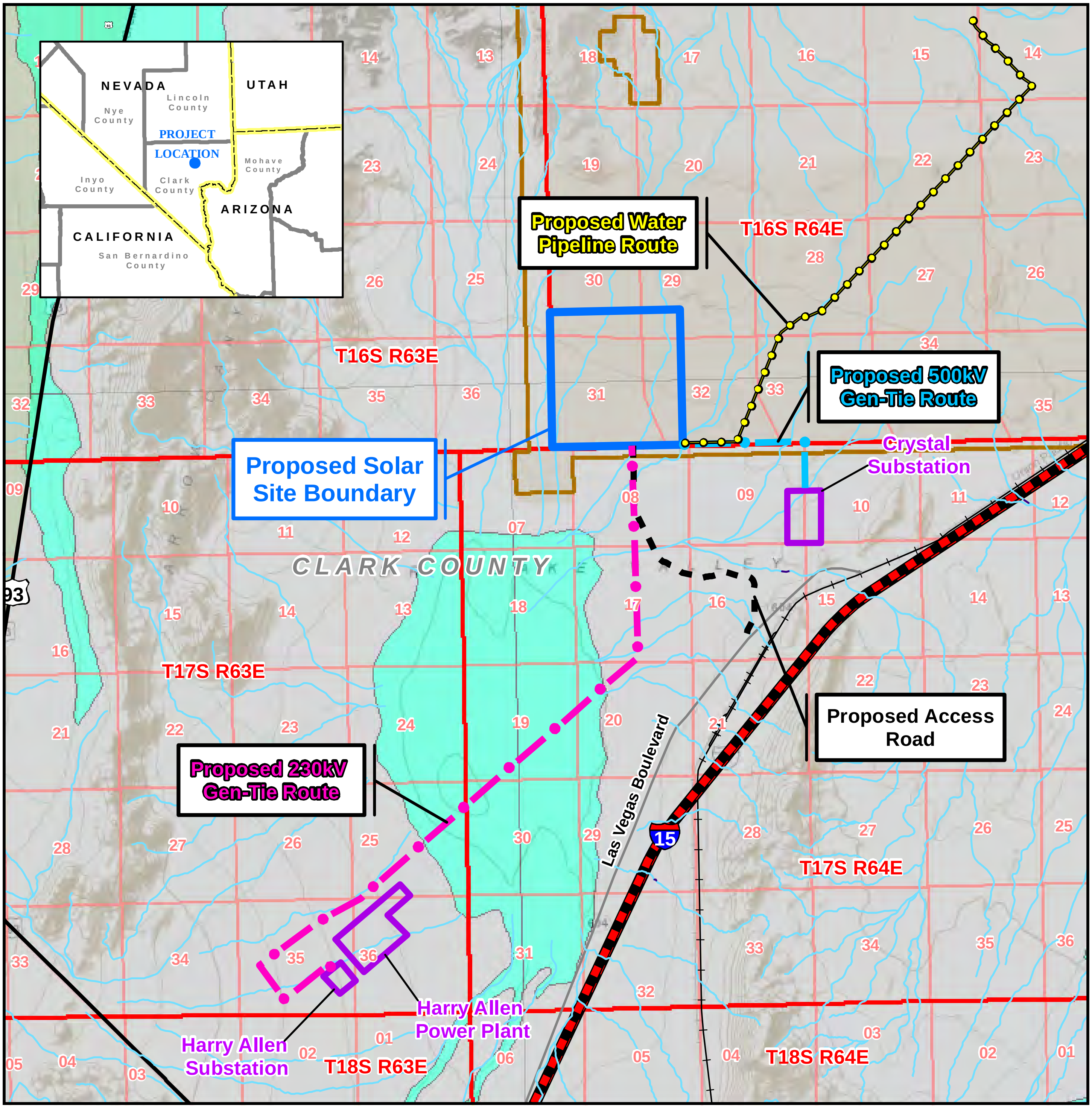
Moapa Solar Energy Center EIS

FIGURE 3-2
SOILS MAP

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

I:\Moapa Solar\MXD's\Soils 8.5x11 043013_EIS Figure 3-2.mxd



Legend

Interstate	Township/Range Boundary
US/State Highway	Section Line
Local Road	Existing Substation Boundary
Railroad	Proposed Solar Site Boundary
Intermittent Stream/River	Indian Reservation
Proposed Water Pipeline	FEMA Flood Zone A
Proposed 230kV Gen-Tie	FEMA Flood Zone X
Proposed 500kV Gen-Tie	
Proposed Access Road	

0 0.5 1 1.5

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE 3-3
FEMA FLOOD ZONE MAP

Map Extent: Clark County, Nevada

Date: 07-29-13 | Author: djb

I:\Moapa Solar\MXD's\Hydrology 8.5x11 072913_EIS Figure 3-3.mxd

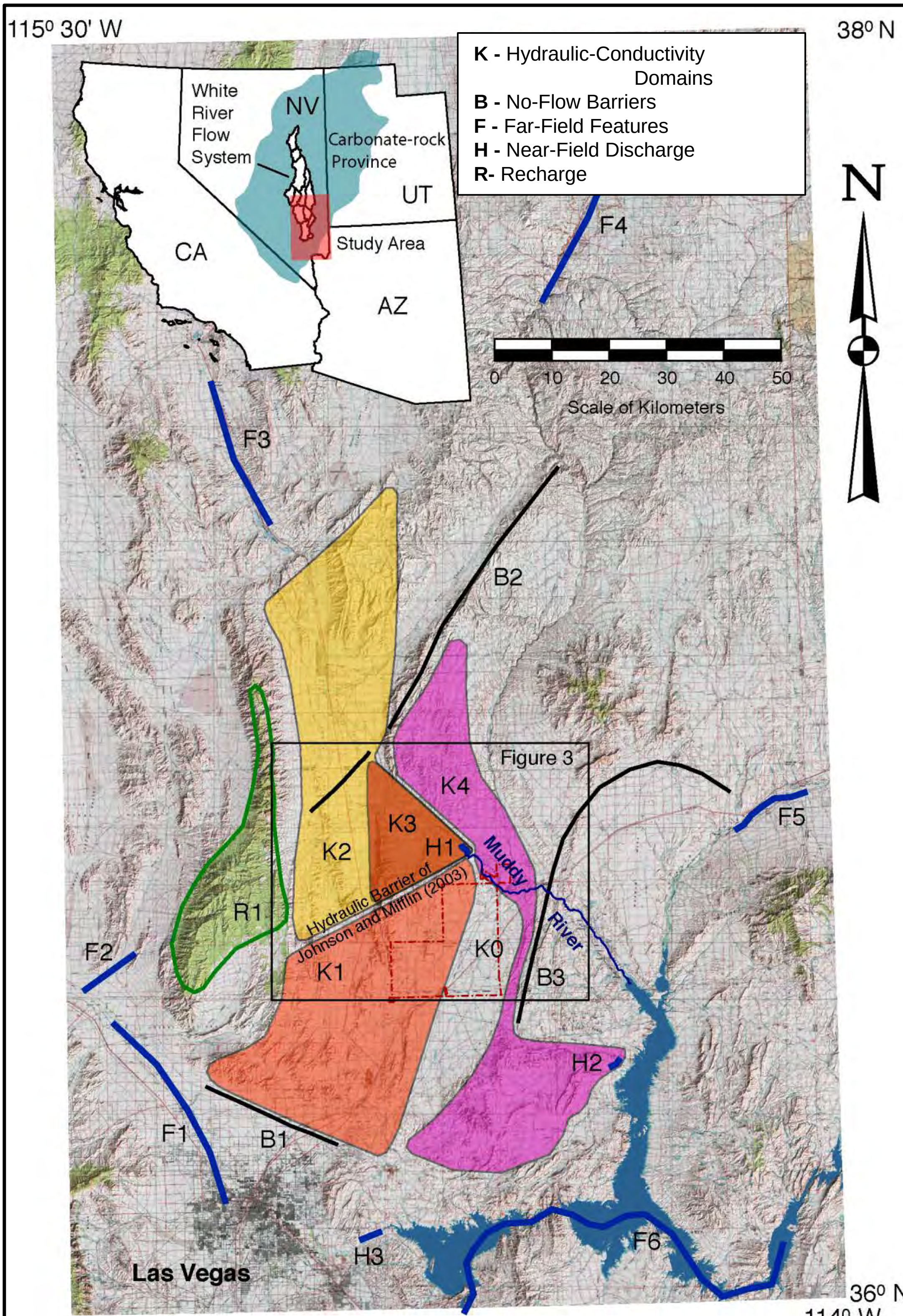
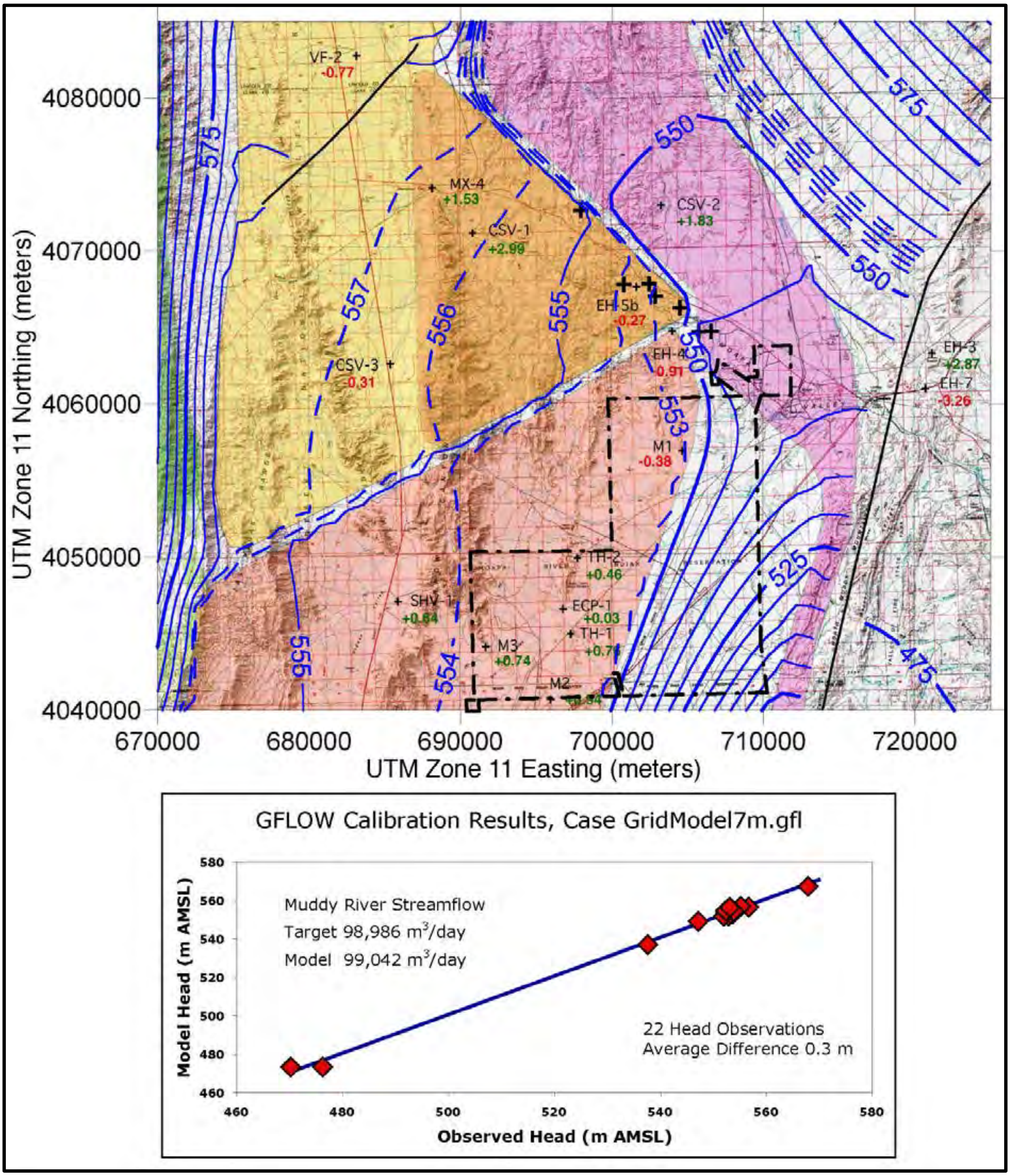


Figure 3-4
Hydrogeologic Characteristics of the Study Area



Contour interval 1 meter where dashed, 5 meters elsewhere. Bold symbols (**+**) show model locations of groundwater extraction by Nevada Power Company (Nevada Energy) and Moapa Valley Water District

Figure 3-5

Potentiometric Surface – Water Table

Head Contours and Residuals at Monitoring Well Locations


09
10
11
12
16
15
14
13
Township 16S
Range 64E
CLARK COUNTY
21
22
23
24
Moapa River
Indian
Reservation
Legend
Interstate
Major Road
Railroad
Proposed 230kV Gen-Tie
Proposed 500kV Gen-Tie
Township/Range Boundary
PLSS Section Line
Existing Substation Boundary
Solar Power Generation Facility Boundary
Proposed Water Pipeline ROW
Proposed 230kV 150' Transmission Line ROW
Proposed 500kV 150' Transmission Line ROW
Proposed Access Road ROW
Creosotebush Series – Cactus/Yucca Scrub
Creosotebush Series – Creosotebush/White-Bursage
Disturbed
Mesquite
Playa Lake
Saltbush
Xeroriparian
Jurisdictional Land Ownership
Bureau of Land Management Land
Indian Land
0
0.25
0.5
Miles
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters
Moapa Solar Energy Center
FIGURE 3-6a
Vegetation Covertype
Map Extent: Clark County, Nevada
Date: 05-03-13
Author: rnc
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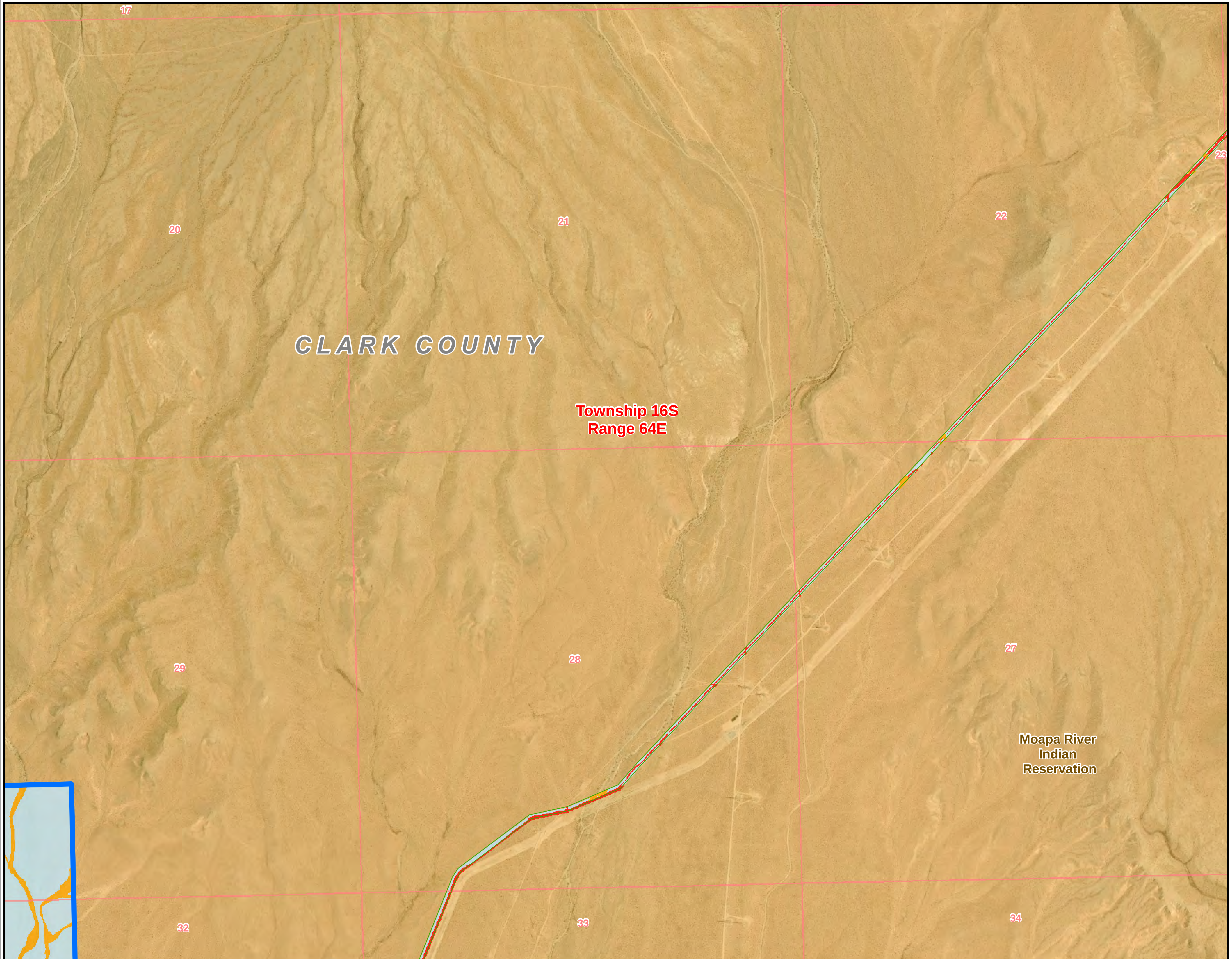


Legend

- Interstate
- Major Road
- Railroad
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Township/Range Boundary
- PLSS Section Line
- Existing Substation Boundary
- Solar Power Generation Facility Boundary
- Proposed Water Pipeline ROW
- Proposed 230kV 150' Transmission Line ROW
- Proposed 500kV 150' Transmission Line ROW
- Proposed Access Road ROW
- Creosotebush Series – Cactus/Yucca Scrub
- Creosotebush Series – Creosotebush/White-Bursage
- Disturbed
- Mesquite
- Playa Lake
- Saltbush
- Xeroriparian

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 0.25 0.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

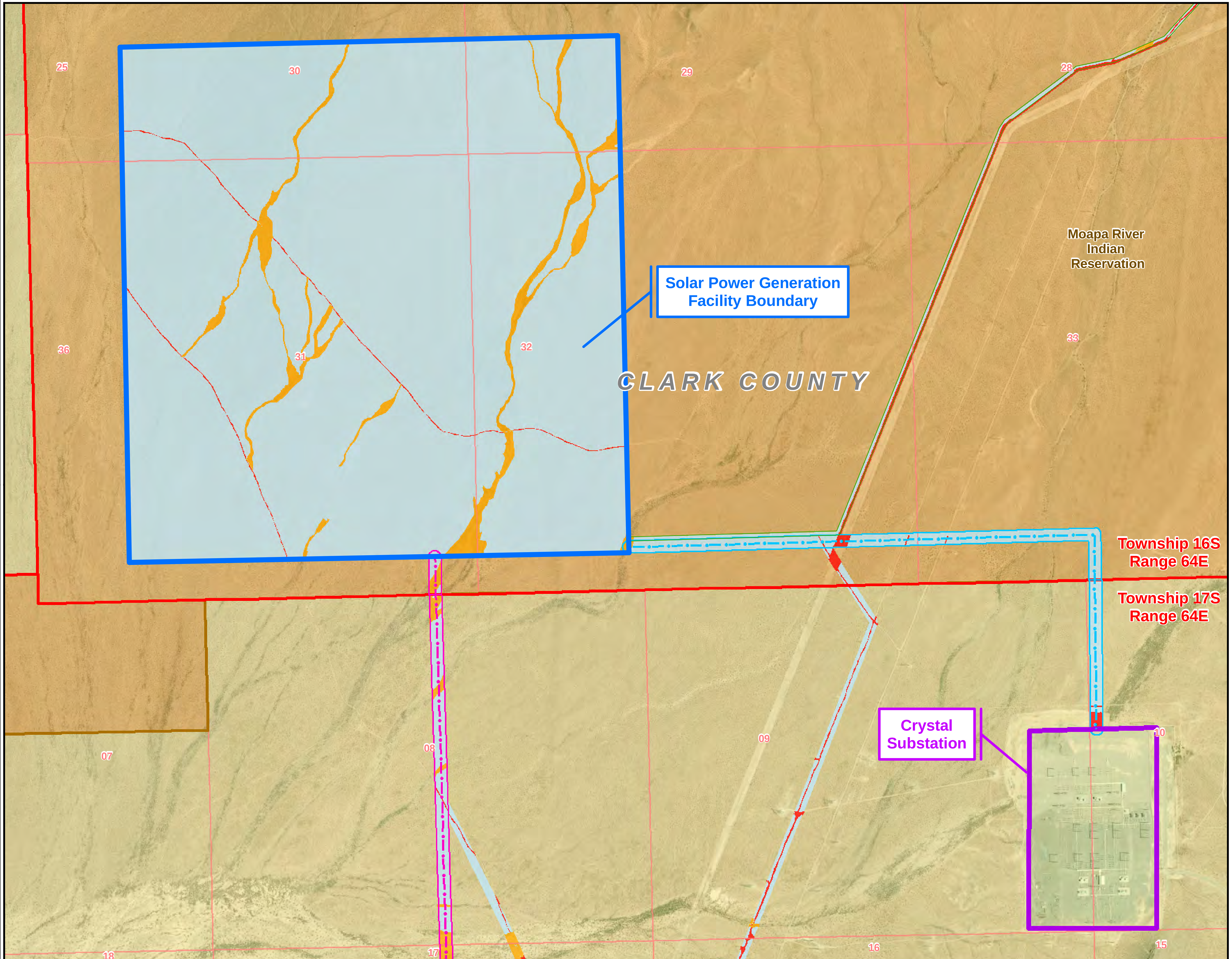
Moapa Solar Energy Center

FIGURE 3-6b
Vegetation Covertype

Map Extent: Clark County, Nevada

Date: 05-03-13 | Author: rnc

I:\Moapa Solar\MXD's\FigureX_VegCovertype_11x17



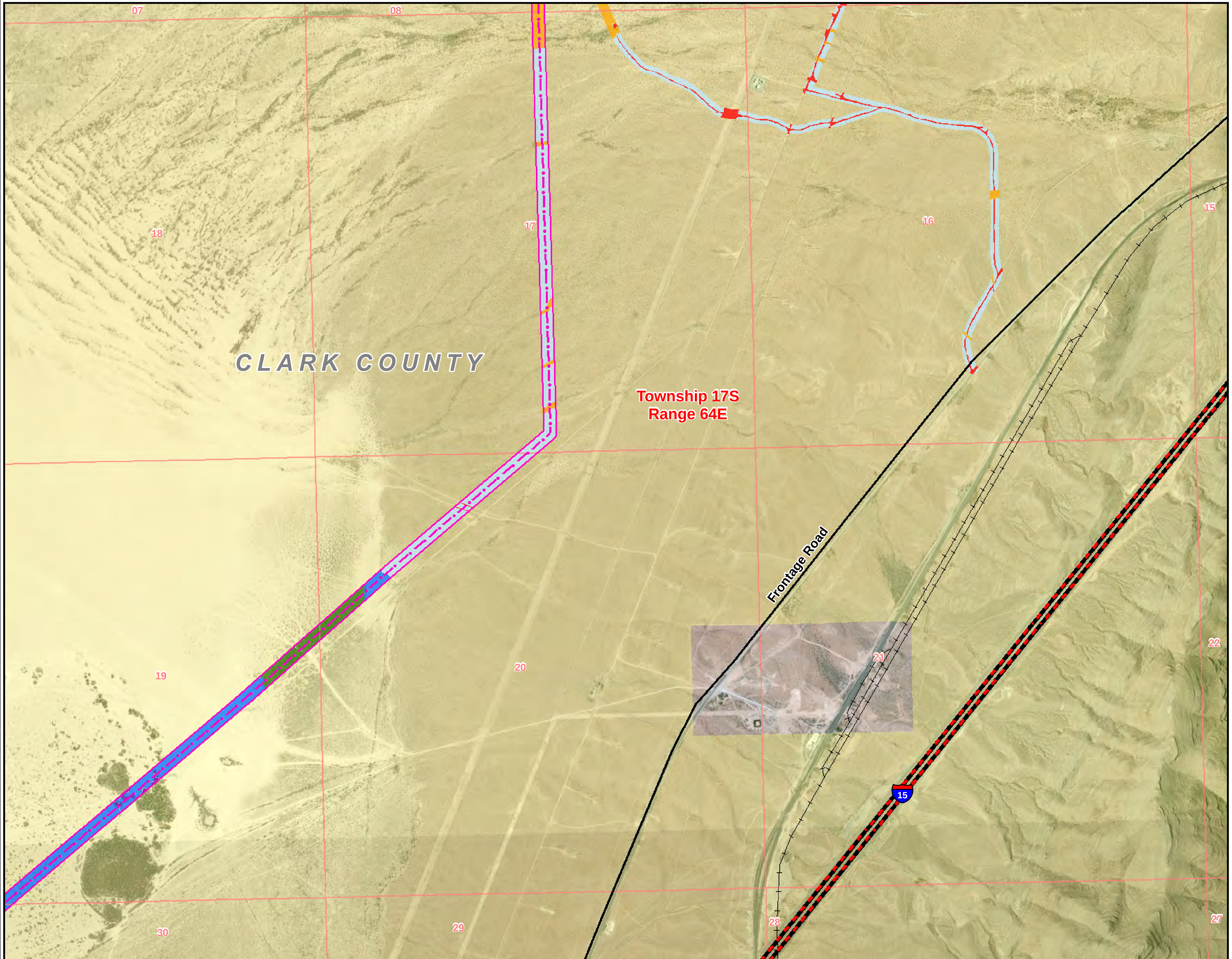
Moapa Solar Energy Center

FIGURE 3-6c
Vegetation Covertype

Map Extent: Clark County, Nevada

Date: 05-03-13 Author: rnc

I:\Moapa Solar/MXD's/FigureX_VegCovertype_11x17



Moapa Solar Energy Center

FIGURE 3-6d
Vegetation Covertype

Map Extent: Clark County, Nevada

Date: 05-03-13 | Author: rnc

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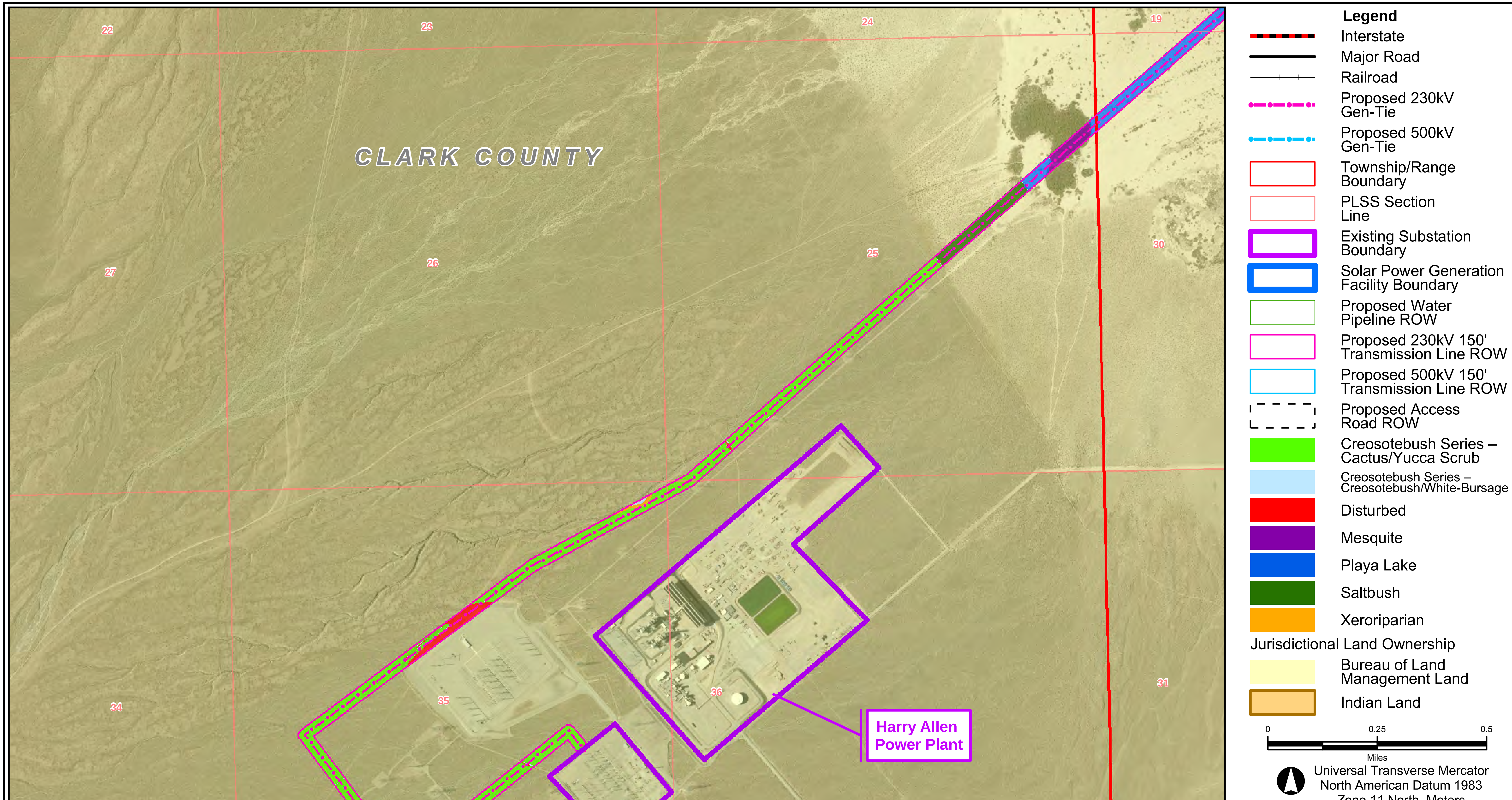

Moapa Solar Energy Center

FIGURE 3-6e
Vegetation Covertype

Map Extent: Clark County, Nevada

Date: 05-03-13		Author: rnc

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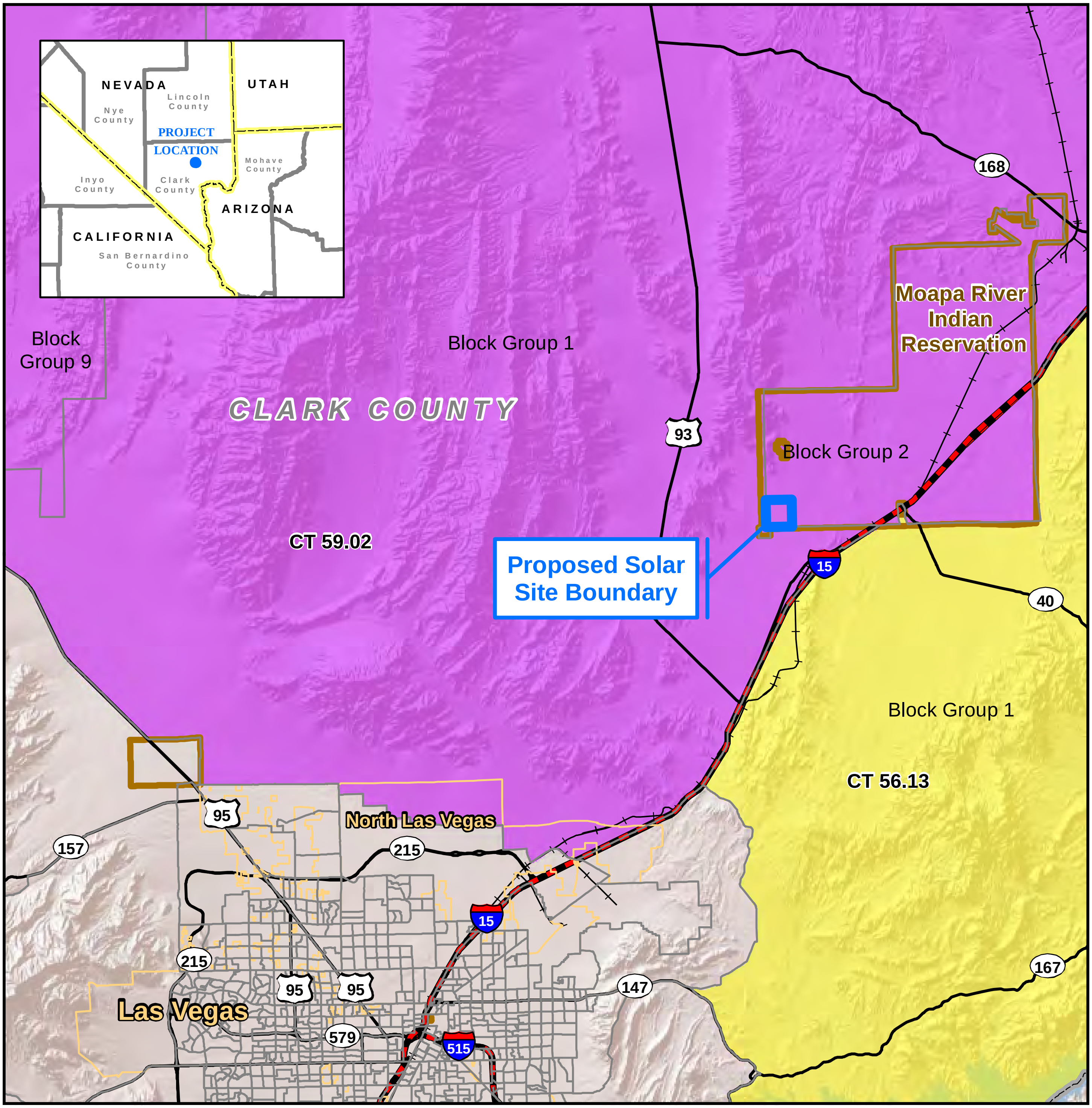
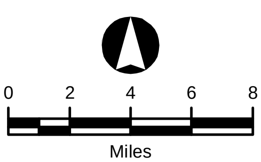


Legend

- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Indian Reservation
- Block Group
- Census Tract 56.13
- Census Tract 59.02



Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

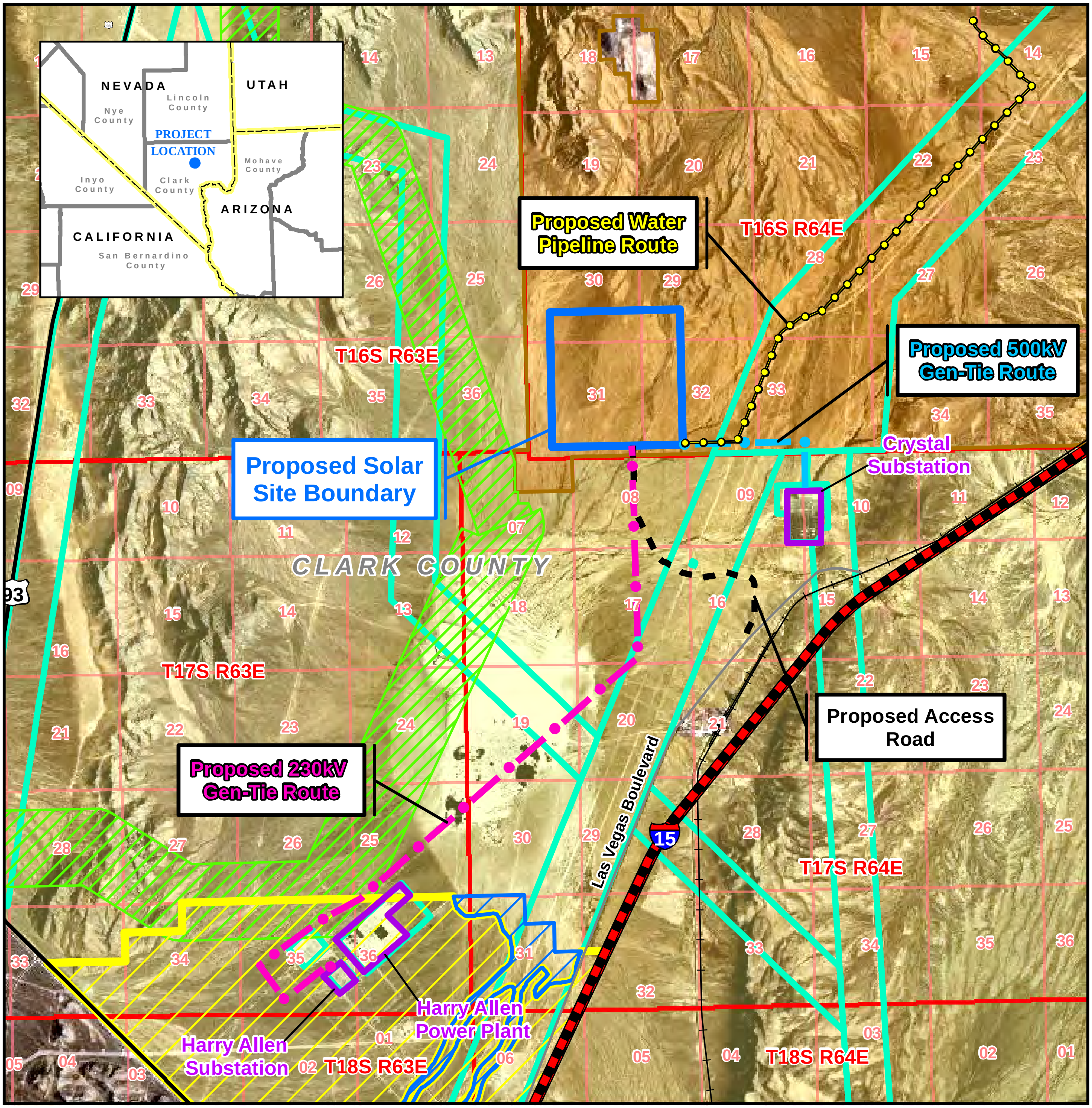
Moapa Solar Energy Center EIS

FIGURE 3-7
REGIONAL CENSUS TRACTS

Map Extent: Clark County, Nevada

Date: 05-31-13		Author: djb

I:\Moapa Solar/MXD's/Census Data 8.5x11 053113_EIS Figure 3-7.mxd



Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary
- Section 368 Utility Corridor
- BLM Utility Corridor
- Dry Lake SEZ (Developable)
- Dry Lake SEZ (Non-Developable)

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Reservation

0 0.5 1 1.5

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

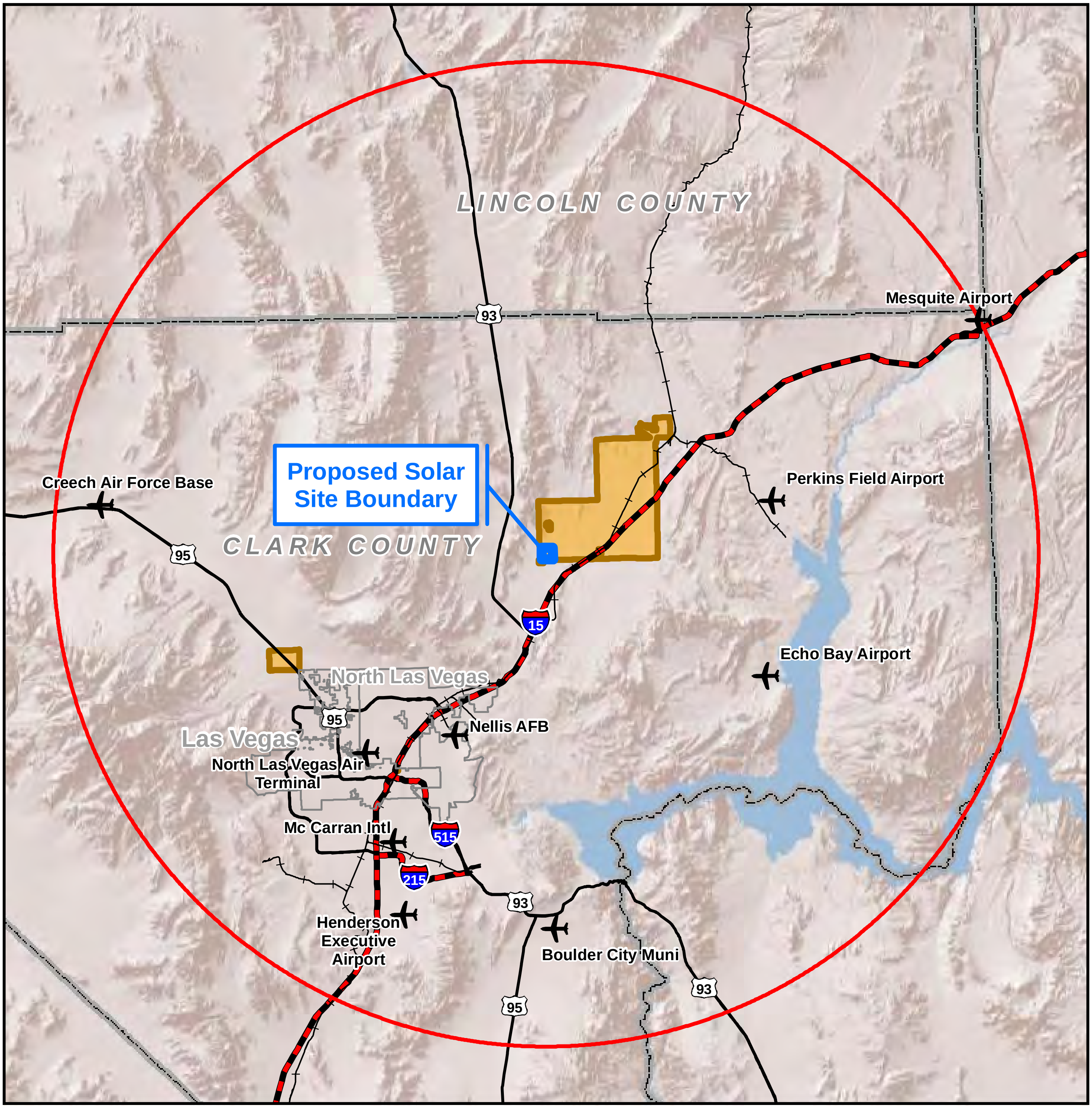
Moapa Solar Energy Center EIS

FIGURE 3-8
DESIGNATED UTILITY CORRIDORS

Map Extent: Clark County, Nevada

Date: 05-31-13 | Author: djb

I:\Moapa Solar\MXD's\Proposed Project Facilities with Utility Corridors 8.5x11 053113_EIS Figure 3-8.mxd



Legend

- Airport
- Interstate
- US/ State Highway
- Railroad
- County Boundary
- Municipal Boundary
- Proposed Solar Site Boundary
- 50 Mile Radius of Solar Project

Jurisdictional Land Ownership

- Indian Reservation

0 5 10 15 20

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

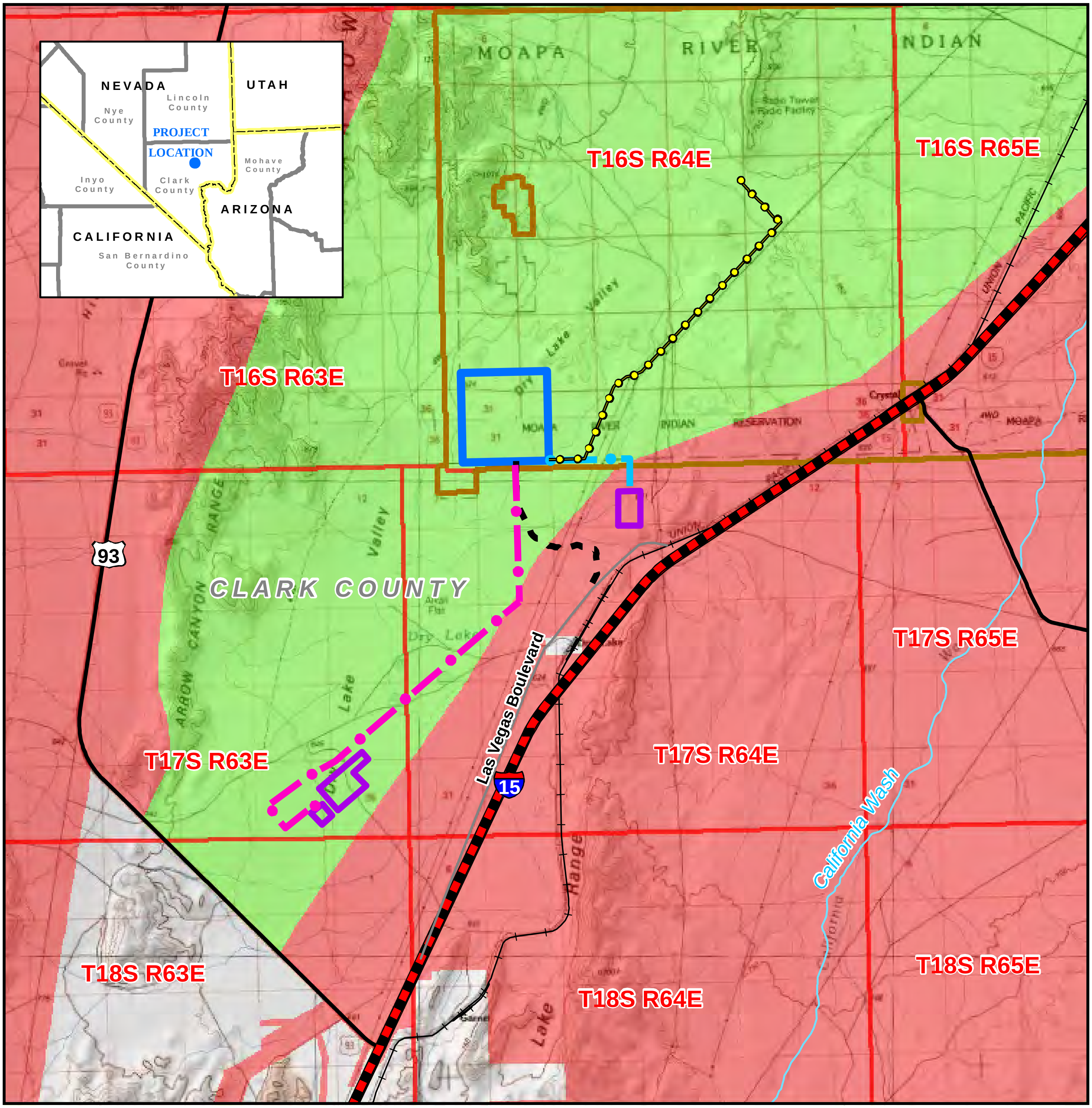
Moapa Solar Energy Center EIS

FIGURE 3-9
AIRPORT LOCATIONS

Map Extent: Clark & Licoln Counties, Nevada

Date: 05-31-13		Author: djb

I:\Moapa Solar/MXD's/Airport Locations 8.5x11 053113_EIS Figure 3-9.mxd



Legend

- Key Observation Point
- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary
- VRM Class III
- VRM Class IV
- Jurisdictional Land Ownership
- Indian Reservation

0 0.5 1 1.5 2

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

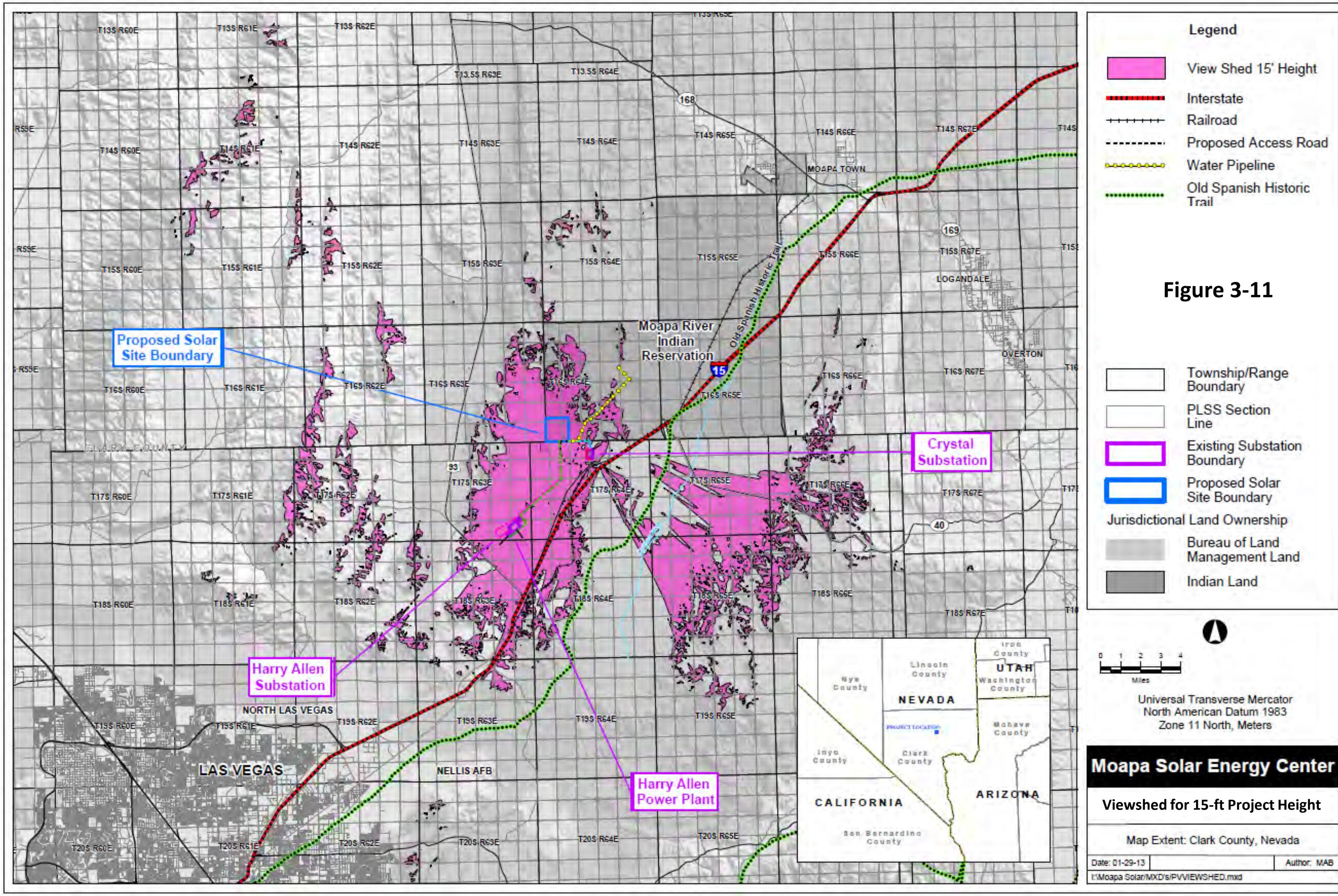
Moapa Solar Energy Center EIS

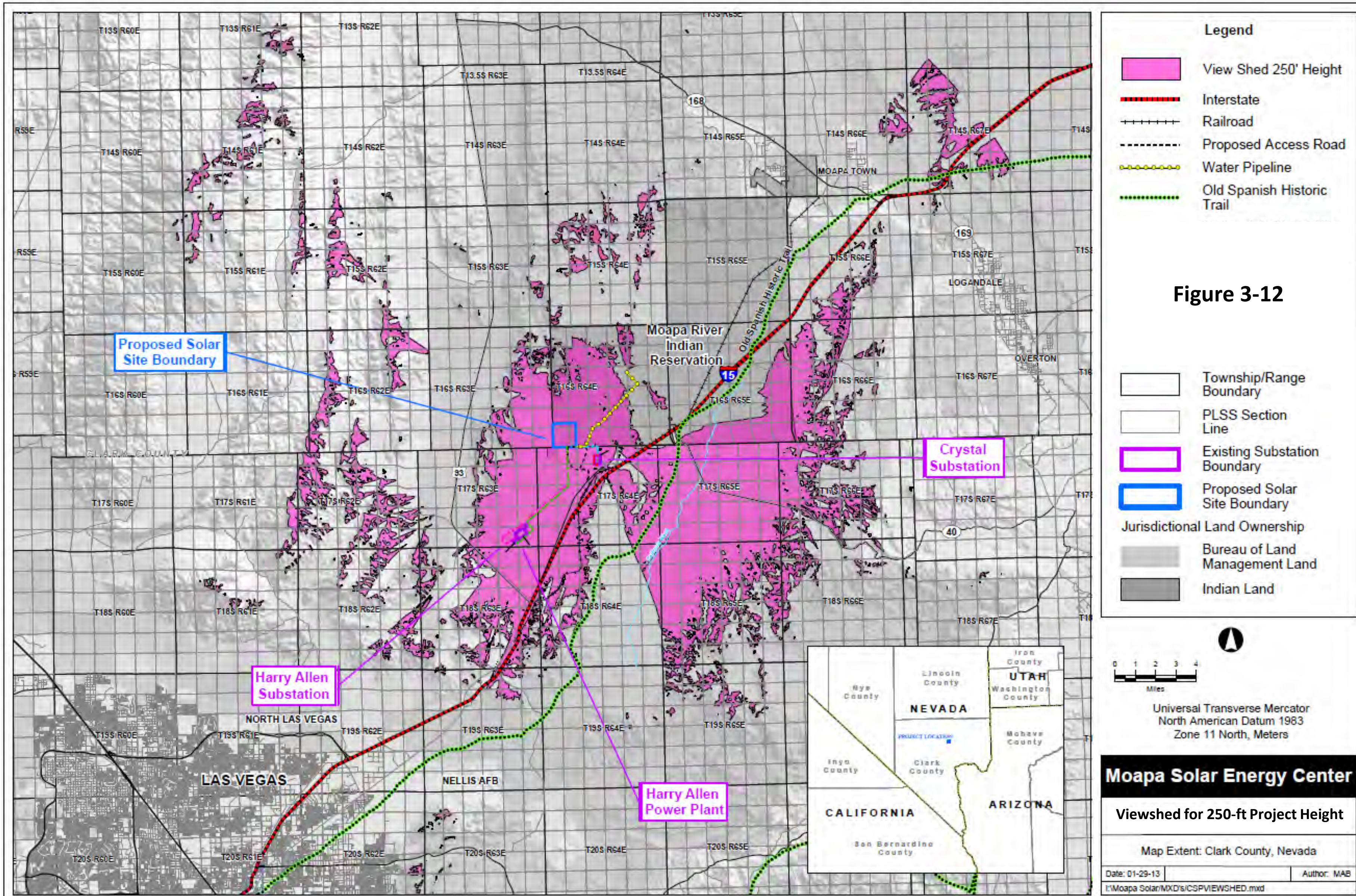
FIGURE 3-10
VISUAL CLASSSIFICATIONS IN THE PROJECT AREA

Map Extent: Clark County, Nevada

Date: 05-31-13		Author: djb

I:\Moapa Solar\MXD's\Visual Classifications 8.5x11 053113_EIS Figure 3-10.mxd


Legend
View Shed 15' Height
Interstate
Railroad
Proposed Access Road
Water Pipeline
Old Spanish Historic Trail
Figure 3-11
Township/Range Boundary
PLSS Section Line
Existing Substation Boundary
Proposed Solar Site Boundary
Jurisdictional Land Ownership
Bureau of Land Management Land
Indian Land
Miles
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters
Moapa Solar Energy Center
Viewshed for 15-ft Project Height
Map Extent: Clark County, Nevada
Date: 01-29-13
Author: MAB
I:\Moapa Solar\MXD's\PVVIEWSHED.mxd
Proposed Solar Site Boundary
Crystal Substation
Harry Allen Substation
Harry Allen Power Plant
Moapa River Indian Reservation
Old Spanish Historic Trail
MOAPA TOWN
LOGANDALE
OVERTON
NORTH LAS VEGAS
LAS VEGAS
NELLIS AFB
CLARK COUNTY
NEVADA
UTAH
ARIZONA
CALIFORNIA
Nye County
Lincoln County
Clark County
Inyo County
Iron County
Washington County
Mohave County
San Bernardino County


Legend
View Shed 250' Height
Interstate
Railroad
Proposed Access Road
Water Pipeline
Old Spanish Historic Trail
Figure 3-12
Township/Range Boundary
PLSS Section Line
Existing Substation Boundary
Proposed Solar Site Boundary
Jurisdictional Land Ownership
Bureau of Land Management Land
Indian Land
Proposed Solar Site Boundary
Crystal Substation
Harry Allen Substation
Harry Allen Power Plant
Moapa River Indian Reservation
MOAPA TOWN
LOGANDALE
OVERTON
NORTH LAS VEGAS
LAS VEGAS
NELLIS AFB
CLARK COUNTY
NEVADA
UTAH
ARIZONA
CALIFORNIA
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters
Moapa Solar Energy Center
Viewshed for 250-ft Project Height
Map Extent: Clark County, Nevada
Date: 01-29-13
Author: MAB
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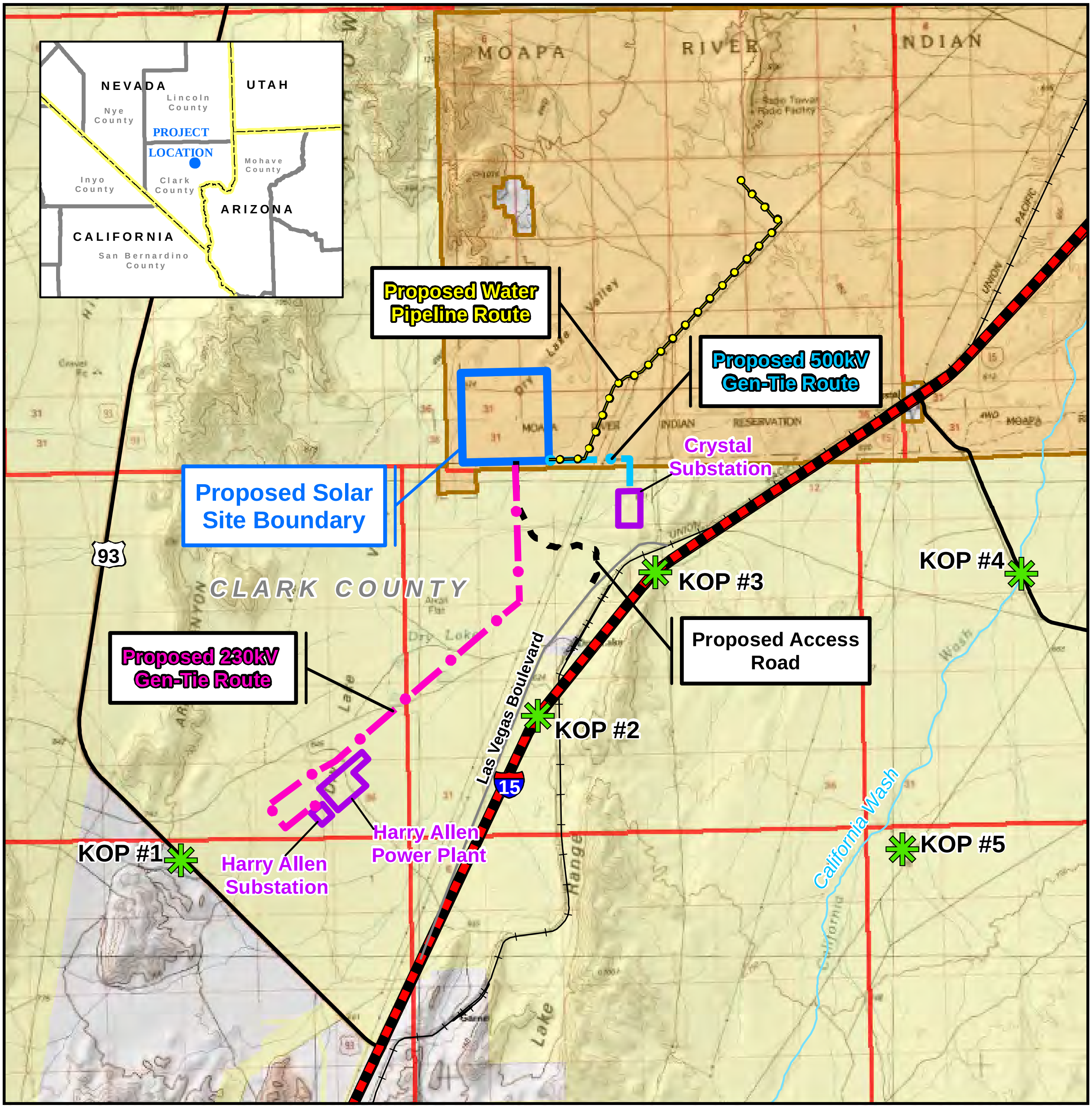


Legend

Key Observation Point	Township/Range Boundary
Interstate	Section Line
US/State Highway	Existing Substation Boundary
Local Road	Proposed Solar Site Boundary
Railroad	
Proposed Water Pipeline	Jurisdictional Land Ownership
Proposed 230kV Gen-Tie	Bureau of Land Management Land
Proposed 500kV Gen-Tie	
Proposed Access Road	Indian Reservation

0 0.5 1 1.5 2
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE 3-13
KOP LOCATIONS

Map Extent: Clark County, Nevada

Date: 05-31-13 | Author: djb

I:\Moapa Solar\MXD's\KOP Locations 8.5x11 053113_EIS Figure 3-13.mxd

FIGURE 3-14
EXISTING VIEW FROM KOP 1
LOOKING NORTHEAST FROM HIGHWAY 93 ABOUT 6.5 MILES SOUTHWEST OF THE MSEC SITE

FIGURE 3-15
EXISTING VIEW FROM KOP 2
LOOKING NORTH FROM I-15 ABOUT 3.5 MILES SOUTH OF THE MSEC SITE

FIGURE 3-16
EXISTING VIEW FROM KOP 3
LOOKING NORTHWEST FROM I-15 ABOUT 2.0 MILES SOUTHEAST OF THE MSEC SITE

FIGURE 3-17
EXISTING VIEW FROM KOP 4
LOOKING WEST FROM ROUTE 40 / OLD SPANISH TRAIL ABOUT 6.75 MILES EAST-SOUTHEAST OF THE OF THE MSEC SITE

FIGURE 3-18
EXISTING VIEW FROM KOP 5
LOOKING NORTHWEST FROM THE OLD SPANISHTRAIL ABOUT 7.0 MILES SOUTHEAST OF THE OF THE MSEC SITE

Chapter 4

Environmental Consequences

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter analyzes the environmental consequences or impacts expected to occur as a result of implementing the actions described for the Proposed Project and alternatives outlined in Chapter 2, Description of the Proposed Project and Alternatives. Current conditions, as described in Chapter 3, were used as the baseline for assessing expected direct, indirect, and cumulative impacts to the human and physical/natural environment. Potential impacts considered in this chapter include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, and health impacts.

The Proposed Project and alternatives would be developed both on Tribal lands and BLM administered lands. **Table 4-1** below summarizes the amount of disturbance that would result from each project component.

Table 4-1
Estimated Land Disturbance
Moapa Solar Energy Center Project Components

Project Component	Temporary vs. Permanent	Land Jurisdiction (acres)		Total Acres
		Reservation	BLM	
SPGF	Temporary	0	0	0
	Permanent	849.9	0	849.9
	Total	849.9	0	849.9
Water Pipeline	Temporary	32.5	0	32.5
	Permanent	0	0	0
	Total	32.5	0	32.5
230 kV Gen-Tie	Temporary	0	42.1	42.1
	Permanent	0.2	19.8	19.8
	Total	0.2	61.9	61.9
500 kV Gen-Tie	Temporary	13.3	0.9	14.2
	Permanent	3.1	0.6	3.7
	Total	16.4	1.5	17.9
Access Road	Temporary	0	0	0
	Permanent	0.7	17.4	18.1
	Total	0.7	17.4	18.1
TOTAL DISTURBANCE	Temporary	45.8	43.0	88.8
	Permanent	853.9	37.8	891.7
	Total	899.7	80.8	980.5
Alternative Access Road	Temporary	0	0	0
	Permanent	4.1	15.0	19.1
	Total	4.1	15.0	19.1

This EIS assesses and analyzes these potential changes and discloses the impacts to decision makers and the public. This process of disclosure is one of the fundamental aims of NEPA.

The following define and clarify the concepts and terms used in this EIS when discussing the impacts assessment.

Impacts- Impacts may refer to ecological, aesthetic, historical, cultural, economic, social, or health-related changes resulting from construction and operation of the Proposed Project or alternatives. Impacts may be direct, indirect, or cumulative. The terms impact and effect are used interchangeably.

Direct Impacts - A direct effect occurs at the same time and place as the action. Direct and indirect impacts are discussed in combination under each affected resource.

Indirect Impacts - Indirect impacts are reasonably foreseeable impacts that occur later in time or are separated by some distance from the action. Direct and indirect impacts are discussed in combination under each affected resource.

Cumulative Impacts - Impacts on a resource are cumulative when added to the impacts (or anticipated impacts) from other past, present, or future proposed projects in the area of the Proposed Project. The cumulative impacts area may be larger than the direct impacts area.

Residual and Irreversible or Irretrievable Impacts - Impacts are considered residual when the effect from the Proposed Project cannot be completely avoided or minimized and remains after or despite mitigation. Irreversible or irretrievable impacts are generally defined as the commitment of non-renewable resources or resources that are renewable only over very long periods of time and could represent a loss of production, harvest or some use of a natural resource.

Significance, Intensity and Context - “Significant” has a very particular meaning when used in a NEPA document. Significance is defined by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1508.27) as a measure of the intensity and context of the impacts of a major federal action on, or the importance of that action to, the human environment. Significance is a function of the beneficial and adverse impacts of an action on the environment.

Intensity refers to the severity or level of magnitude of impact. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent- setting effects are all factors to be considered in determining the intensity of the effect.

Context means that the effect(s) of an action must be analyzed within a framework or within physical or conceptual limits. Resource disciplines, location, type, duration, or size of area affected (e.g., local, regional, national) and affected interests are all elements of context that ultimately determine significance.

Impact Indicators - Impact indicators are used to determine quality, intensity, and duration of change in a resource. Working from an established existing condition (i.e., the baseline conditions described in Chapter 3), the indicators would be used to predict or detect change in a resource that would exceed a defined threshold.

Adverse - An adverse effect is negative to a particular resource or a number of resources.

Beneficial - A beneficial effect is positive to a particular resource or a number of resources.

Negligible or No Impact - A negligible or no effect is at the lowest level of detection with change difficult to measure.

Mitigation – Where applicable, mitigation measures are proposed in this document. Mitigation measures are solutions to environmental impacts that are applied in the impact analysis to reduce intensity or eliminate the impacts. To be adequate and effective, CEQ regulations (40 CFR 1508.20) require that mitigation measures fit into one of five categories:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
- Compensating for the impact by replacing or providing substitute resources or environments.

The environmental analysis and documents produced in the NEPA process should provide the decision-maker with relevant and timely information about the environmental effects of the decision and reasonable alternatives to mitigate these impacts.

4.2 Climate/ Climate Change

Effects of GHG emissions from the Proposed Project and each alternative are presented in the following sections. Renewable energy projects like this Proposed Project generally have a net beneficial effect on climate change by offsetting older fossil-fired generation.

4.2.1 Indicators

Greenhouse gas impacts from the Proposed Project would affect the environment if they would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and/or hinder the state's goals of reducing GHG emissions

The CEQ issued guidance on February 18, 2010, which states that "if a proposed project would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public" (CEQ 2010). CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description for agency actions involving direct emissions of GHGs.

EPA has determined through promulgation of the Tailoring Rule that any Proposed Project that increases GHG emissions by more than 75,000 tons per year on a CO_2 equivalent basis would be required to include GHG emission requirements in their permit. As discussed in Chapter 3, the Proposed Project's annual emissions of GHG emissions are expected to be substantially less than the threshold of 75,000 CO_2e tons/year.

4.2.2 Direct and Indirect Effects by Alternatives

4.2.2.1 Proposed Project

Short-term increases in GHGs would result from construction and decommissioning. Exhaust from construction equipment and vehicles would increase ambient concentrations of GHGs. During construction of the Proposed Project, the annual GHG emissions would be expected to be far less than the 12,000 metric tons of CO_2e estimated to be emitted from construction equipment and worker commute vehicles for the K Road Moapa Solar Project (BIA 2012).This is because the K Road project is more than twice the size of the Proposed Project and has a longer expected construction period (approximately 4.5 years versus 2 years for the Proposed Project). It is expected that decommissioning activities would result in similar but lower emissions than construction and that decommissioning would generate well less than the 3,200 tons of CO_2e estimated for the K Road project.

Operation of the Proposed Project would include combustion emissions from worker commutes, delivery trips, and construction equipment. Ongoing operational emissions of GHGs are estimated to be less than 3,500 metric tons of CO_2e. The loss of desert vegetation and soil disruption associated with the development of the Proposed Project could have a small effect the ability of the local ecosystem to cycle or sequester carbon and modulate atmospheric CO_2 levels.

However, long-term generation of renewable electricity through solar power would have long-term air quality benefits as part of regional and national goals to replace other forms of electricity production that may have much higher levels of air pollutant and GHG emissions. This is consistent with federal and state goals for reducing GHG emissions and the recommendations of the Nevada Climate Change Advisory Committee (NCCAC) Final Report (NCCAC 2008) to support the development of renewable energy.

Therefore, the Proposed Project would not result in significant GHG emissions and would not adversely hinder federal or state goals to reduce GHG emissions levels.

4.2.2.2 CSP Project Alternative – AREVA Technology

Like the Proposed PV Project, development of the CSP Alternative would result in short-term increases in GHGs from construction and decommissioning primarily from exhaust from construction equipment and vehicles. The annual GHG emissions would be higher for the CSP Alternative than the Proposed Project because of the longer construction period (3 years for CSP versus 2 years for PV) but still less than the 12,000 metric tons of CO_2e estimated for the K Road Project. The beneficial impacts to climate and GHGs from displacing fossil fuel generation would also be the same as the Proposed Project.

4.2.2.3 eSolar CSP Technology Alternative

This Alternative would result in the same general GHG impacts as the AREVA CSP Alternative. The amount of GHG emissions from earth-moving and grading would be similar, there would be no change to the construction schedule, and the vehicle and equipment emissions from construction and decommissioning would not change. The beneficial impacts to climate and GHGs from displacing fossil fuel generation would also be the same as the Proposed Project.

4.2.2.4 Dry-Cooling Alternative

This Alternative would also result in the same general GHG impacts as the Proposed Project and the other CSP alternatives. The emissions from grading and vehicles / equipment would be similar. The beneficial impacts to climate and GHGs from displacing fossil fuel generation would also be the same as the Proposed Project.

4.2.2.5 Access Route Alternative

The Alternative Access Route would be 0.1 mile less in length than the Proposed Route but, because this differential is small, this Alternative would also be expected to result in the same general GHG impacts as the Proposed Project. The beneficial impacts to climate and GHGs from displacing fossil fuel generation would also be the same as the Proposed Project.

4.2.2.6 No Action Alternative

Under the No Action Alternative, the Proposed Project would not be built and there would be no direct or indirect effects on climate or emissions of GHGs. There would be no benefit from the replacement of fossil fuel generated energy with solar generated energy from the Proposed Project.

4.2.3 Residual Effects

Because of the overall decrease in GHGs that would result from the replacement of fossil fuel generation by the renewable energy generated by the Proposed Project, the residual effects on GHG emissions would be beneficial.

4.3 Topography, Geology and Geologic Hazards

This section discusses effects on existing topography, geology, and geologic hazards that could occur with implementation of the Proposed Project or alternatives.

4.3.1 Indicators

The Proposed Project would affect topography, geologic resources or be affected by geologic hazards if it would:

- Be located on a geologic unit that is unstable or would become unstable as a result of the Proposed Project and result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse;
- Result in physical alteration to topographic features;
- Result in physical alteration of or damage to geologic features; or
- Present a significant threat to public safety due to damage to Proposed Project components by geologic hazards.

4.3.2 Direct and Indirect Effects by Alternatives

To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource.

4.3.2.1 Proposed Project

Under this alternative, the Proposed Project would be implemented including the PV solar project, gen-tie, access road, and water pipeline. Effects that could result from the implementation of the Proposed Project during construction, O&M, or decommissioning activities are discussed below:

1.Geologic unit that is unstable or would become unstable as a result of the Proposed Project and result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.

The Proposed Project is located in the Dry Lake Valley in northeastern Clark County, Nevada. Dry Lake Valley is a broad, northeast-trending, alluvium-filled valley bounded on the east by the Muddy Mountains and to the west by the Arrow Canyon mountain range. Extreme rain events can result in the suspension and transportation of sand, gravel, or even boulders, which can cause structural damage. Earthquakes can result in landslides in the region but the site has a low susceptibility to landslides because of its flat topography.

No construction or operational activity would alter the stability of the site or corridors. Generally, the natural terrain and its existing drainage system around the site and relatively minimal grading on the site would facilitate natural drainage through the area. The relatively flat terrain would limit the movement of sediments during large precipitation events. Therefore, it is not likely that the geologic unit would become unstable as a result of the Proposed Project. In addition, all excavations associated with the Proposed Project would be filled with approved soil or foundation material.

The presence of subterranean void spaces can contribute to subsidence, landslides, and/or collapse. The Proposed Project would not create this condition, would not increase the geologic instability of the area, and would not increase the risk of on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.

2. Physical alteration to topography

The solar site would be graded but, because it is relatively flat, the grading would be minor and would not create a long-term significant effect to the topography of the site. No large scale mining or excavations would take place for the construction of the Proposed Project so only negligible effects on topography would occur.

3. Physical alteration of or damage to geologic features.

To provide water for construction and operation of the Proposed Project, the existing TH- 1 well located approximately 5.4 miles northeast of the SPGF would be used. No effects to subsurface geologic features would occur. No unique geologic features were identified on the site so geologic features would not be affected.

4. Proposed Project components damaged by geologic hazards present a threat to public safety.

As indicated in Section 3.3.3, the Proposed Project lies within Dry Lake Valley in the central portion of the Basin and Range physiographic province, which is an area with moderate to high potential for strong earthquake shaking. The USGS indicates there is a 40 percent chance of a magnitude 5.0 or greater earthquake in the Proposed Project area in the next 50 years.

An earthquake could cause structural damage to the solar facilities, gen-tie line, access roads, and water pipeline. However, all Proposed Project structures would be required to comply with applicable seismic building codes reducing the potential for earthquake-related structural damage components of the Proposed Project. Because the site would be fenced with restricted access, only Project employees would be exposed to potential earthquake damage at the facility.

Damage to on-site structures or down-gradient areas from flash floods would not be expected because of the relative flatness of the site and surrounding area, the absence of well-defined drainages on site, and the site design would incorporate drainage control to ensure protection against floods.

Compliance with Clark County seismic building codes and maintaining the natural drainage would minimize potential risk associated with the geologic hazards in the area. With proper construction engineering and BMPs, potential short- or long- term adverse effects would be reduced so they would be short-term and localized.

4.3.2.2 CSP Project Alternative – AREVA Technology

Effects to topography, geology, and geologic hazards resulting from implementation of the CSP Alternative using the AREVA technology would be the same as those identified for the Proposed Project. The same site and ROWs would be graded and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.3.2.3 eSolar CSP Technology Alternative

Effects to topography, geology, and geologic hazards resulting from implementation of the eSolar CSP Alternative would be the same as those identified for the Proposed Project. The same site and ROWs would be graded and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.3.2.4 Dry-Cooling Alternative

Effects to topography, geology, and geologic hazards resulting from implementation of the Dry Cooling Alternative would also be the same as those identified for the Proposed Project. While a larger solar field would be required for this cooling technology, it would occur within the same 850-acre site footprint and ROWs and the same BMPs would be employed as mitigation.

4.3.2.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. While this would result in slightly decreased impacts than the Proposed Project, the impacts to topography, geology, and geologic hazards would be similar.

4.3.2.6 No Action Alternative

Under this alternative, development of the Project would not occur so there would be no effect on topography or geologic hazards.

4.3.3 Residual Effects

Given that there would be no direct or indirect impacts associated with topography, geology or geologic hazards, there would be no residual impacts from the Proposed Project.

4.4 Soils

This section discusses effects on soil resources that would occur as a result of implementation of the Proposed Project or alternatives. The indicators used to identify and analyze effects are presented, and potential effects and agency-recommended mitigation measures are discussed.

4.4.1 Indicators

The Proposed Project would affect soil resources if it would:

- Increase erosion rates;
- Reduce soil productivity by compaction or soil mixing to a level that would prevent successful rehabilitation and eventual reestablishment of vegetative cover to the recommended or preconstruction composition and density; or
- Increase exposure of human or ecological receptors to potentially hazardous levels of chemicals or explosives due to the disturbance of contaminated soils or to the discharge or disposal of hazardous materials into soils.

4.4.2 Direct and Indirect Effects by Alternatives

To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource area.

4.4.2.1 Proposed Project

Implementation of the Proposed Project could result in effects to soils that are detailed below, along with corresponding mitigation measures that would reduce effects.

1. Increase in soil erosion rates.

Several factors affect the potential for soil erosion by water or wind including soil texture, the length and percent of slope, vegetative cover, and intensity of rainfall or wind. Development of the Proposed Project would affect up to approximately 960 acres of land that would be cleared and graded during the two-year construction period.

Generally, undisturbed soils in the area are not susceptible to wind erosion because of the presence of desert pavement on the soil surface and the presence of vegetation. During construction, the Applicant would clear and grade less than 850 acres within the SPGF boundary and an additional 110.3 acres for the transmission, pipeline, and access road corridors associated with the Proposed Project. This removal of the vegetation and soil crusts by grading would expose soil and increase the potential for wind and water erosion. Areas within the SPGF site where grading would not occur would maintain their current susceptibility to water and wind erosion. The Proposed Project site is relatively flat, but it has the potential for high winds and infrequent strong rains that could cause erosion.

To reduce the potential for water erosion, the Applicant would develop an erosion control and stormwater drainage plan as part of the final Project design and this would be incorporated into the stormwater pollution prevention plan (SWPPP). The drainage plan would incorporate existing natural off-site washes to allow the stormwater flow to pass through the site naturally. The drainage control features on-site would include berms with armoring of stormwater channels within the solar field and rock weirs or gabions within existing drainage channels to help dissipate flow energy to minimize scour and erosion. These features would be designed to protect the integrity of existing drainages and not channelize all flow within the site.

Construction of the erosion and stormwater control system would reduce water erosion susceptibility within the project area. To further ensure that soil erosion is minimized, the Applicant would incorporate a series of BMPs into their Proposed Project. Implementation of these BMPs would reduce localized soil impacts resulting from wind and water erosion but would not eliminate all soil loss within the Proposed Project.

Wind erosion would be increased due to the removal of vegetation within the Proposed Project areas impacted by construction. This would likely result in a localized loss of topsoil.

2. Reduce soil productivity.

The soils that occur within the Proposed Project footprint provide support for desert vegetation and provide wildlife habitat. Impacts to local flora and fauna are discussed in Section 4.6, Biological Resources Impacts. To reduce effects on soil production, the Applicant proposes to limit the area of grading in areas of temporary disturbance and reserve the top layer of native soil in these areas where appropriate to preserve sensitive soils and seed banks. Salvaged soil would be held on-site until it is used for restoration. Soil productivity may be negligibly affected if BMPs as discussed are implemented.

3. Increase exposure of contaminated soils.

The Proposed Project site does not contain any contaminated or hazardous soils. The applicant would use native soil for on-site construction. Other materials such as gravel and concrete needed for construction would be suitable for construction purposes and free of contamination.

4.4.2.2 CSP Project Alternative – AREVA Technology

Effects to soils resulting from implementation of the CSP Alternative using the AREVA technology would be the same as those identified for the Proposed Project. However, under this alternative, the entire 850-acre site would be graded resulting in higher susceptibility to wind and water erosion. The same site and ROWs would be graded and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.4.2.3 eSolar CSP Technology Alternative

Effects to soils resulting from implementation of eSolar CSP Alternative would be the same as those identified for the AREVA CSP Alternative. The same site and ROWs would be graded and developed and the same BMPs would be employed as mitigation as for the AREVA CSP Alternative.

4.4.2.4 Dry-Cooling Alternative

Effects to soils resulting from implementation of the Dry Cooling Alternative would also be the same as those identified for the wet-cooled CSP alternatives. While a larger solar field would be required for this cooling technology, it would occur within the same 850-acre site footprint and ROWs and the same BMPs would be employed as mitigation.

4.4.2.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. While this would result in slightly decreased impacts than the Proposed Project, the impacts to soils would be similar.

4.4.2.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects on soil resources.

4.4.3 Residual Effects

Construction, operation, and decommissioning of the Proposed Project would increase the potential for soil loss through wind and water erosion. The Applicant would design an extensive water erosion control system and would implement BMPs, but some localized soil erosion would occur. These residual soil erosion impacts would be most common on dry, windy days, when wind erosion on the solar site would be greatest, and during flash flood events larger than the 100-year flood, when water volume may exceed the capacity of the flood control system. These impacts would be localized to the Proposed Project area and only occur during unique climatic conditions.

4.5 Water Resources

This section discusses effects on water resources/hydrology that could occur as a result of implementation of the Proposed Project or alternatives.

4.5.1 Indicators

The Proposed Project would affect water/hydrology resources if it would:

- Decrease groundwater supply or interfere substantially 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; or
- Increase the potential for flood hazards.

4.5.2 Direct and Indirect Effects by Alternatives

To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. The effects discussed in this section are both direct and indirect.

4.5.2.1 Proposed Project

1. Decrease groundwater supply or interfere substantially with groundwater recharge.

The Proposed Project would require less than 50 AFY for the construction period and up to approximately 30 AFY for O&M activities.

Water is needed primarily for dust suppression and soil compaction during construction. During operation, water would only be needed for panel washing, fire protection, dust control, and worker daily consumptive uses. Water would be supplied from one of the existing Reservation wells, TH-1, which is capable of producing 60 gpm of water.

The potential impacts of water withdrawal on area wells were evaluated in the Hydrogeologic and Groundwater Modeling Analysis for the Calpine Company Moapa Paiute Energy Center (Mifflin 2001). The proposed Calpine energy generation project required 7,000 AFY of groundwater extraction from the California Wash hydrographic basin. This analysis evaluated three different scenarios and concluded that only under the least probable scenario would the proposed 7,000 AFY withdrawal result in observable changes to the Muddy River Springs Area hydrology, and those would only occur during prolonged drought periods.

The Tribe would provide water to the Proposed Project from one of the wells in the same well field that was analyzed for the Calpine project (Well TH-1). The potential groundwater impacts that would be realized from the water withdrawal associated with the Proposed Project was evaluated in an updated analysis, the Hydrogeologic and Groundwater Modeling Analysis for the Moapa Solar Energy Center (Mifflin 2013).This analysis is included in **Appendix F**. The model and its results are described in more detail in Section 4.5.2.2 and showed that the use of 30 AFY would not impact local water levels or flows at the Muddy River Springs area.

2. Degrade the quality of groundwater such that it is no longer suitable for its intended use.

Spills of chemicals and petroleum products can degrade groundwater quality such that it is no longer suitable for its intended use. The Proposed Project would use small amounts of hazardous materials during construction and operation. Petroleum spills would be possible while refueling equipment during construction and operation of the Proposed Project. During operations, wastewater would be piped to lined, onsite evaporation ponds. In addition, transformers would be used and would be located throughout the PV solar array field and at the substation. Transformers at the substation would require insulating oil and would be installed with secondary containment. The transformers within the PV field each would contain 250-300 gallons of mineral insulating oil, would be located throughout the PV solar array field.

As described in Section 3.5, Groundwater Resources, groundwater is located around 300 to 500 feet below ground surface. The Project SPCC Plan would be developed and implemented to protect the environment from petroleum product and other spills during operation. Adequately-sized secondary spill containment would be incorporated with all chemical storage vessels to ensure proper capture and control measures for potential spills. An emergency response plan would also be developed to respond to any emergencies including leaks and spills during construction. Successful implementation of these measures would minimize the potential for a spill and minimize the impact of any spills that occur. This, in combination with the depth to groundwater, makes it unlikely that any surface spill would infiltrate the groundwater so the potential for impacts is minor.

The local groundwater contains relatively high concentrations of TDS and sulfate so it would be necessary to install a RO treatment facility to remove these constituents from the water to be used for the Project. The removal of concentrated water with dissolved solids is part of the RO process and is considered “reject” water. This reject water would be discharged to a designated on-site evaporation pond that would be properly sized (about 5 aces) and protected to accept reject water and lined to prevent leaks and potential percolation.

3. Degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters.

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. As described in Section 3.4.1, Surface Water Resources, the Proposed Project would be within the Mojave Desert where there is very little precipitation. There are no perennial water bodies within the Proposed Project site. As described above, the Applicant’s emergency response plan (construction phase) and SPCC Plan (operation phase) would minimize impacts from these sources by providing for hazardous material spill prevention and clean-up measures were a spill to occur so that potential impacts would be minor. Once decommissioning has occurred and vegetation has reestablished, erosion would naturally be controlled, so the impact would be long-term (life of the project) but also temporary.

There would be potential for increased erosion or sedimentation on-site or off-site due to Proposed Project construction and O&M activities. Although there are no perennial water bodies within the Proposed Project, there are ephemeral drainages (dry washes) in the Proposed Project area that flow ultimately into Dry Lake playa south of the SPGF. It is expected that bed loads and suspended loads would be high during significant storm events.

The Applicant would avoid construction within the major washes on the Project site to the extent possible and the drainage plan will be designed to allow all surface flows upstream of the site to flow to the ephemeral drainages downstream of the site. The avoidance of these drainages on-site would help preserve the habitat within them, would help maintain their drainage functions, and would help reduce erosion and sedimentation impacts. In addition, avoidance of these drainages to the extent possible would result in reduced construction costs and improvement to the effectiveness of post-closure reclamation.

The Applicant would also incorporate construction-phase erosion and sediment control measures consistent with regional BMPs and Federal, state, and local regulations including the Proposed Project's General Permit (issued by EPA) and SWPPP. These measures would control erosion and sediment transport during construction.

There would likely be effects that last beyond the construction period and terms of the General Permit and SWPPP. Although the Applicant proposes to maintain existing drainage patterns in and around the solar field, construction and operation of the Proposed Project activities would change natural runoff patterns and erosion and deposition.

Construction activities causing ground disturbance, such as grading would disrupt the soil surface and dislodge biological crusts that bind soil together. These activities would likely have long-term adverse effects on the quality of local surface water flowing to the playa downstream of the Proposed Project. Minimizing grading on the solar site to only those areas where necessary would reduce the surface areas subject to increased erosion by minimizing surface disturbance and maximizing the number of areas where the existing surface or desert pavement would be maintained along with any existing vegetation.

Across the Proposed Project area, drainage occurs via sheet flow and in smaller washes that feed into the seven main drainages and one playa. Under the proposed drainage plan, berms would be constructed to direct the surface flow around the Project site and back into the seven drainages and playa downstream of the site. Concrete weirs or rock gabions may also be used within the on-site drainages to control flash flooding downstream and reduce sediment transport.

The Applicant would conduct biannual and post-storm monitoring of erosion and sedimentation. If localized gullies were to develop or result in increased rates of erosion and sedimentation, the Applicant would make repairs and update erosion and sedimentation control measures.

The Applicant would develop and implement erosion and sedimentation control measures to be used to minimize impacts during the life of the Proposed Project. At a minimum, these controls would include:

- Soil stabilization measures to offset loss of vegetation;
- Biannual and post-storm monitoring of erosion and sedimentation; and

- Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water collection on or at the site.

The erosion and sediment control measures and SWPPP would be approved by the Tribe prior to the beginning of Proposed Project construction and potential impacts would be minor. Once decommissioning has occurred and vegetation has reestablished, erosion would naturally be controlled, so the impact would be long-term (life of the project) but also temporary.

4. Increase the potential for flooding hazards.

Development could result in an increase in flooding hazard if it were to:

- Impede or redirect flood flows;
- Cause inundation or additional risk associated with a debris flow; or
- Otherwise increase the rate or amount of surface water leaving the site.

Flood hazards can increase due to multiple factors, including alteration of the natural drainage of an area to prevent adequate water flow, reducing the area within which precipitation and runoff infiltrate, and increasing the impervious surface area in a region. The drainages in the Project area drain into the playa to the south. In order to reinforce the existing drainages and prevent lateral channel migration over the life of the Proposed Project, the Applicant would construct drainage channels that would be designed to accommodate the 100-year flood event and include riprap to minimize scour.

To decrease downstream peak flows, concrete weirs or rock gabions would be constructed within the major drainages on the SPGF site at key locations to minimize velocity and decrease sediment transport. Sediment deposits on the upstream side of the gabions would be manually maintained throughout operations to ensure minimal downstream sedimentation.

Flows resulting from extreme rain events can suspend sand, gravel, or even boulders, and transport them downstream or downslope, resulting in damage to structures impacted by flood waters (USGS 2001). The Proposed Project site is located on a relatively flat area and flooding is considered unlikely. The Proposed Project solar site does not contain any FEMA flood zones (**Figure 3-3**), however the 230 kV gen-tie line would cross the 100-year floodplain associated with the playa. No damage to gen-tie structures would be expected to occur as the foundations would be designed to withstand the low-velocity flooding associated with the playa. This conclusion is supported by the presence of the other existing transmission lines in this area. With proper implementation of these mitigation measures, including adaptive management of practices, effects related to flooding would be reduced to negligible levels.

Water quality impacts that would result from development of the water pipeline and transmission lines would be minimal and temporary. No permanent structures would be placed within ephemeral washes outside of the SPGF boundary. The water pipeline ROW would be restored to pre-construction contours, and therefore, natural flow and downstream sedimentation would not be affected.

4.5.2.2 CSP Project Alternative – AREVA Technology

The CSP Project Alternative would require about 50 AFY for the construction period and up to approximately 600 to 800 AFY for O&M activities. The CSP project would require operational water for CSP mirror cleaning, for the cooling cycle for the CSP steam turbine, make-up water for the SSG system, service water, fire protection, dust control, and worker daily consumptive uses.

Up to 800 AFY of groundwater would be pumped from the same production well in the carbonate aquifer on the Reservation described for the Proposed Project. Depths to regional saturation in the carbonate aquifer are generally quite deep (300 to 600 feet) and transmissivities (the ability for water to move through the aquifer) are high (over 2,500 m^2/day) in the area where the production well has been completed and tested. Therefore, the lowering of water levels due to pumping cones is not expected to be a concern. However, because many of the carbonate aquifers throughout the general region are believed to be associated with groundwater flow systems that discharge at large springs, an analysis has been conducted to determine whether the proposed groundwater use by this Alternative has the potential for long-term impacts on spring flows and, in particular, the Muddy River springs located about 12 miles north of the production well that would provide water to the Project.

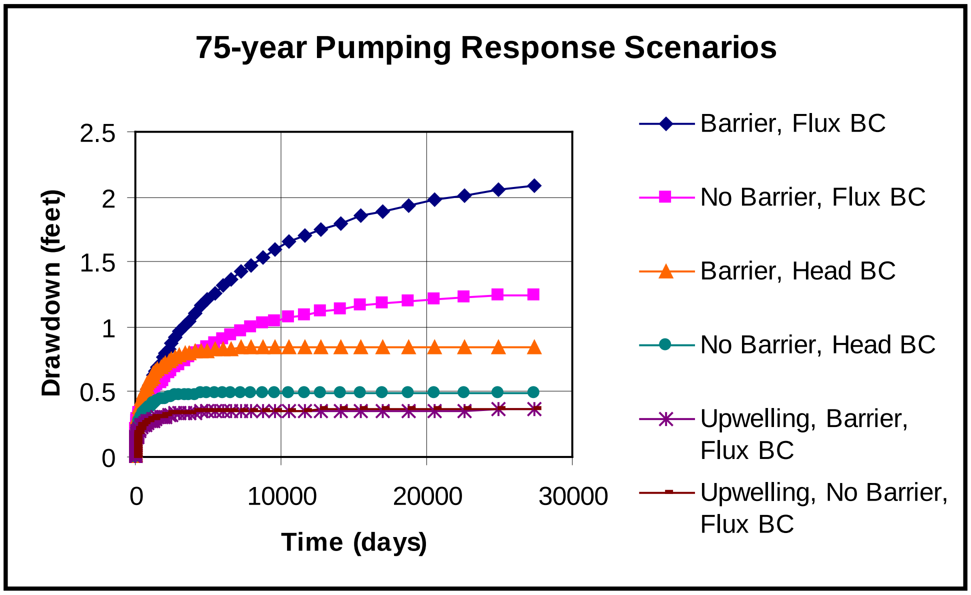
The hydraulic and hydrochemical databases of the Northern and Southern flow fields described in Section 3.5 (Johnson et al. 2001; Johnson and Mifflin 2003, 2006) suggest limited hydraulic continuity between the two flow-field regions in the area. However, the Hogan Spring Fault Zone extends north and south of the potential barrier zone between the two flow regions, suggesting the possibility of locally well-developed hydraulic continuity between the two areas. This provides two important conceptual model differences that are not mutually exclusive: well-developed hydraulic continuity between northern and southern areas, or poorly-developed hydraulic continuity between the two areas. A conceptual model must satisfy both possibilities in terms of the finite extent of either type of feature.

In the modeling analyses conducted for the Project, two general conceptual models are employed to incorporate this conceptual uncertainty. In the first, the hydraulic barrier of Johnson and Mifflin (2003) is included, in the second it is removed. For each of the two contrasting physical-property configurations (barrier and no-barrier), the effects of prescribed-head and prescribed-flux boundary conditions were examined, including a variant of the prescribed-flux case where a small area of prescribed head was included to represent an “upwelling zone”. A prescribed-head boundary is a region where water levels (heads) are held constant in the simulation, so if drawdowns occur in adjacent areas, the flux of water across the prescribed-head boundary increases in response to the increased hydraulic gradient. These "induced inflows" mitigate drawdowns and lessen impacts on groundwater sinks (springs) in the model domain. Prescribed-flux boundaries, on the other hand, are regions where the water level (head) is allowed to vary, but the amount of water entering or leaving the model domain in those regions is held constant. This resulted in six conceptual model scenarios that were evaluated. **Appendix F** contains the groundwater modeling report that provides more detail on the modeling parameters and results.

Two indicators were used to compare the forecast impacts from the various scenarios investigated for the Project - drawdown near the proposed Project well field and flow reductions at the headwaters of the Muddy River. Drawdown is measured in feet of decline at distances from the producing well and flow reductions at the Muddy River are expressed as percentage decreases from average 2001 River flows. Flows in 2001 were used as the base case for comparison because it was the first full calendar year of Southern flow field monitoring records, which indicated a hydraulic barrier and the climatic component of regional water-level decline, which in turn allowed a 5-year well hydraulics analysis of the Muddy River springs area and a comprehensive water balance on the Muddy River. Simulated conditions with and without the hydraulic barrier at 10 and 75 years from Project startup were examined.

Figure 4-1 below shows the predicted drawdowns that would occur at a distance of approximately 1.3 miles from the production well area from which water would be provided for the Project. Drawdown projections are provided for each of the six modeling scenarios. The upper four curves represent the predicted drawdowns for the Project life cycle for cases with and without the hydraulic barrier and under two alternative representations of boundary conditions on the model grid (either head or flux retaining prescribed values with time). "Upwelling" cases (lower 2 curves) are the most consistent with pumping response and paleohydrologic evidence that have been gathered in the area. All scenarios show little drawdown over time with the upwelling cases showing the least.

Figure 4-1



Source: Mifflin and Associates, 2013)

Table 4-2 shows the modeling results for percentage decreases in Muddy River flows (using 2001 flows as the baseline) at 10 and 75 years resulting from Project withdrawals of 800 AFY from the production well.

Table 4-2
Model Impacts from Withdrawals of 800 AFY on Muddy River Flows
Measured in Percent Reduction of 2001 flows (nominally 40.5 cfs)

	With Hydraulic Barrier			Without Hydraulic Barrier		
	Flux Boundary		Head Boundary	Flux Boundary		Head boundary
Induced Inflow	No	Upwelling Zone	Grid Perimeter	No	Upwelling Zone	Grid Perimeter
10 years	0.58	0.16	0.30	0.96	0.29	0.56
75 years	1.65	0.22	0.35	1.94	0.35	0.58

Minimum flow reduction impact to the Muddy River flows at both 10 and 75 years (0.16 and 0.22 percent, respectively) is associated with upwelling within the model domain and the presence of a hydraulic barrier, both supported by experimental and observational evidence. By 75 years the hydraulic barrier has lost effectiveness. Maximum flow reduction impact at both 10 and 75 years (0.96 and 1.94 percent, respectively) is predicted to occur with the absence of both the hydraulic barrier and upwelling, and a prescribed-flux boundary. Even with a barrier present, near maximum flow reductions (1.65 percent flow reduction) would be predicted to occur with a flux boundary and no upwelling.

Forecast reductions to Muddy River flows would be expected to be only on the order of 0.2 to 2.0 percent at 75 years under any scenario. Therefore, a Project pumping stress of up to 800 AFY was found to produce very small impacts in terms of spring flow reductions, even after 75 years of pumping. The existing data and analyses allow several credible conceptual model scenarios, all of which yield very small impacts to flows in the Muddy River springs area. This range of projected flow variations are within the range of natural variations of water level and spring discharge that have been measured, and much less than measurement uncertainty associated with spring discharge measurements. While the model-forecasted impacts for the various scenarios are theoretical, because they are small, natural stresses of larger magnitude and shorter time scales would conceal any Project effects.

Potential effects from potential spills and potential effects to surface water resources and floodplains resulting from implementation of the CSP Alternative using the AREVA technology would be the same as those identified for the Proposed Project.

More of the 850-acre site would be graded to facilitate the construction and operation of the AREVA CSP Alternative than under the Proposed Project. Up to the entire 850-acre site would be graded and developed. The same ROWs would be developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.5.2.3 eSolar CSP Technology Alternative

Effects to hydrology and water quality resulting from implementation of eSolar CSP Alternative would be the same as those identified for the CSP Project Alternative using AREVA technology. The eSolar technology is expected to utilize the same amount of water (up to 800 AFY) which would be supplied from the same well. This would result in the same potential impacts to local groundwater. The same site and ROWs would be graded and developed and the same BMPs would be employed as mitigation as for the AREVA CSP Alternative.

4.5.2.4 Dry-Cooling Alternative

Effects to surface water hydrology and water quality resulting from implementation of the Dry Cooling Alternative would also be the same as those identified for the wet-cooled CSP alternatives. The solar field would occur within the same 850-acre site footprint and ROWs and the same BMPs would be employed as mitigation.

Significantly less groundwater would be needed for this alternative (60 to 80 AFY). Therefore, even less potential aquifer drawdown and potential impact to flows in the Muddy River Spring Area would occur than projected for the Proposed Project’s consumption of up to 800 AFY. However, because the impacts from the Proposed Project are projected to be small and difficult to separate from naturally occurring variations in the aquifer and flows, the groundwater hydrology impacts from the Dry Cooling Alternative would likely be similar to the wet-cooled CSP alternatives, the Proposed Project, and similar to natural variation.

4.5.2.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. While this would result in slightly decreased disturbance than the Proposed Project, the impacts to hydrology and water quality would be similar.

4.5.2.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects on water resources hydrology and water quality.

4.5.3 Jurisdictional Waters, Drainages, and Riparian Areas

The USACE asserts jurisdiction over traditional navigable waters of the United States and wetlands adjacent to those waters (adjacent means ‘bordering, contiguous, or neighboring’) and over non-navigable tributaries with relatively permanent flows. As stated in Section 3.5.4, based on an approved jurisdictional determination of the waters of the U.S. by the USACE (February 16, 2011), it was confirmed that the USACE would not assert jurisdiction over any of ephemeral drainages located within the SPGF boundary (**Appendix G**).

Jurisdictional waters outside of the SPGF would potentially be impacted along the associated ROWs. It is not anticipated that they would require a permit through the USACE under Section 404 of the Clean Water Act as they drain into the playa with no nexus to navigable waters. If needed, the gen-tie lines and access road would potentially be covered under the nationwide permit program.

The removal of vegetation could result in increased erosion and sedimentation, resulting in the degradation of water quality within the drainages. During construction and routine O&M, the use of maintenance and access roads that cross desert washes could affect drainages by crushing vegetation and increasing erosion. The use of vehicles and equipment to cross these washes could also result in degradation of water quality from the potential introduction of hazardous materials such as fuels and oils.

If the drainages within the Proposed Project area cannot be avoided, adverse impacts would be both short- and long-term. The Applicant would design drainage crossings to accommodate estimated peak flows and ensure that natural volume capacity can be maintained throughout construction and upon post-construction restoration. This measure is necessary to minimize the amount of erosion and degradation to drainages.

4.5.4 Residual Effects

Residual effects on water resources or hydrology resulting from implementation of the Proposed Project or alternatives include: (1) a reduction in groundwater availability for other uses in the Basin (up to 800 AFY), (2) localized increases in sedimentation and scour in Proposed Project drainages, (3) a higher volume of concentrated storm water due to drainage structures, and (4) a potentially higher flood hazard, particularly due to loss of vegetative cover.

4.6 Air Quality

This section discusses effects on existing air quality that may occur with construction, operation, and decommissioning of the Proposed Project.

During the process of construction, operation, and decommissioning of the Proposed Project, emissions of regulated air pollutants from specific types of area sources (i.e., fugitive dust and mobile source fuel combustion) have the potential to affect air quality. Impacts to air quality are discussed in terms of project emissions of criteria air pollutants and compliance with air quality regulations and standards. As discussed below, the impacts associated with the Proposed Project are anticipated to be below all applicable thresholds that define any noticeable change to air quality or the local/regional climate.

Emissions common to all Action Alternatives would consist of carbon monoxide (CO), nitrogen dioxide (NO_2), inhalable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), volatile organic compounds (VOC), and hazardous air pollutants (HAP). Sources of emissions from the Proposed Project would include:

- Fugitive dust from vehicle travel on unpaved surfaces, during construction, operation and decommissioning,
- Fugitive dust from vehicle travel on paved surfaces, during construction, operation and decommissioning,
- Vehicle exhaust emissions during construction, operation, and decommissioning (both on-road vehicles and construction equipment),
- Windblown dust from disturbed areas during construction, operation, and decommissioning,
- Fugitive dust from grading and vegetation removal during construction,
- Fugitive dust from excavations during construction and decommissioning,
- PM_{10} from the wet-cooling tower(s) during operation of the CSP option,
- Stationary sources during operation consisting of the following:
    - Emergency diesel generator and fire water pump engines
    - Sulfur hexafluoride (SF_6) leakage from substation circuit breakers

These impacts are described in terms of (1) total project emissions compared to current emissions for Clark County, (2) the probability of causing or contributing to existing exceedances of National Ambient Air Quality Standards (NAAQS), and (3) the likelihood of emissions being visible from the Old Spanish National Historic Trail.

Air emissions associated with the proposed construction and decommissioning of the Proposed Project would be primarily short-term and mainly associated with engine exhaust from construction equipment and fugitive dust. Smaller contributions to air emissions would be generated from on-road travel of vehicles for commuting workers and delivery of materials and equipment to the Proposed Project's construction site. It is expected that decommissioning phase would result in similar but less emissions than construction. Emissions of air pollutants during the operational phase would primarily result from commuting workers and delivery of materials/equipment to the site and would be significantly less than the construction and decommissioning phase. The emergency generators and fire pumps would also generate emissions but only during emergencies or testing. Fugitive dust emissions from vegetation clearing, excavation and grading would not contribute to operational emissions as these activities would not occur during this phase of the Project.

If there are no other potential sources of emissions other than fugitive PM emissions from construction activities and from unpaved and paved roads, a New Source Review (NSR) permit would not be required prior to construction on tribal land in Region 9 (K Road FEIS 2012).To determine whether a new source would otherwise require an NSR permit, the applicability test requires that sources estimate their potential to emit each of the regulated NSR pollutants. In making this estimation, only sources that belong to one of 28 source categories listed pursuant to section 302(j) of the Clean Air Act are required to include fugitive emissions to the extent that they are quantifiable (40 CFR 49.153 (a)(1)). These source categories are codified in 40 CFR 52.21(b)(1)(i)(a). None of these listed source categories include solar panel arrays. Therefore, because this facility is not one of the source categories that would be required to include fugitive emissions in its applicability determination, and because there do not appear to be any other emissions that would otherwise trigger NSR review, no NSR permit would be required.

Construction of the Proposed Project would take approximately two years to complete and would generate emissions of: CO, NO_x, VOCs, SO_2, PM_{10} and $PM_{2.5}$. Ozone is not emitted directly but is created in the atmosphere via a chemical reaction between NO_x and VOCs in the presence of sunlight. NO_x and VOCs are referred to as ozone precursors.

4.6.1 Indicators

A Proposed Project could affect air quality if it would:

- Violate any air quality standard or contribute substantially to an existing or proposed projected air quality violation, result in a cumulatively considerable net increase of any criteria pollutant for which the Proposed Project region is in non-attainment under an applicable federal or state ambient air quality standard, or expose sensitive receptors to substantial pollutant concentrations.

4.6.2 Direct and Indirect Effects by Alternative

4.6.2.1 Proposed Project

Construction. Exhaust and fugitive dust emissions generated from construction equipment and mobile sources would increase ambient concentration of regulated air pollutants. Fugitive dust would be generated from disturbed areas by construction activities and travel on paved and unpaved roadway surfaces and can impact visibility or contribute to violations of air quality standards if not properly managed. However, the emissions of engine exhaust and fugitive dust associated with constructing and decommissioning the Proposed Project are not expected to contribute to local or regional exceedances of criteria air pollutant NAAQS.

Fugitive emissions due to land-disturbing activities (such as vegetation removal and grading) would be intermittent and generally low-level releases, and consist of larger dust particles that are expected to settle out of the atmosphere within close proximity to their release point. Therefore, long-range transport of fugitive particulate emissions from land disturbance is not anticipated. The Project area is within the HA 218 (California Wash) airshed which is in attainment for all criteria pollutants except O_3, and the non-attainment area for O_3 excludes the Reservation. For these reasons, vehicle equipment emissions and fugitive emissions from land-disturbing activities are not expected to result in or contribute meaningfully to exceedances of ambient air quality standards locally or within the adjacent non-attainment area.

The Proposed Project would implement BMPs to minimize the resultant impacts to local and regional air quality. To comply with Clark County dust control requirements, the applicant would use BMPs (i.e., water) for dust control. Currently, only water is approved for dust control within potential threatened and endangered (T&E) species habitat such as the desert tortoise. Any application of palliative or other dust reducing agent other than water would need to be approved by the regulatory authorities.

In addition, the Applicant would limit grading on the solar site to only those areas where necessary. This would reduce the surface areas subject to increased erosion by minimizing surface disturbance and maximizing the number of areas where the existing surface or desert pavement would be maintained along with any existing vegetation. Desert pavement occurs where soils of mixed particle size have been eroded of fines leave a stony surface behind**.** The pavement of stones along with the remaining vegetation would help protect the underlying surface from wind erosion.

The Proposed Project would implement the following BMPs for fugitive dust and wind erosion control:

- Minimize grading and vegetation removal, and limit surface disturbance during construction to the time just before module support structure installation;
- Limit vehicular speeds on non-paved roads (Clark County ordinance speed limit is 25 miles per hour);
- Apply water to disturbed soil areas of the Proposed Project to control dust and to maintain moisture level at optimum levels for compaction, as needed. Water would be applied using water trucks. To prevent runoff and ponding, water application rates would be minimized;
- Cover exposed stockpiled material areas during windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater), apply dust control measures to haul roads to adequately control wind erosion;
- During periods of high wind, suspend excavation and grading;
- Cover all trucks hauling soil and other loose material or maintain at least 2 feet of freeboard; and
- All paved roads would be kept clean of amounts of mud, dirt, or debris, as necessary. Gravel or other similar material would be used where dirt access roads intersect the paved roadways to prevent mud and dirt track-out.

Estimates of air pollutant emissions during construction, operation, and decommissioning were developed and are presented in **Tables 4-3** through **4-5**. Detailed emission calculations for construction, operation, and decommissioning which break-down each emission category and pollutant by source type (such as excavation and grading from construction) are presented in **Appendix L**. Based on the estimated yearly construction and decommissioning emissions totals for O_3 precursors (NO_x and VOCs) associated with the Proposed Project would be less than de minimis thresholds (100 and 50 tons/year, respectively) as specified under the Federal General Conformity Rule (40 CFR 93). Therefore, the Proposed Project-related emissions are assumed to conform to the SIP and the regional air quality plans. Overall, the Proposed Project is anticipated to result in minor, direct, short-term air quality impacts during construction and during decommissioning.

<u>Operations.</u> During its operational phase, the Proposed Project would generate emissions of regulated air pollutants associated with exhaust from the emergency fire pump, back-up generator, mobile combustion emissions from workers and deliveries, SF_6 leakage from substation circuit breakers, and limited fugitive dust from O&M activities.

The Proposed Project would require an operational workforce of 20 to 40. O&M would require the use of vehicles and equipment including trucks for on-site security/work and panel washing, and all-terrain vehicles for minor equipment maintenance. Additional maintenance equipment would include forklifts, bobcats, and water trucks for general lifting, drainage maintenance, and daily dust control.

Ongoing emissions of regulated air pollutants associated with operation of the Project would be relatively minor over the duration of its operational phase (long- term) as discussed below. There would be no large combustion sources on-site. Fugitive dust emissions would continue from O&M vehicles traveling on the paved and gravel roads. During Proposed Project operation, dust management needs would be minimal as fugitive dust- generating activities such as vehicle traffic are limited. Vehicular traffic during operations is primarily related to periodic inspections and repairs to equipment.

Also, the panels themselves would function as wind breaks and shield the ground from prevailing winds so surface soils could be less disturbed by windy conditions. Because of their relatively fixed orientation and placement low to the ground, the panels would provide a break in the aerodynamic surface near the ground diverting and slowing winds across the solar field similar to the way that snow fences or planted vegetation function as wind breaks (NRCS USDA 2013, USEPA 2013). Barriers obstructing the path of the wind reduce momentum transferred to the surface and, thus, surface shear stress. That is done by deflecting the flow upwards and dissipating some of its energy in frictional losses. The amount of protection provided would depend on the angle of the panels and the direction and speed of the wind at any given time.

The following practices would be implemented, as necessary, to further reduce the potential for fugitive dust during plant operation:

- Vehicular speeds on non-paved roads and access ways would be limited to 25 mph;
- Regular inspections would be suspended during periods of high winds; and
- Water trucks would be used, as necessary, during specific meteorological events.

Air pollutant emissions from the emergency diesel generators and fire water pump engines would be subject to emission limits under National Source Performance Standards (NSPS) Subpart IIII. The Applicant would adopt an operating limitation of no more than 50 hours per year, per engine for routine testing and maintenance of these components. These engines would be compliant with current EPA tier emission performance criteria.

Table 4-3
Summary of PV Construction Emissions

Year 1 Construction Emissions

Construction Emission Category	NO_x (tons)	CO (tons)	SO_2 (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO_2 (tons)	N_2O (tons)	CH_4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	5.53	3.35	0.01	0.74	0.57	0.57	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	3.22	1.27	0.00	0.16	0.19	0.17	455.29	0.00	0.01	413.37	0.03
On-Road Vehicle Exhaust - Commute Vehicles	3.01	13.21	0.03	0.58	0.21	0.12	1709.90	0.02	0.03	1556.94	0.17
Fugitive Dust from Travel on Paved Roads	-	-	-	-	5.39	1.32	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	2.79	0.28	-	-	-	-	-
Fugitive Dust from Construction Activities	-	-	-	-	11.15	2.32	-	-	-	-	-
Total	**11.77**	**17.83**	**0.04**	**1.48**	**20.31**	**4.78**	**2165.19**	**0.02**	**0.04**	**1970.31**	**0.20**

Year 2 Construction Emissions

Construction Emission Category	NO_x (tons)	CO (tons)	SO_2 (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO_2 (tons)	N_2O (tons)	CH_4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	9.74	5.86	0.01	1.34	0.97	0.97	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	5.91	2.36	0.01	0.30	0.36	0.31	907.17	0.00	0.02	823.64	0.06
On-Road Vehicle Exhaust - Commute Vehicles	5.43	24.54	0.06	1.03	0.41	0.23	3357.99	0.03	0.06	3056.64	0.31
Fugitive Dust from Travel on Paved Roads	-	-	-	-	10.74	2.64	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	5.57	0.56	-	-	-	-	-
Fugitive Dust from Construction Activities	-	-	-	-	0.10	0.02	-	-	-	-	-
Total	**21.08**	**32.76**	**0.08**	**2.67**	**18.15**	**4.73**	**4265.16**	**0.04**	**0.08**	**3880.28**	**0.36**

Table 4-4
Summary of PV Operation Emissions

Operation Emission Category	NO_x (tons)	CO (tons)	SO_2 (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO_2 (tons)	N_2O (tons)	CH_4 (tons)	SF_6 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Paved Roads	-	-	-	-	0.58	0.14	-	-	-	-	-	-
Unpaved Roads	-	-	-	-	3.74	0.37	-	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	0.40	0.16	0.00	0.02	0.02	0.02	61.33	1.19E-04	1.14E-03	-	55.68	3.88E-03
On-Road Vehicle Exhaust - Commute Vehicles	0.36	1.64	4.03E-03	0.07	0.03	0.02	223.87	2.30E-03	4.05E-03	-	203.78	0.02
Circuit Breaker SF6 Emissions	-	-	-	-	-	-	-	-	-	0.005	97.55	-
Diesel Fire-Pump Emissions	0.20	0.05	0.01	1.76E-02	0.02	0.02	8.21	0.02	0.01	-	7.47	5.02E-04
Diesel Generator Emissions	0.59	0.14	0.04	5.08E-02	0.05	0.05	23.68	0.06	0.02	-	21.56	1.45E-03
Total	**1.56**	**1.98**	**0.06**	**0.16**	**4.43**	**0.61**	**317.09**	**0.08**	**0.03**	**4.50E-03**	**386.04**	**0.03**

Table 4-5
Summary of Decommission Emissions

Decommission Emission Category	NO_x (tons)	CO (tons)	SO_2 (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO_2 (tons)	N_2O (tons)	CH_4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	0.82	0.49	1.07E-03	0.11	0.08	0.08	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	0.07	0.03	9.15E-05	3.72E-03	4.49E-03	3.87E-03	11.42	2.22E-05	2.12E-04	10.36	7.22E-04
On-Road Vehicle Exhaust - Commute Vehicles	0.08	0.34	8.50E-04	1.45E-02	5.72E-03	3.23E-03	47.17	4.84E-04	8.53E-04	42.94	4.30E-03
Fugitive Dust from Travel on Paved Roads	-	-	-	-	0.14	0.04	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	0.47	0.05	-	-	-	-	-
Total	**0.97**	**0.87**	**0.00**	**0.13**	**0.71**	**0.17**	**58.59**	**0.00**	**0.00**	**53.31**	**0.01**

The estimated yearly emissions totals of O_3 precursors (NO_x and VOCs) would be less than the de minimis thresholds as specified under the Federal General Conformity Rule (40 CFR 93); thus, Proposed Project related emissions during the operational phase are assumed to be minor and conform to the SIP and the regional air quality plans.

Decommissioning. The types of emissions generated during decommissioning of the Proposed Project would be similar to but lower than those generated during Proposed Project construction. This is because the same types of equipment and activities would be used to remove Project facilities but over a shorter period of time. The activities would be similar for construction and decommissioning, and because air quality impacts from construction would not be significant, air quality impacts from decommissioning would also not be significant. The air quality impacts associated with Proposed Project decommissioning would be temporary.

To ensure that decommissioning the facility would not have an adverse effect, the Facility Decommissioning Plan would be approved by the BIA and Tribe prior to commencement of site closure activities and to the BLM for facilities on lands managed by them. The Plan would address conformance to applicable regulatory requirements including air quality. Potential closure activities could include re-grading and restoration of original site contours and revegetation of areas disturbed by closure activities in accordance with the Site Restoration Plan.

The Proposed Project would not violate any air quality standard or contribute substantially to an existing or proposed projected air quality violation.

4.6.2.2 CSP Project Alternative – AREVA Technology

Air emissions from construction and decommissioning the CSP Project Alternative would be similar to those described for the Proposed Project. The 850-acre site would be fully graded under this alternative and ROWs would be graded and developed and the same BMPs would be employed as mitigation as for the Proposed Project. These releases are anticipated to result in short-term, minor direct impacts during construction and decommissioning activities.

The operational emissions from the CSP Project Alternative would be different than the PV project primarily from using wet cooling towers for power plant cooling. The cooling towers would be sources of PM_{10} and $PM_{2.5}$ emissions as the aerosol droplets released as plume drift from the towers would evaporate in the atmosphere and the dissolved salts would precipitate as fine particles. **Table 4-6** provides a summary of the operational emissions expected from the CSP Project Alternative. The direct long-term impacts associated with the O&M of this alternative would minor in intensity. No long-term or short-term indirect impacts are anticipated.

Table 4-6
Summary of CSP Annual Operation Emissions

Operation Emission Category	NO_x (tons)	CO (tons)	SO_2 (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO_2 (tons)	N_2O (tons)	CH_4 (tons)	SF_6 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Paved Roads	-	-	-	-	0.58	0.14	-	-	-	-	-	-
Unpaved Roads	-	-	-	-	3.74	0.37	-	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	0.40	0.16	0.00	0.02	0.02	0.02	61.33	1.19E-04	1.14E-03	-	55.68	3.88E-03
On-Road Vehicle Exhaust - Commute Vehicles	0.72	3.27	8.07E-03	0.14	0.05	0.03	447.73	4.59E-03	8.09E-03	-	407.55	0.04
Circuit Breaker SF6 Emissions	-	-	-	-	-	-	-	-	-	0.005	97.55	-
Wet Cooling Tower	-	-	-	-	4.60	0.03	-	-	-	-	-	-
Diesel Fire-Pump Emissions	0.20	0.05	0.01	1.76E-02	0.02	0.02	8.21	0.02	0.01	-	7.47	5.02E-04
Diesel Generator Emissions	0.59	0.14	0.04	5.08E-02	0.05	0.05	23.68	0.06	0.02	-	21.56	1.45E-03
Total	**1.92**	**3.62**	**0.07**	**0.23**	**9.05**	**0.66**	**540.95**	**0.08**	**0.04**	**4.50E-03**	**589.82**	**0.05**

4.6.2.3 eSolar CSP Technology Alternative

This Alternative would result in the same general air quality impacts as the CSP Alternative using AREVA technology. The construction and decommissioning emissions would be similar as the same 850-acre site and ROWs would be graded and developed and the same BMPs would be employed as mitigation as for the Proposed Project. The amount of exhaust and fugitive dust emissions from earth-moving and grading would be similar, there would be no change to the construction schedule, and the vehicle and equipment emissions from construction and decommissioning would not change. The operational emissions, cooling system, and operational equipment would be the same.

4.6.2.4 Dry-Cooling Alternative

This Alternative would also result in similar construction and decommissioning air quality impacts as the CSP alternatives. The same 850-acre site and ROWs would be graded and developed/restored and the same BMPs would be employed as mitigation as for the CSP alternatives. The emissions from grading and vehicles / equipment would be similar. However, dry-cooling would eliminate the cooling towers their associated PM_{10} and $PM_{2.5}$ emissions, so operational PM emissions associated with the dry-cooling alternative would be much lower than those associated with the wet-cooled CSP alternatives.

4.6.2.5 Access Route Alternative

The Alternative Access Route would be 0.1 mile less in length than the Proposed Route but, because this differential is small, this Alternative would also be expected to result in the same general air quality impacts as the Proposed Project.

4.6.2.6 No Action Alternative

Under the No Action Alternative, the Proposed Project would not be built and there would be no direct or indirect effects on air quality.

4.6.3 Residual Effects

All air quality impacts were assessed as if all Applicant-proposed mitigation measures, BMPs, and other design features of the alternatives have been applied. Therefore, the residual effects are represented by the Proposed Project impacts discussed above.

4.7 Noise

This section discusses the effects on the ambient noise and vibration levels that may occur with implementation of the Proposed Project or alternatives. The indicators used to identify and analyze effects are presented and potential effects and agency-recommended mitigation measures are discussed.

4.7.1 Indicators

The primary indicator of noise levels for this analysis is the A-weighted average noise level measured in decibels (Leq). The one-hour average noise level (dBA Leq [1-hour]) is often used to characterize ongoing operations or long-term effects. The maximum dBA level (dBA Lmax) is used to document the highest intensity, short-term noise level. Another commonly used measure of noise effects is Ldn. The Ldn value is a 24-hour A- weighted sound level average calculated from midnight to midnight, where sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting.

The BIA and the BLM do not have regulations quantitatively limiting noise generation or effects from the Proposed Project during the temporary construction phases or operational phase. The EPA has developed and published a criterion to be used as an acceptable guideline when no other local, tribal, county, or state standard has been established (USEPA 1974).

The Proposed Project would affect ambient noise and vibration levels if it would:

- Result in the generation of noise levels or exposure of persons and sensitive species to noise levels or ground-borne vibration and noise levels in excess of standards established in applicable Federal, state, and local general plans or noise ordinances at nearby noise-sensitive areas

4.7.2 Direct and Indirect Effects by Alternatives

To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource.

4.7.2.1 Proposed Project

Noise effects could result from the implementation of the Proposed Project during construction, O&M, and decommissioning activities. These impacts could be short-term (construction) and long-term (operations and maintenance).

Short-Term. The construction phase of the Proposed Project is expected to last up to 24 months. During peak construction activity, the Proposed Project would require approximately 300 workers. To evaluate potential noise impacts due to Proposed Project construction, reference noise levels were obtained from the Construction Noise Handbook (Federal Highway Administration [FHWA] 2006) which provides a comprehensive assessment of noise levels from construction equipment. Based on the reference values in the guide and the list of construction equipment to be used on the Proposed Project, presented in **Table 4-7**, the loudest equipment used to construct the Proposed Project would generally emit noise in the range of 80 to 85 dBA at 50 feet, with utilization factors of 16 to 50 percent that account for the time period the equipment would be used during a 10-hour work day. Noise at any specific receptor is typically dominated by the closest and loudest equipment. The type of construction equipment and the number of equipment pieces near any specific receptor location would vary over time.

For the purpose of this analysis, construction noise impacts are evaluated the “worst- case” conditions as described by the Proposed Project grading scenario and the electrical gen-tie installation scenario. The specified equipment and their respective utilization factors were evaluated for each scenario. The noise impact assessment assumed that construction equipment would operate between the hours of 7:00 a.m. and 5:00 p.m., Monday through Saturday.

Table 4-7
Typical Construction Equipment Noise Levels

Equipment	Typical Utilization Factor (%)	Noise Level (dBA) at 50feet
Backhoe	40	80
Concrete mixer truck	40	85
Concrete pump truck	20	82
Crane	16	85
Drill rig	20	85
Dozer	40	85
Excavator	40	85
Generator	50	82
Grader	40	85
Loader	40	80
Paver	50	85
Roller	20	85
Heavy truck	40	84
Tractor	40	84

Source: FHWA, 2006

As shown above in **Table 4-7**, the maximum intermittent construction equipment noise levels are expected to range between 80 and 85 dBA at approximately 50 feet. Based on construction noise modeling, the highest predicted and combined operational noise level for construction equipment associated with the Proposed Project would be 86.3 dBA at 50 feet from the grading operations and 84.4 dBA during the installation of the gen-tie lines. Given the two temporary worst-case construction scenarios defined above, the construction equipment noise levels at various distances are presented in **Table 4-8**.

Although actual, combined noise levels from construction activities would depend on the duration of each task and the exact number and utilization factor of each piece of equipment and vehicle, it is estimated that construction activities would produce a short- term, adverse increase over the existing ambient noise levels at the site boundary of the Proposed Project (50 feet from the source).

Table 4-8
Construction Equipment Noise Levels versus Distance

Distance from Property Line	Grading Noise Impact Level (Leq dBA)	Transmission Noise Impact Level (Leq dBA)
50	86.3	84.4
100	83.0	79.2
200	78.2	72.8
400	74.3	68.2
800	68.7	61.9
1,600	62.2	55.1
3,200	54.6	47.4
6,400	45.2	37.9

Source: K Road EIS 2012

The use of percussive or vibratory equipment during the installation of the PV solar components may produce short-term, ground-borne vibration (VdB) above 75 VdB and ground-borne noise within the vicinity of the Proposed Project. These noise and vibration levels would be well below existing ambient noise levels by the time they reached the closest residence (approximately 20 miles northeast from the site) making them inaudible at the closest sensitive receptor. Therefore, no noise impacts would occur to the nearest sensitive human receptor and generated noise would not exceed the EPA noise threshold limit of 55 dBA Ldn (48 dBA Leq). Likewise, there are no sensitive human receptors that would be adversely impacted by the construction of the transmission line, access road, or water pipeline. Therefore, no mitigation is required to reduce construction related noise and vibration impacts.

Construction noise could be perceptible to recreational users along the Off-Highway Vehicle (OHV) routes in the area but would be short-term and unlikely to impair the recreational experience. The Proposed Project is not near any designated ACECs or other sensitive land use areas. Construction noise from the Proposed Project is not anticipated to affect users of the Old Spanish National Historic Trail because the Trail is located more than five miles away and I-15 and a railroad are located between the Project and the trail.

Short term noise impacts could affect wildlife species such as birds and small mammals adjacent to the facility. Most wildlife species would return to the area after construction if habitat and foraging opportunity exists.

Long Term. During the operational phase, the Proposed Project is expected to employ up to 20 permanent workers to operate and maintain the facility and to provide plant security. Maintenance needs for the PV project would include panel washing, array inspection, vegetation control (as needed), and inverter and switchyard maintenance. The equipment would also include the use of all-terrain vehicles to travel inside the SPGF for physical inspection and parts replacement.

The potential sources of long-term operational noise would stem from the operation of electrical equipment including the transformers for the solar arrays, corona noise from the 230 kV and 500 kV gen-tie lines, the SPGF substation, the existing Crystal and Harry Allen substations, and noise from vehicle operations during routine O&M.

Noise from electrical equipment, such as transformers, is low frequency and volume. The transformer locations are spread widely over the site, which would additionally reduce the composite noise level at a receptor. The nearest transformer to a sensitive noise receptor is approximately 20 miles so the combined noise level of the transformers would be inaudible not exceeding the EPA noise thresholds.

Other maintenance activities, such as visual inspections and equipment parts replacement would be expected to be ongoing over the life of the Proposed Project. Potential effects from these activities on the existing ambient noise levels may be detectable for a short duration at the site and on local roads (minor increase in traffic). Given the relative location of the site with respect to sensitive receptors, any potential increases in noise levels on-site are unlikely to be detectable or of concern to the general public. Therefore, there would be no long-term effects on existing ambient noise and vibration levels at the nearest residential sensitive receptor from O&M of the Proposed Project. No additional mitigation has been identified.

When a transmission line is in operation, an electric field is generated in the air surrounding the conductors forming a “corona.” The corona is an event that results from the partial breakdown of the electrical insulating properties of the air surrounding the conductors. When the intensity of the electric field at the surface of the conductor exceeds the insulating strength of the surrounding air, a corona discharge occurs at the conductor surface, representing a small dissipation of heat and energy. Some of the energy may dissipate in the form of small local pressure changes that result in audible noise or in radio or television interference. Audible noise generated by corona discharge is characterized as a hissing or crackling sound that may be accompanied by a hum.

Slight irregularities or water droplets on the conductor and/or insulator surface accentuate the electric field strength near the conductor surface, thereby making corona discharge and the associated audible noise more likely. Therefore, audible noise from transmission lines is generally a foul-weather (wet conductor) phenomenon. However, during fair weather, insects and dust on the conductors can also serve as sources of corona discharge.

The Electric Power Research Institute (EPRI) has conducted several studies of corona effects (EPRI 1978 and 1987). Typical noise levels of transmission lines with wet conductors are shown in **Table 4-9**.

Table 4-9
Transmission Line Voltage and Audible Noise Level

Line Voltage (kV)	Audible Noise Level Directly Below the Conductor(dBA)
138	33.5
240	40.4
356	51.0

Source: EPRI, 1978 and 1987
kV=kilo Volt; dBA=A-weighted decibels

As the Proposed Project gen-tie lines for the Project could be 230 or 500 kV, operation of the line could generate 40 to 51 dBA. This level of noise would only occur during infrequent wet conditions and would generally be indistinguishable from background ambient noise even during the nighttime hours. Therefore, operation of the Proposed Project gen-tie lines would have a negligible effect on existing ambient noise level at the nearest residential sensitive receptor. No mitigation is required.

Maintenance activities associated with the transmission lines and access road would result in noise levels below those associated with construction-related activities would occur less frequently, and would be of shorter duration than construction activities. Maintenance activities would be conducted on an as-needed basis and due to their short duration and the distance to the nearest sensitive receptors, there would be no long-term adverse effect on the existing ambient noise conditions. Therefore, no mitigation is required.

Decommissioning. The expected life of the Proposed Project is 30 years. In the event that the site would no longer be used for power generation, it would be decommissioned and reclaimed. All equipment, buildings, concrete foundations, and driven piles would be removed from the site, generating a temporary and localized increase in ambient noise levels during decommissioning. The Applicant would develop a Facility Decommissioning Plan consistent with BIA and Tribal requirements in a manner that protects public health and safety and is environmentally acceptable. Adverse effects during decommissioning would be negligible, localized, and short-term. No mitigation would be required due to the distance to the nearest sensitive receptor.

4.7.2.2 CSP Project Alternative – AREVA Technology

The construction and decommissioning impacts associated with solar field and the ROW components of the CSP Alternative using AREVA Technology would generally be the same as the Proposed Action. This is because it would be located within the same 850-acre site footprint and would utilize the same ROWs. Also, similar construction equipment would be used and the same mitigation would be employed.

However, while the construction sound levels for the CSP technology would be similar to those during PV construction, they would occur over a longer construction period (36 months). In addition, the highest construction noise levels would occur at the power block area, where key components (steam turbine and generator) needed to generate electricity would be located. A maximum of 95 dBA at a distance of 50 feet would be expected in this area. The power block area would be located in the center of the site, at a distance of more than 0.5 miles from the site boundary. Noise levels would attenuate to about 40 dBA at a distance of 1.2 miles from the power block area - the noise level typical of daytime mean rural background levels. Assuming a 10-hour daytime work schedule, the EPA guideline level of 55 dBA Ldn for residential areas (EPA 1974) would occur about 1,200 feet from the power block area, which would be well within the SPGF site footprint with no impact to sensitive receptors.

During operation of the CSP project, rotating machinery within the power block would contribute to ground vibration in the immediate vicinity of the equipment. Outdoor noise levels throughout the power block would range from 90 dBA near certain groups of equipment to 65 dBA in areas farther away from noise sources. Diesel-fired emergency power generators and firewater pump engines would be additional sources of noise, but their operations would be limited to several hours per month (for preventive maintenance testing). The operation of the CSP project would result in a negligible, direct, long-term impact that would cease when the facility is decommissioned.

Steam releases can occur as a result of emergency pressure safety valve discharges during CSP operations. Steam by-pass systems are designed so discharges are a rare event. When a pressure safety valve discharge does occur, it can produce high noise levels at the discharge point for short durations that are clearly audible noise within 3,000 feet. Because there are no sensitive receptors anywhere near the Project, the steam releases would result in a negligible intermittent impact over the life of the SPGF.

4.7.2.3 eSolar CSP Technology Alternative

Noise effects resulting from implementation of the eSolar CSP Technology Alternative would be the same as those identified for the CSP Alternative using AREVA Technology. The construction and decommissioning impacts would be the same because this alternative would be located within the same 850-acre site footprint and would utilize the same ROWs. Also, similar construction equipment would be used. It would also have similar operational impacts because it would have the same power block equipment.

4.7.2.4 Dry-Cooling Alternative

Noise effects resulting from implementation of the Dry Cooling Alternative would be the same as those identified for the Proposed Project. This alternative would be located within the same 850-acre site footprint and would utilize the same ROWs. Similar construction equipment would be used but for a slightly longer period. Operational impacts would be the same.

4.7.2.5 Access Route Alternative

The Alternative Access Route would result in similar noise effects as the Proposed Project.

4.7.2.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed, so there would be no noise effects.

4.7.3 Residual Effects

There would be no residual noise effects from construction, O&M, and decommissioning of the alternatives.

4.8 Biological Resources

This section discusses vegetation, wildlife, and sensitive wildlife species. Effects on biological resources that could result from the implementation of the Proposed Project and Alternatives during construction, O&M, or decommissioning activities are analyzed in this section.

Analysis of impacts to biological resources was conducted by: (1) using information from numerous sources and historical reports in addition to data provided by the Applicant and the

Tribe; and (2) evaluating temporal and spatial impacts to habitats and organisms potentially present within the Proposed Project site and within a regional geographic context.

Field surveys were conducted for protected vegetation, Gila monsters (*Heloderma suspectum)*, desert tortoises (*Gopherus agassizii)* and burrowing owls (*Athene cunicularia)* in May of 2010 (NBC 2011). Surveys were also conducted for desert tortoise, Gila monsters and burrowing owls in May and October of 2012 (Heritage 2013). The botanical inventory documented and quantified the presence/absence of special status plant species within the Proposed Project site. The results of these studies have been used in this analysis to assess potential vegetation impacts including impacts to special status plant species within the Proposed Project. The desert tortoise survey results were used to prepare a Biological Assessment under Section 7 of the ESA for the consultation between the BIA, BLM and USFWS.

4.8.1 Indicators

The Proposed Project would affect biological resources if it would:

- Substantially alter the structure, function, and persistence of sensitive upland, riparian, or aquatic vegetative communities;
- Change the diversity or substantially alter the numbers of a local population of any wildlife or plant species, or interfere with the survival, growth, or reproduction of affected wildlife and plant populations;
- Substantially interfere with the seasonal or daily movement, migration corridors, or range of migratory birds and other wildlife;
- Result in a substantial long-term habitat loss, degradation, fragmentation, or substantial increase in the ”edge effect” of key habitat of special status species;
- Result in direct or indirect impacts on candidate or special status species populations or habitat that would contribute to or result in the federal or state listing of the species (e.g., substantially reducing species numbers, or resulting in the permanent loss of habitat essential for the continued existence of a species);
- Introduce and/or increase the potential for introduction of invasive, non-native plants or noxious weeds to an area or potential increase in existing populations of these plants;
- Introduce physical structures or involve production, use, or disposal of materials that pose a health hazard to special status species;
- Result in changes in the environment that increase opportunities for predators of special status species; or
- Result in water use, water developments, or water controls that impact native vegetation, special status plant species, or habitat of special status plant species.

4.8.2 Vegetation

There are seven vegetative covertypes present within the project area: Creosotebush-White bursage, cactus/yucca, xeroriparian, mesquite, playa lake, saltbush and disturbed. See Chapter 3- Biological Resources for a description of vegetative covertypes in Project Area. Direct and indirect effects, mitigation, and residual effects to vegetation resources are discussed below. **Table 4-9** presents the permanent and temporary impact acreage project area components.

4.8.2.1 Vegetation Communities

4.8.2.1.1 Direct and Indirect Effects by Proposed Action and Alternatives

4.8.2.1.1.1 Proposed Project

A botanical inventory of the Proposed Project was conducted in May 2010 that documented and quantified the presence/absence of special status plant species within the Proposed Project site. The results of this study have been used in this analysis to assess the potential vegetation impacts including impacts to special status plant species within the Proposed Project site.

Clearing and grading the SPGF site would cause the direct loss of less than 850 acres of vegetation the majority of which is the creosotebush-white bursage scrub vegetation community. Full grading and clearing would occur only in those areas necessary to facilitate construction and operation of the PV tracking system. In areas where grading is not necessary, vegetation would left in place but trimmed as needed. The soil surface would be left undisturbed. After construction, vegetation within the SPGF would be managed and trimmed where needed to maintain movement of the tracking system, to facilitate maintenance, and reduce fire risk. Herbicides would be used where needed; use of specific chemicals would only occur after approval from the BLM, USFWS, and/or BIA. The site would be disturbed for the life of the project but would be rehabilitated after decommissioning. Therefore, disturbance would be considered long-term but not permanent. Development of the gen-tie lines and water pipeline associated with the Proposed Project would result in short term impacts to the local vegetation as the result of construction. After the construction phase, the temporarily disturbed areas not covered by facilities would be reclaimed.

Reduction of native plant species would leave bare areas at risk for the potential spread of non-native, invasive weed species and increase the potential for increased erosion. Construction activities would disturb soil within the Proposed Project, further creating opportunities for non-native, invasive weed species to colonize the disturbed work areas. Weed sources would include incoming vehicles, incoming fill, construction BMPs such as hay bales and adjacent lands via natural movement such as wind. Invasive weed species could out-compete native plants for resources such as water and space. The Applicant would implement an approved Weed Management Plan (WMP) to control the growth of weeds and other undesired vegetation.

Indirectly, soil disturbance could reduce the native seed bank and dust generated during construction could potentially affect off-site native vegetation communities by reducing photosynthetic activity. Catchment of storm water runoff and subsequent storage in retention ponds could reduce localized water availability in downstream washes and could affect downstream vegetation. The treatment of noxious/invasive weeds (i.e., herbicide treatments, plant removal) could result in inadvertent injury of native plant species that are in close proximity.

The proposed ROWs associated with the Project include creosotebush-white bursage scrub, and xeroriparian vegetative covertypes. Water for the Project would be delivered to the SPGF site via an approximately 5.4 mile water pipeline located on the Reservation. Construction activities for the pipeline would include ground-disturbing activities that would result in the temporary loss of approximately 32.5 acres of vegetation in the ROW.

Water drawdowns at the well location would have the potential to affect instream flows in the Muddy River, which could in turn affect hydrophytic or phreatophytic vegetation. As discussed in the groundwater section (Section 4.5), the potential flow reduction is not expected to be significant for the 50 AF used during construction, 30 AFY that would be used during the operational life of the PV project, and the 50 AF needed for site decommissioning. Therefore, impacts to downstream vegetation resulting from groundwater withdrawals are not expected to occur.

The proposed 2.5-mile gravel access road would be constructed largely on BLM-administered lands and would result in the long-term loss of approximately 18.1 acres of vegetation within the access road ROW. Frequent vehicular use by personnel associated with the O&M of the SPGF could result in the import of noxious/invasive weeds along the access road and SPGF but would be mitigated by implementation of the Weed Management Plan. A draft of the Weed management Plan is included in **Appendix C**.

Development of the gen-tie lines would result in temporary disturbance associated with construction at each structure location and pull sites used to string the conductor into place. Long-term gen-tie impacts would be associated with the access needed for each structure location and the footprint of each structure. The 230kV gen-tie would result in the temporary loss of approximately 42.1 acres of vegetation and long-term loss of 19.9 acres of vegetation in the gen-tie line ROW. The 500kV gen-tie would result in the temporary loss of approximately 14.2 acres of vegetation and the long-term loss of approximately 3.7 acres of vegetation.

Table 4-10
Impacts to Vegetation Types by Proposed Project (acres)

	SPGF		230kV[1]		500kV[1]		Access Road		Water Pipeline		Total	
Vegetation Community Type	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**
Creosotebush/White-Bursage	817.6	0	5.6	11.1	3.2	13	13.4	0	0	21.4	839.8	45.5
Cactus/Yucca	0	0	8.1	19.6	0	0	0	0	0	0	8.1	19.6
Disturbed	2.5	0	0.4	0.8	0.3	1	3.1	0	0	10.4	6.4	12.2
Mesquite	0	0	0.5	1	0	0	0	0	0	0	0.5	1
Playa Lake	0	0	3.1	5.7	0	0	0	0	0	0	3.1	5.7
Saltbush	0	0	1.5	2.8	0	0	0	0	0	0	1.5	2.8
Xeroriparian	29.8	0	0.7	1.1	0.2	0.2	1.6	0	0	0.7	32.3	2
Total Impacts	**849.9**	**0**	**19.9**	**42.1**	**3.7**	**14.2**	**18.1**	**0**	**0**	**32.5**	**891.7**	**88.8**

[1]Values include pole structures, construction area, gen-tie road and pull site.

Proposed Project facilities have an expected life of 30 years or more. The Applicant has developed a draft Habitat Restoration and Revegetation Plan defining the procedures for the revegetation and rehabilitation of areas disturbed by the Proposed Project (**Appendix E**). This plan would be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the gen-tie line routes, water pipeline, and access road. It would also be implemented after decommissioning of the project.

To minimize the potential impacts on vegetation, the following mitigation measures would be implemented:

- Pre-construction surveys for protected and sensitive species;
- Best management practices;
- Biological monitors during construction;
- Worker Environmental Awareness Program;
- Weed Management Plan;
- Site Restoration Plan; and
- Vehicles and equipment would be cleaned of soil and plant material prior to entering the site.

Chapter 5 Mitigation Measures - Biological Resources, provides additional details on the proposed mitigation measures.

4.8.2.1.1.2 CSP Project Alternative – AREVA Technology

Effects to vegetation resulting from construction and decommissioning of the CSP Alternative using AREVA Technology would be the same as those identified for the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

Operation of this wet-cooled CSP alternative would require up to 800 AFY of water. The groundwater pumping required to deliver this water could potentially impact vegetation communities downstream from the Muddy River Springs area. However, as discussed in the groundwater analysis for the this Alternative, the proposed groundwater withdrawal for this alternative is not expected to have significant impacts to local stream flows, so potential impacts to vegetation associated with nearby surface waters and vegetation downstream from the Muddy River Springs area is unlikely.

4.8.2.1.1.3 eSolar CSP Alternative

Effects to vegetation resulting from implementation of eSolar CSP Alternative would be the same as those identified for the CSP Project Alternative using AREVA Technology. This wet-cooled CSP alternative would use the same amount of groundwater. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project. In addition, this alternative would use the same amount of water as the AREVA technology.

4.8.2.1.1.4 Dry-Cooling Alternative

Effects to vegetation resulting from construction of the Dry Cooling Alternative would also be the same as those identified for the Proposed Project. It would occur within the same 850-acre site footprint and ROWs and the same BMPs would be employed as mitigation.
During operations, dry-cooling would require only about 10 percent of the water that would be used by the wet-cooled CSP alternatives – or approximately 60 to 80 AFY. The lower groundwater withdrawal would result in approximately 10 percent of the potential aquifer drawdown and potential impact to flows in the Muddy River Spring Area than projected for the CSP Project’s consumption of up to 800 AFY. However, because the impacts from the proposed wet-cooling associated with the CSP Project are projected to be small and difficult to separate from naturally occurring variations in the aquifer and flows, the potential impacts to downstream vegetation from the Dry Cooling Alternative would likely be similar to the other CSP alternatives.

4.8.2.1.1.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. While this would result in slightly decreased impacts than the Proposed Project, the impacts to vegetation would be similar.

4.8.2.1.1.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to vegetation resources.

4.8.2.1.2 Residual Effects – Vegetation

The Proposed Project would result in the long-term loss of approximately 960 acres of vegetative covertypes for the operational life of the Project (See **Table 4-10** for a complete list of covertypes)**.** The increase in vehicular traffic during the construction and O&M of the Proposed Project could negatively impact vegetation through increased atmospheric dust. Subsequent to implementation of the mitigation measures, it is possible that noxious/invasive weeds could be introduced in the area after construction and during operations phases, but implementation of the Weed Management Plan would help prevent the spread of noxious/invasive weeds.

Following decommissioning when all facilities would be removed, disturbed areas would be revegetated in accordance with the Habitat Restoration and Revegetation Plan. This would reduce the long-term effects to vegetation.

4.8.2.2 Special Status Plant Species

4.8.2.2.1 Direct and Indirect Effects by Proposed Action and Alternatives

4.8.2.2.1.1 Proposed Project

Surveys for the federally-listed and candidate, threatened or endangered plant species (Las Vegas Buckwheat (*Eriogonum corymbosumnilesii)* that are known to occur within Clark County, NV were conducted for the Project. No federally protected vegetation was found at the Proposed Project site (NBC 2011). Additionally, the Applicant surveyed for state protected, regulated, listed and BLM special status vegetation. Special status species that were surveyed for and did not occur on the Proposed Project site include: Blue Diamond Cholla (*Cylindropuntia multigeniculata*), Three Corner Milkvetch (*Astragalus geyeri* var. *triquetrus),* Beaverdam Breadroot *(Pediomelum castoreum),*Nye Milkvetch (*Astragalus nyensis)*, Rosy twotone Beardtongue (*Penstemon bicolor* spp. *roseus)* and White Bearpoppy (*Arctomecon merriamii)*.

The Applicant also surveyed for cacti, which are protected under Nevada state law (NRS 527 – Protection and Preservation of Timbered Lands, Trees and Flora). Cacti were found throughout the upland portions of the Proposed Project site. **Table 3-6** in Chapter 3 lists the protected species of cacti that occur on the Proposed Project site.

A draft Habitat Restoration and Revegetation Plan has been developed defining the procedures for the revegetation and rehabilitation of areas disturbed by the Proposed Project (**Appendix E**). This plan would be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the gen-tie line routes, water pipeline, and access road.

Additional surveys for these plants would be conducted prior to any construction of the Proposed Project. Impacts to documented plants would be avoided if practical or reduced through use of construction BMPs and habitat restoration. If impacts cannot be avoided then impacts would be mitigated through seed collections from affected populations and a potential sponsorship of each affected species via the Center for Plant Conservation imperiled plant collection.

4.8.2.2.1.2 CSP Project Alternative – AREVA Technology

Effects to special status plant species resulting from implementation of the CSP Alternative using AREVA Technology would be the same as those identified for the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

The groundwater pumping required to deliver the up to 800 AFY of water for the CSP project is not expected to have significant impacts to local stream flows could potentially impact vegetation communities associated with nearby surface waters or downstream of the Muddy River Springs area as discussed in the groundwater analysis for the Project. Therefore, potential impacts to any sensitive plant species occurring in these habitats from the proposed groundwater withdrawal are unlikely.

4.8.2.2.1.3 eSolar CSP Alternative

Effects to special status plant species resulting from implementation of eSolar CSP Alternative would be the same as those identified for the CSP Project Alternative using AREVA Technology. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the AREVA CSP Alternative.

4.8.2.2.1.4 Dry-Cooling Alternative

Effects to special status vegetation resulting from implementation of the Dry Cooling Alternative would be similar to those identified for the Proposed Project. This alternative would occur within the same 850-acre site footprint and ROWs and the same BMPs would be employed as mitigation.

Dry-cooling require only about 10 percent of the water that would be used by the wet-cooled CSP project – or approximately 60 to 80 AFY. The lower groundwater withdrawal would result in approximately 10 percent of the potential aquifer drawdown and potential impact to flows in the Muddy River Spring Area than projected for the wet-cooled CSP alternatives’ consumption of up to 800 AFY. However, because the impacts from the wet-cooled CSP alternatives are projected to be small and difficult to separate from naturally occurring variations in the aquifer and flows, the potential impacts to vegetation associated with nearby surface waters and downstream from the Muddy River Springs area from the Dry Cooling Alternative would likely be similar to the Proposed Project.

4.8.2.2.1.5 Access Route Alternative

The Alternative Access Route would be approximately 0.4 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. While this would result in slightly decreased impacts than the Proposed Project, the impacts to special status plant species would be similar.

4.8.2.2.1.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to special status plant species.

4.8.3 Wildlife

4.8.3.1 Direct and Indirect Effects by Proposed Action and Alternatives – Wildlife

Biological surveys for native wildlife (e.g. burrowing owls, desert tortoises, Gila monsters) were conducted for the Proposed Project during May of 2010 and May and October of 2012. The following analysis is based on the results of those surveys as well as publically available data and reports.

4.8.3.1.1 Proposed Action

Ground-disturbing activities associated with construction of the SPGF site are potential sources of direct mortality and injury to wildlife. Impacts from equipment and vehicles can occur for slow-moving species, species that have subsurface burrows, or ground-nesting birds. Some nesting birds, large mammals, and reptiles are susceptible to visual and noise disturbances caused by the presence of humans and construction equipment and the generation of dust. Such disturbances could cause wildlife to alter foraging and breeding behavior and avoid suitable habitat (e.g., nesting birds may abandon nests due to these disturbances). Loss of burrows due to Proposed Project construction, ground vibration, or avoidance behavior would cause wildlife to search for and/or dig new burrows.

Wildlife occurring in and around the project area would also be indirectly impacted. The removal and/or modification of natural vegetation communities would reduce forage, shelter, and nesting opportunities to wildlife including multiple special status wildlife species (see special status species **Section 4.8.4** below). The long-term loss and/or degradation of approximately 960 acres of wildlife habitat would cause wildlife to rely more heavily on habitat in surrounding areas. Construction activities and O&M activities would have the potential to impact wildlife in surrounding areas. Construction and operation of the Proposed Project could directly and adversely impact wildlife by causing wildlife to alter foraging and breeding behavior. For example, increased noise as a result of construction could result in wildlife avoiding the general area surrounding the Proposed Project.

Additionally, removal of resources and exclusion of wildlife from the fenced portions of the Proposed Project would add pressure on the food resources in adjacent areas. Ground-disturbing activities and mowing could increase the spread of noxious/invasive weeds, which could potentially out-compete existing annual vegetation that would indirectly and adversely affect the quality of wildlife habitat and forage. Implementation of the WMP would greatly reduce or eliminate these impacts.

The Project infrastructure may also indirectly cause mortality to wildlife by increasing the risk of predation on certain species by native predators such as ravens and raptor species. Increased predation would be minimized by the implementation of perch deterrents around the Proposed Project area as well as weed/vegetation control to reduce foraging habitat. The addition of electric transmission poles/towers could provide additional perching resources to ravens and raptor species, which could result in increased foraging activity of these species within and near the Proposed Project site. Construction and O&M of the Proposed Project could result in trash and debris that may attract predators such as ravens and coyotes. A draft Raven Control Plan has been prepared that addresses minimization and avoidance measures that would be taken to reduce the attraction of the Proposed Action to common ravens, thereby minimizing impacts to species that ravens prey upon. **Appendix M** contains the draft Raven Control Plan.

During construction, hazardous waste (solid and liquid) would be generated at the site. Exposure to hazardous waste could be a direct source of wildlife mortality and/or injury through the poisoning of individuals. Spills of hazardous waste could also indirectly adversely impact wildlife if the spill of the hazardous waste results in the loss of natural vegetation community. O&M activities could also result in production of similar hazardous waste as during the construction phase of the Proposed Project, and would result in the same type of impacts. The hazardous waste that would be on the Proposed Project site is subject to strict regulation by the Hazardous Materials Management Plan. The subsequent containment and disposal of hazardous waste outlined in SPCC Plan would reduce the likelihood that significant spills would adversely affect wildlife.

Evaporation ponds for the Project would be located on the SPGF site. Such ponds can pose a hazard to wildlife, particularly birds. High levels of dissolved solids could be present and can affect birds that drink the water. Waterfowl could also be affected by the formation of salt crusts on feathers, reducing flight capabilities. Mitigation measures such as a fine twine netting, designed to deter avian and bat species (further described in Chapter 5) would reduce the attractiveness and risk to wildlife posed by the evaporation ponds.

Although resident bird diversity in the Proposed Project site is low, a number of migratory bird species could nest there. A number of minimization measures would be implemented to reduce impacts to birds including surveying for, delineating, and adhering to non-disturbance buffers for nesting birds during the breeding season.

Construction activities for the water pipeline would result in the temporary loss of approximately 32.5 acres of vegetation and the subsequent loss of wildlife habitat. Construction of the access road would result in the long-term loss of approximately 18.1 acres of wildlife habitat. The construction of the 500 kV gen-tie line would result in the temporary loss of approximately 11.3 acres and the long-term loss of 3.4 acres of habitat. The construction of the 230 kV would result in the temporary loss of 27.5 acres and the long-term loss of 17.5 acres of habitat. The removal of wildlife habitat is expected to increase competition for adjacent resources. Mitigation measures outlined below and in Chapter 5 describe how these potential impacts would be minimized.

As mentioned above, the Applicant has developed a Habitat Restoration and Revegetation Plan defining the procedures for the revegetation and rehabilitation of areas disturbed by the Proposed Project. This plan would be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the gen-tie line routes, water pipeline, and access road. The future removal of project infrastructure, the revegetation of disturbed areas, and the absence of a continual O&M presence would likely result in the reestablishment of native vegetation as well as the reestablishment of wildlife habitats, returning the site to pre-project conditions.

The Applicant has incorporated the following BMP measures to help avoid or reduce impacts on wildlife species:

- SWPPP (Erosion and Dust Control);
- SPCC Plan;
- Raven Control Plan;
- Waste Management Plan;
- Weed Management Plan;
- Bird and Bat Conservation Strategy;
- Restoration Plan and Facility Decommissioning Plan; and
- Environmental Clearances (Permits).

To further reduce impacts, the following mitigation measures would also be employed:

- Preconstruction surveys for protected species;
- Biological monitors during the construction of the Proposed Project;
- Worker Environmental Awareness Program;
- Reduced night lighting;
- Turning off idling equipment;
- Proper maintenance of equipment and vehicles;
- Construction equipment muffled;
- Proper installation of transformer equipment;
- Imported soils are free from contaminants before use on-site; and
- Scheduling site disturbing construction activities to avoid avian breeding and nesting seasons to comply with provisions of the MBTA, as practicable.

4.8.3.1.2 CSP Project Alternative – AREVA Technology

The CSP Project using the AREVA technology would result in impacts to wildlife similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

The groundwater pumping required to deliver the up to 800 AFY of water for the CSP project is not expected to have significant impacts to local stream flows that could potentially impact wildlife habitat downstream as discussed in the groundwater analysis for the Project. Therefore, potential impacts to downstream wildlife habitat from the proposed groundwater withdrawal are unlikely.

4.8.3.1.3 eSolar CSP Alternative

In this alternative, the eSolar CSP technology and solar field would be used. This CSP technology involves the use of a large field of heliostats (mirrors) reflecting sunlight on central receivers mounted on towers approximately 250 feet in height. The central receiving towers used in eSolar CSP technology and the heliostats would increase the risk of collision for avian species.

A pilot project built with similar technology (the Solar One/Solar Two facility) exhibited risk to birds (McCrary et al. 1986) with birds occasionally colliding with the heliostats and the towers. The risk of bird collision would exist for the eSolar CSP Alternative at this site but is anticipated to be lower than at Solar One/Solar Two. This is because the pilot project was sited in an agricultural area with nearby surface water and relatively high bird abundance. The MSEC Project area is extremely arid with low bird abundance and diversity and very few year-round resident species.

Standby, maintenance, or test operations for CSP tower technologies require focusing mirrors on points away from the solar collecting tower. This can create 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 and by implementing measures to reduce the overall attractiveness of the area to birds.

The eSolar CSP Alternative would increase fragmentation of the southern portion of the Reservation as well as increase potential perching sites for predators. Impacts to wildlife as a result of this Alternative would be similar to and potentially greater than the AREVA CSP Alternative.

4.8.3.1.4 Dry-Cooling Alternative

Effects to wildlife resulting from implementation of the Dry Cooling Alternative would also be similar to those identified for the Proposed Project. While a larger solar field would be required for this cooling technology, it would occur within the same 850-acre site footprint and ROWs and the same BMPs would be employed as mitigation.

Dry-cooling would require only about 10 percent of the water that would be used by the wet-cooled CSP project – or approximately 60 to 80 AFY. The lower groundwater withdrawal would result in approximately 10 percent of the potential aquifer drawdown and potential impact to flows in the Muddy River Spring Area than projected for the Proposed Project's consumption of up to 800 AFY. However, because the impacts from the Proposed Project are projected to be small and difficult to separate from naturally occurring variations in the aquifer and flows, the potential impacts to aquatic species downstream from the Muddy River Springs area from the Dry Cooling Alternative would be similar to the Proposed Project.

Evaporation ponds would be up to 90 percent smaller than the proposed wet-cooling methods, reducing the risk of ingestion of evaporation pond water by avian and mammalian species. Short and long-term impacts to wildlife resulting from the dry-cooling alternative would be less than the wet-cooled CSP alternatives.

4.8.3.1.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. While this would result in slightly decreased impacts than the Proposed Project, the impacts to wildlife would be similar.

4.8.3.1.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to wildlife resources.

4.8.3.2 Residual Effects - Wildlife

There would be long-term residual effects to wildlife due to the construction of the Proposed Project. The SPGF site would be graded as needed to provide the needed clearances for construction and operation of the solar field. Where grading is not necessary, vegetation would be trimmed or mowed as needed to allow the surface soils and local drainage to be left undisturbed. This would reduce the loss of wildlife habitat to less than 960 acres due to construction of the Proposed Project. The loss of wildlife habitat would result in a loss of shelter, nesting habitat, and foraging sources for wildlife species and would result in the affected wildlife having to rely more heavily on habitat outside of the Project footprint.

Following decommissioning when all facilities would be removed, disturbed areas would be revegetated in accordance with the Habitat Restoration and Revegetation Plan. This would reduce the long-term effects to wildlife and habitats.

4.8.4 Special Status Wildlife Species

The list of federally threatened or endangered species occurring in Clark County was reviewed for potential occurrence in and around the project area. The Nevada Natural Heritage Program database was also queried for other special status species occurrences in the vicinity of the project area. Four species listed under the Endangered Species Act (ESA) (1974), three candidates for listing under the ESA, one species protected by the Bald and Golden Eagle Protection Act (BGEPA), and one BLM sensitive species were identified as potentially occurring in or around the project area and potentially impacted by the Proposed Project. These include the desert tortoise, Moapa dace, relict leopard frog, Yuma clapper rail, southwestern willow flycatcher, yellow-billed cuckoo, and golden eagle. Surveys for special status species and habitat analysis suggests that only desert tortoise and golden eagle are in the Project Area. Additionally, the Moapa dace is known to occur in an area potentially affected by groundwater withdrawals associated with the proposed project. More detail can be found in **Table 3-9** and the Biological Assessment that has been prepared concurrently with this EIS (**Appendix N**) and the Biological Opinion prepared by the USFWS (**Appendix R**).

4.8.4.1 Direct and Indirect Effects - Special Status Species

The previously discussed biological impacts from construction, O&M, and decommissioning are similar to the potential adverse impacts to special status wildlife species.

4.8.4.1.1 Desert Tortoise

4.8.4.1.1.1 Proposed Action

Desert tortoises could be harmed or killed during ground-disturbing activities and as a result of vehicle travel on access roads during construction and operation of the facility. Proposed Project activities could result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Individual tortoises could be injured or entombed in their burrows. Disruption of tortoise behavior could occur due to noise or vibration from the heavy equipment during construction or operation of facilities. Although unlikely to occur through implementation of mitigation measures (proper disposal and storage of trash), injury or mortality could occur from encounters with workers' or visitors' pets and trash could attract desert tortoise predators such as ravens and coyotes. Desert tortoises may also be attracted to the construction area by application of water for dust control, placing them at higher risk of injury or mortality. Additionally, tortoises may take shelter under parked vehicles and incidental take may occur when the vehicle is moved. Desert tortoises could be harmed by inadvertent hazardous materials spills, including equipment fuel and hydraulic fluid leaks.

During the life of the Proposed Project, approximately 951.1 acres of the suitable habitat for the desert tortoise would be lost long-term due to the construction of the Proposed Project. **Table 4-11** delineates temporary and long-term disturbance to desert tortoise habitat by project component.

The Proposed Project could result in minimal effects to local tortoise population connectivity. Landscape \genetic analysis performed by Latch et al. (2011) identified both natural (slope) and anthropogenic (roads) landscape variables that significantly influenced desert tortoise gene flow of a local population. Although they determined a higher correlation of genetic distance with slope compared to roads, desert tortoise pairs from the same side of a road exhibited significantly less genetic differentiation than tortoise pairs from opposite sides of a road. Project access roads are not anticipated to decrease local population connectivity substantially beyond the existing conditions. However, the fenced SPGF could potentially limit habitat connectivity and tortoise movement at a local level. Movement patterns of individual tortoises occurring in the project area could potentially be altered once the fence for the SPGF is installed.

The proposed solar facility would be constructed in Dry Lake Valley, a closed northeast-trending basin, bounded on the northwest by the Arrow Canyon Range and on the southeast by the Dry Lake Range (BLM 2012). These topographic features may to some extent isolate the desert tortoises in Dry Lake Valley from other adjacent populations. Dry Lake Valley was not identified in modeling least-cost pathways for desert tortoise gene flows based on geographic distance, barriers to dispersal, and landscape friction (Hagerty et al. 2010). The overall importance of Dry Lake Valley to tortoise population connectivity and recovery is unknown, but Dry Lake Valley has not been identified as a linkage corridor in current modeling (Averill-Murray et al. 2013). Therefore, based on the information currently available, it is not anticipated that the proposed project would significantly modify current opportunities for desert tortoise connectivity.

Installation of exclusionary fencing at the SPGF could result in take of desert tortoises due to equipment operation, removal of tortoise burrows, and subsequent tortoise relocation. Fencing would preclude desert tortoises from re-entering their home range or could separate individuals from their home range. The exclusionary fence would restrict tortoise movement and habitat connectivity and could result in displacement stress that could result in loss of health, exposure, increased risk of predation, reduced productivity, increased intra-specific competition, and/or death.

All desert tortoises found within the proposed SPGF boundary of the Proposed Project would be relocated in accordance with USFWS protocols to BLM-managed lands or Tribal lands. Capturing, handling, and relocating desert tortoises from the Proposed Project after installation of the fencing would result in take and may also result in death or injury. This is particularly true if relocation methods are performed improperly, such as during extreme temperatures, or if tortoises void their bladders due to handling stress, leaving them susceptible to severe dehydration. Displaced tortoises that do not shelter from extreme temperatures may die from exposure.

Relocation activities could adversely impact the existing tortoises located within a relocation site if tortoises that are infected with upper respiratory tract disease (URTD; e.g., *Mycoplasma agassizii*, *M. testudineum*) or other pathogens are relocated. Once a tortoise is infected with Mycoplasma, it is a carrier for life, with recurrence of the disease at some point in the future, regardless of treatment (Jacobson 1992). The introduction or spread of URTD would result in the illness and potential mortality of infected individuals. In order to minimize the risk of spreading URTD, health assessments would be conducted for all desert tortoises that would be relocated. Assessments would include blood work and each desert tortoise would be radio tagged to aid in relocation during preconstruction clearance surveys.

During construction, breaches in the solar field exclusionary fencing may occur and desert tortoises could pass through the barrier and be affected by Project-related activities. If breaches occur, materials and equipment left behind following construction and maintenance activities may entrap or entangle desert tortoises, attract predators such as common ravens and coyotes, or provide shelter for desert tortoises, which, when removed, may result in displacement or injury of the tortoise. During operation, surface water flows could also undercut and compromise the desert tortoise fence and allow short-term access to desert tortoise and their predators until such time as repairs are made.

Table 4-11
Temporary and Long-Term Impacts (Acres) to Desert Tortoise Habitat on the Proposed Project Area and Alternatives

Project Component		Covertype	Long-Term Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
SPGF		Creosotebush-White Bursage	817.6	0.0	817.6
		Xeroriparian	29.8	0.0	29.8
		TOTAL	**847.4**	**0.0**	**847.4**
230kV Gen-Tie	230kV Pole Structures	Cactus/Yucca	3.9	0.0	3.9
		Creosotebush-White Bursage	2.6	0.0	2.6
		Saltbush	0.7	0.0	0.7
		Xeroriparian	0.1	0.0	0.1
		TOTAL	**7.3**	**0.0**	**7.3**
	230kV 12ft Road	Cactus/Yucca	4.2	0.0	4.2
		Creosotebush-White Bursage	3.0	0.0	3.0
		Saltbush	0.8	0.0	0.8
		Xeroriparian	0.5	0.0	0.5
		TOTAL	**8.5**	**0.0**	**8.5**
	230kV Construction Area	Cactus/Yucca	0.0	15.9	15.9
		Creosotebush-White Bursage	0.0	10.2	10.2
		Saltbush	0.0	2.8	2.8
		Xeroriparian	0.0	1.1	1.1
		TOTAL	**0.0**	**27.1**	**27.1**

Table 4-11
Temporary and Long-Term Impacts (Acres) to Desert Tortoise Habitat on the Proposed Project Area and Alternatives

Project Component		Covertype	Long-Term Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
	230kV Pull Site	Creosotebush-White Bursage	0.0	0.9	0.9
		Cactus/Yucca	0.0	3.7	3.7
		TOTAL	**0.0**	**4.6**	**4.6**
500kV Gen-Tie	500kV Pole Structures	Creosotebush-White Bursage	1.1	0.0	1.1
		Xeroriparian	0.2	0.0	0.2
		TOTAL	**1.3**	**0.0**	**1.3**
	500kV 12ft Road	Creosotebush-White Bursage	2.1	0.0.	2.1
		Xeroriparian	0.0	0.0	0.0
		TOTAL	2.1	0.0	2.1
	500kV Construction Area	Creosotebush-White Bursage	0.0	6.2	6.2
		Xeroriparian	0.0	0.2	0.2
		TOTAL	**0.0**	**6.4**	**6.4**
	500kV Pull Site	Creosotebush-White Bursage	0.0	6.8	6.8
		TOTAL	**0.0**	**6.8**	**6.8**
Proposed Access Road		Creosotebush-White Bursage	13.4	0.0	13.4
		Xeroriparian	1.6	0.0	1.6
		TOTAL	**15.0**	**0.0**	**15.0**
Alternate Access Road		Creosotebush-White Bursage	0.0	0.0	0.0
		Xeroriparian	0.4	0.0	0.4
		TOTAL	**0.4**	**0.0**	**0.4**
Water Pipeline		Creosotebush-White Bursage	0.0	21.4	21.4
		Xeroriparian	0.0	0.7	0.7
		TOTAL	**0.0**	**22.1**	**22.1**
PROJECT TOTALS			**881.6**	**69.9**	**951.5**

The Applicant has developed a Habitat Restoration and Revegetation Plan defining the procedures for the revegetation and rehabilitation of areas disturbed by the Proposed Project. The future removal of project infrastructure, the revegetation of disturbed areas, and the absence of a continual O&M presence would likely result in the reestablishment of native vegetation as well as the reestablishment of desert tortoise habitat, returning the site to pre-project conditions..

Based on pre-project survey results, approximately 2 (but up to 10) adult and subadult (≥160 mm MCL) tortoises and 0 to 56 juvenile and hatchling (<160 mm MCL) tortoises will be captured and relocated from harm's way as a result of the development of the SPGF. Between 1 and 46 eggs occur in the SPGF area. Because of the difficulty in locating juvenile desert tortoises and eggs, some but not all are likely to be relocated from the SPGF. No individuals larger than 160 mm MCL are anticipated to be unobserved in the SPGF; therefore, all individuals occurring in the SPGF in this age class will be relocated. Effects to juvenile desert tortoises and eggs that are undetected on the project sites are discussed later in this section.

It is anticipated that all adult and subadult desert tortoises will be captured and translocated from the fenced SPGF and any portion of the action area where individuals may be in harm's way of project activities. Desert tortoises that are encountered on linear features of the project in harm's way will be moved the minimal distance out of harm's way to secure and appropriate habitat but no more than 1,000 feet in accordance with the Desert Tortoise Field Manual (USFWS 2009).

Based on draft USFWS (or Service) guidance (USFWS 2012), the USFWS is not requiring the development of a desert tortoise translocation plan for this project. However, desert tortoises that are captured in the SPGF or associated infrastructure will be relocated in accordance with each individual's Service-approved disposition plan (Conservation Measure 17). For the purposes of these analyses, we use the words relocate and translocate interchangeably to describe desert tortoises that will be removed from the SPGF. Based on the project size and configuration, the furthest distance a desert tortoise may be relocated from the SPGF is 966 m (0.6 mile). Prior to relocating tortoises captured in the SPGF, health assessments, which include visual inspection relative to body condition, clinical signs of disease, and collection of biological samples for disease screening (i.e., blood samples to test for antibodies to pathogens), will be completed for each individual in accordance with the most recent Service guidance (USFWS 2013) and a disposition plan will be prepared. All areas to which tortoises will be relocated from the SPGF will be approved by the Service prior to the tortoise's release to ensure habitat suitability (Conservation Measures 15 and 17). After disease screening results, and approval of disposition plans, the Applicant will relocate all desert tortoises to their respective relocation area. Capture and relocation of individual desert tortoises occurring in the SPGF may result in accidental death and injury due to stress or disease transmission associated with handling; and stress associated with moving individuals outside of their established home range. Relocated individuals and residents in the relocation area may be adversely impacted by resource competition or stress from artificially increasing the density of tortoises in areas outside the SPGF.

The Biological Opinion (**Appendix R**) contains additional measures for desert tortoise that are necessary to minimize adverse impacts to desert tortoise. These measures include, but are not limited to:

- Oversee establishment and functionality of sediment control devices as outlined in the Storm Water Pollution Prevention Plan. Ensure that Best Management Practices (BMPs) are in place and working properly on a weekly basis.
- Awareness training for desert tortoise would be provided to everyone onsite and performed by qualified personnel only.
- Biologists would monitor the construction activities daily during the initial site disturbance (including installation of temporary and permanent desert tortoise exclusion fencing) and at weekly intervals after all tortoises have been removed from the site. Biologists shall be onsite daily to respond to tortoise issues. Exclusionary fencing would be checked monthly and after any substantial rain event to ensure that they are effective barriers for desert tortoise.
- Implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation within the project area from an outside source. Trucks and other large equipment would be randomly checked before entering the site for any invasive species debris or seed.
- A permanent perimeter of tortoise-exclusionary fencing will be constructed around the solar facility boundary. Pre-construction clearance surveys to remove tortoises from the construction area will be conducted following USFWS protocol (2010). Construction of the exclusionary fence will be monitored by a qualified biologist in order to eliminate impacts to tortoise burrows or live tortoises. The fence shall be maintained in accordance with Service standards. Tortoise guards shall be placed at all road access points, where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the road and solar facility.
- Biological monitors to monitor the various construction crews in the active construction areas will be assigned until 100-percent tortoise clearance is confirmed. Biological monitoring will also occur during access road improvements and gen-tie and water pipeline construction in occupied desert tortoise habitat.
- The project will pay a fee based on acreage of disturbance to the Tribe for disturbance of Tribal lands and to the BLM for disturbance of BLM lands. The fees will be assessed at a rate to be determined by the Tribe, BLM, and Service. The Tribe, BLM, and Service have agreed that the funds will be used to implement conservation measures established in the Reservation-wide desert tortoise management and conservation plan prepared for the K Road Moapa Solar Project and approved by the Tribe, BIA, and Service.
- A biological monitor will be present during maintenance activities if occurring outside of the perimeter fence. Pre-maintenance clearance surveys followed by temporary exclusionary fencing may also be required in desert tortoise habitat if the maintenance action requires ground or vegetation disturbance.
- Speed limits within the project area will be restricted to less than 25 miles per hour (mph) during construction and operation. Speed limit signs will be posted along the access road. Lower speed limits may be imposed to protect tortoises if determined necessary

by the Service.

- Lighting will be focused in toward the solar facility and downward to avoid lighting habitats beyond the SPGF perimeter.
- Any trenches or excavations will be covered if left overnight or have escape ramps to allow wildlife to safely exit.
- A Raven Control Plan will be prepared for the project. This plan will prescribe the following measures to limit the impacts of common ravens and other avian scavengers on desert tortoise:
  - Monitoring for the presence of ravens and other potential human-subsidized predators of special status wildlife will be conducted.
  - BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.
  - If ravens are seen building nests, this nesting material will be removed prior to an egg being laid.
  - To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for wildlife. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.
- A Weed Management Plan, which must be approved by the BIA, BLM, and the Tribe will be implemented prior to the initiation of ground disturbing activities. Mitigation measures in the Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; re- establishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration.
- A designated field contact representative (FCR) will be assigned to the construction phase of the solar project components; additional FCRs will be assigned for the linear project components including the transmission line and water pipeline.
- Desert tortoises will be relocated to BLM-managed lands or Tribal lands following the Terms and Conditions of the Biological Opinion. Reporting of relocations and other information pertaining to desert tortoise will be completed per the Terms and Conditions in the Biological Opinion issued by the USFWS. Desert tortoise relocation is considered a take and requires an incidental take authorization from the Service.
- If a tortoise is injured as a direct or indirect result of project activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility.
- Tortoises within the solar facility footprint will be translocated to secure areas outside the fence on Tribal lands as approved by the USFWS. The disposition of displaced desert tortoises will be evaluated and reported on following the Terms and Conditions of the Biological Opinion.

- Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is encountered on the project site. Project activities may resume after an authorized desert tortoise biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.
- The Applicant and Tribe will coordinate to salvage and relocate cacti, yuccas, and shrubs on linear ROWs and plant them back on temporarily disturbed portions of the ROWs similar to the efforts undertaken on adjacent BLM lands. If the Tribe chooses to salvage plants from the solar facility, these plants may be held in a nursery or other temporary holding location until needed; no monitoring is required for these plants.
- All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible.
- The Applicant will develop a habitat restoration plan to be implemented for all temporary disturbances associated with construction of the project to be approved by the BIA, BLM (for disturbance of BLM land), Tribe, and the USFWS.

The Applicant would implement the following measures to help avoid or reduce impacts on the desert tortoise:

- SWPPP;
- SPCC Plan;
- Waste Management Plan;
- Weed Management Plan;
- Restoration Plan and Facility Decommissioning Plan;
- Environmental Clearance;
- Desert Tortoise Measures;
- Raven Control Plan;
- Worker Environmental Awareness Program.

In summary, adverse impacts on desert tortoises would occur with the implementation of the Proposed Project and activities associated with the O&M. Impacts to desert tortoise would include the removal of all desert tortoises from the SPGF and the long-term loss of suitable desert tortoise habitat due to the construction of exclusionary fencing. Only the solar site would be fenced for the duration of the operational life of the Project. All ROWs would be unfenced and allow for unrestricted movement of tortoises following construction. Therefore, impacts to movement corridors and habitat connectivity for the tortoise would be limited. Temporary impacts would be short-term and localized to the proposed transmission lines and water pipeline. These ROWs would not be permanently fenced but desert tortoises could be relocated from these corridors during construction and a temporary impact to vegetation and loss of burrows could result. In addition to the long-term loss of 951.1 acres of suitable desert tortoise habitat in the Dry Lake Valley that would result from the Proposed Project, relocated individuals would likely impact the fitness of resident desert tortoises that already occupied the translocation site. To minimize all potential impacts, the Applicant would be required to adhere to all terms and conditions outlined in a Project-specific Biological Opinion and to implement a USFWS-approved Translocation Plan.

4.8.4.1.1.2 CSP Project Alternative – AREVA Technology

Effects to desert tortoise resulting from implementation of the CSP Project using AREVA technology would be the same as those identified for the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.1.3 eSolar CSP Alternative

Effects to desert tortoise resulting from implementation of eSolar CSP Alternative would be the same as those identified for the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.1.4 Dry-Cooling Alternative

Effects to desert tortoise resulting from implementation of the Dry Cooling Alternative would also be the same as those identified for the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.1.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. This would result in approximately 14.4 fewer acres of tortoise habitat disturbance. While this would result in slightly decreased impacts than the Proposed Project, the impacts to desert tortoise would be similar.

4.8.4.1.1.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to desert tortoises.

4.8.4.1.2 Moapa Dace

4.8.4.1.2.1 Proposed Project

The Moapa dace is only known to occur in the Muddy River and several associated headwater springs in the Warm Springs area. Those springs represent the primary water source for the Muddy River to which the Moapa dace is endemic. The Proposed Project would include the withdrawal of up to 50 AF during construction and 30 AFY during operation from a well approximately 12-miles north of the project. Groundwater withdrawals represent the only potential effect to Moapa dace from the Proposed Project.

The entire flow of the Muddy River is derived from the discharge from the regional carbonate aquifer, except during infrequent precipitation events that increase River flows for up to a few days. Historic flow records indicate that about 51 cubic feet per second (cfs) of groundwater discharge sustain the spring and river flows. Currently, consumptive uses related to (1) natural evapotranspiration, (2) surface-water diversions, and (3) groundwater diversions reduce the Muddy River flows to about 25,000 AFY (35 cfs) at the Warm Springs Road gaging station, located about 3 kilometers (km) downstream of the spring area. Thus, about 32% (12,000 AFY) of the regional flux to the area is consumptively removed from the system above the gage. Of this, about 3,600 AFY (~25 percent) is estimated to be lost by evapotranspiration from the well-vegetated areas of the headwater channels and springs, and the rest is removed through pipelines by Moapa Valley Water District (MVWD) and Nevada Power Company (NPC) for use elsewhere.

The Moapa dace would not be directly affected by the construction or operation and maintenance of the proposed project. However, groundwater withdrawals associated with the proposed project would indirectly affect the Moapa dace. The proposed PV Project would use approximately 50 AFY during construction and 30 AFY that would be withdrawn from the well field on the Reservation. This level of groundwater use would contribute to ongoing adverse effects to Moapa dace as was analyzed in the 2006 programmatic biological opinion (PBO) as described in more detail in the following section. The potential impacts for the Proposed Project would be only about 4 percent of that described for the wet-cooled CSP alternatives described below (30 AFY versus up to 800 AFY).

4.8.4.1.2.2 CSP Project Alternative – AREVA Technology

Several groundwater models have been created to predict the range of potential impacts resulting from the withdrawal of up to approximately 800 AFY associated with the CSP Project. Potential impacts resulting from the withdrawal of up to approximately 800 AFY associated with the CSP Project is summarized in the analysis summarized in Section 4.5 and described in detail in **Appendix F**.

Several regional groundwater scenarios may be possible based on current uncertainty about connectivity between portions of the modeled area and the role of adjacent areas on the edges of the modeled area. The various models were used to predict the various potential scenarios that could arise given these uncertainties. The models used 2001 flows as the model baseline (40.5 cfs).

Estimates of flow reduction ranged from a 0.16% reduction in 10 years (0.22 percent reduction in 75 years) to a 0.96 percent reduction in 10 years (1.94 percent reduction in 75 years). Experimental and observation evidence suggest that the model predicting the lowest impacts is likely the most plausible. Thus, for the purposes of this analysis the values of 0.16 percent in 10 years and 0.22 percent in 75 years were used. These reductions would result in flows in the Muddy River of 40.44 cfs in 10 years (40.41 cfs in 75 years), compared to the baseline flow of 40.5 cfs in 2001.

On July 14, 2005 a Memorandum of Agreement (MOA) was signed by the Southern Nevada Water Authority (SNWA), Meadow Valley Wash Water District (MVWWD), Coyote Springs Investment (CSI), the Tribe and the USFWS regarding the withdrawal of 16,100 AFY from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins that included conservation measures for the Moapa dace. The MOA outlined specific conservation actions that each party would complete in order to minimize potential impacts to the Moapa dace should water levels decline in the Muddy River system as a result of the cumulative withdrawal of 16,100 AFY of groundwater from the two basins. On January 20, 2006 the USFWS concluded intra-service consultation and issued a PBO entitled the *Intra-Service Programmatic Biological Opinion for the Proposed Muddy River Memorandum of Agreement Regarding the Groundwater Withdrawal of 16,100 Acre-Feet per Year from the Regional Carbonate Aquifer in Coyote Spring Valley and California Wash Basins, and Establish Conservation Measures for the Moapa Dace, Clark County, Nevada* (Programmatic Biological Opinion; PBO). The MOA and PBO include the following conservation measures:

- Implement restoration of Moapa dace habitat on the Service's Apcar Unit of the Moapa Valley National Wildlife Refuge (MVNWR);
- Develop a Recovery Implementation Program (Recovery Program), which would be used to effectuate the goals of the MOA by implementing measures necessary to accomplish the protection and promote the recovery of the Moapa dace, as well as outline the development of regional water facilities and include additional parties as appropriate. The Recovery Program would be developed for the purposes of continuing to identify the key conservation actions that, when implemented, would continue to contribute to off-set any pumping impacts that may result from groundwater pumping;
- Assist in developing an ecological study designed specifically to determine effects of groundwater pumping on the Moapa dace and other aquatic dependent species in the Muddy River system;
- Construct fish barriers in order to prevent additional non-native fishes from migrating into Moapa dace habitat;

- Eradicate non-native fish, such as tilapia from the historic range of Moapa dace;
- Restore Moapa dace habitat outside the boundary of the MVNWR;
- Provide the use of the Tribal greenhouse to cultivate native plants for restoration actions in the Muddy River area;
- Provide access to Tribal lands for the construction and maintenance of at least one fish barrier;
- Dedication of an existing 1.0 cfs Jones Spring water right (MVWD) towards establishing and maintaining in-stream flows in the Apcar tributary system that empties into the Muddy River, and
- Dedication of 460 AFY of water rights (portion of CSI appropriated water rights) to the survival and recovery of the Moapa dace, in perpetuity. In addition, minimum in-stream flow levels were also established in the MOA that trigger various conservation actions should those predetermined levels be reached.

The flow levels would be measured at the Warm Springs West Flume located on MVNWR. These automatic actions are identified in the MOA and are summarized below:

- Should the water flows reach 3.2 cfs, the signatories would meet to discuss the issue and compare/evaluate hydrology data;
- Should the water flows reach 3.0 cfs, during the pendency of the pump test, the Arrow Canyon well would shut down and SNWA would provide the MVWD with the sufficient water quantity necessary to meet their municipal demands. In addition, SNWA and CSI would take necessary actions to geographically redistribute groundwater pumping in Coyote Springs Valley if flows levels continue to decline;
- Should the water flows reach 3.0 cfs or less but greater than 2.9 cfs, SNWA and CSI would restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 8,050 AFY;
- Should the water flows reach 2.9 cfs or less but greater than 2.8 cfs, SNWA and CSI would restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 6,000 AFY, and the Tribe would restrict their pumping (under permit number 54075) in the California Wash basin to 2,000 AFY;
- Should the water flows reach 2.8 cfs or less but greater than 2.7 cfs, SNWA and CSI would restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 4,000 AFY, and the Tribe would restrict their pumping (under permit number 54075) in the California Wash basin to 1,700 AFY;
- Should the water flows reach 2.7 cfs or less, SNWA and CSI would restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 724 AFY, and the Tribe would restrict their pumping (under permit number 54075) in the California Wash basin to 1,250 AFY.

The PBO indicated that the adverse effects associated with the withdrawal of 16,100 AFY of groundwater would not result in “jeopardy” for the Moapa dace. The USFWS estimated that the incidental take of Moapa dace at the programmatic level would be a 22-percent loss in riffle habitat and a 16-percent loss in pool habitat. Current monitoring data indicate that the instream flow at the Warm Springs West Flume is 3.4 cfs, which represents a 0.2 cfs reduction in flows since pumping began. As such, no instream flow trigger points have been reached.

The Moapa dace would not be directly affected by the construction or operation and maintenance of the proposed project. However, groundwater withdrawals associated with the proposed project could indirectly affect the Moapa dace. The effects of these groundwater withdrawals were previously analyzed in the 2006 PBO which evaluated the cumulative effects associated with the withdrawal of up to 16,100 AFY from the carbonate aquifer in Coyote Spring Valley and California Wash basins. The Tribe is one of several parties that would withdraw water under this analysis. Up to 2,500 AFY of Tribal withdrawals were included in the total 16,100 AFY analyzed in the 2006 PBO. The 800 AFY of withdrawals proposed as part of this CSP wet-cooled alternative is included in the previously permitted 2,500 AFY of Tribal withdrawals included in the 2006 PBO analysis. The use of these 800 AFY would contribute to ongoing adverse effects to Moapa dace as was analyzed in the 2006 PBO to which the Biological Assessment for this Project tiers.

4.8.4.1.2.3 eSolar CSP Alternative

Effects to Moapa dace resulting from implementation of eSolar CSP Alternative would be the same as those identified for the CSP alternative using the AREVA technology. This alternative would use the same amount of water as the AREVA technology and would result in the same potential impacts to Muddy River flows.

4.8.4.1.2.4 Dry-Cooling Alternative

Effects to the Moapa dace resulting from implementation of the Dry Cooling Alternative would be similar to those identified for the Proposed Project. This alternative would use approximately 10 percent of the water as the wet-cooled CSP alternatives and approximately double the water projected for the Proposed Project.

4.8.4.1.2.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. This alternative would not affect the amount of water projected to be used by the Proposed Project.

4.8.4.1.1.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to Moapa dace.

4.8.4.1.3 Relict Leopard Frog, Yuma Clapper Rail, Southwestern Willow Flycatcher, Yellow-Billed Cuckoo

4.8.4.1.3.1 Impacts from the Proposed Action and Action Alternatives

Relict leopard frog, Yuma clapper rail, southwestern willow flycatcher, and yellow-billed cuckoo do not have habitats on the Proposed Project site or nearby areas but do have habitats downstream of the Project area. The groundwater hydrology analysis discussed in **Section 4.5** indicated that the proposed maximum withdrawal by the Project would be up to 800 AFY associated with the wet-cooled CSP alternatives and that this would not result in observable differences to spring flows in the Muddy River Springs Area. Therefore, because there would be no measurable effects to downstream habitats, there would be no impact to these species from the Proposed Project or action alternatives. Under the No Action Alternative, the Project would not be constructed so there would be no impact to these species.

4.8.4.1.4 Bats

4.8.4.1.4.1 Proposed Action

Twelve protected bat species have the potential to occur on the Proposed Project site: California leaf-nosed bat (*Macrotus californicus*), California myotis (*Myotis californicus*), Townsend's big-eared bat (*Plecotus townsendii*), western red bat (*Lasiurus blossevillii*), big free-tailed bat (*Nyctinomops macrotis*), fringed myotis (*Myotis thysanodes*), Allen's lappet-eared bat (*Idionycteris phyllotis),* spotted bat *(Euderma maculatum),* Western pipistrelle *(Pipistrellus hesperus*)*,* Brazilian free-tailed bat (*Tadaroda brasiliensis), pallid bat (Antrozous pallidus)* and cave myotis (*Myotis velifer*). These species are only expected to be present within the Proposed Project site during nocturnal foraging events. Artificial lighting and the presence of an evaporation pond could alter the foraging behavior of bat species. High levels of dissolved solids could be present and can affect bats that drink the water. The loss of the natural vegetation could decrease the prey availability (i.e., insects) within the Proposed Project area for nocturnally feeding bats. Additional light sources during the operation could result in a concentrated foraging location as the artificial lighting could attract insects.

Mitigation measures to minimize potential impact to bats include evaporation pond netting and the nighttime light reduction would be utilized to reduce potential impacts to protected bat species. These measures are outlined in Chapter 5. A draft Bird and Bat Conservation Strategy (BBCS) that provides detail of the measures that would be used to minimize impacts to bats and birds is included in **Appendix O**.

The Applicant has developed a draft Habitat Restoration and Revegetation Plan defining the procedures for the revegetation and rehabilitation of areas disturbed by the Proposed Project (**Appendix E**). The future removal of project infrastructure, the revegetation of disturbed areas, and the absence of a continual O&M presence would likely result in an increase of foraging habitat for bat species and a reduction in collision and ingestion hazards.

4.8.4.1.4.2 CSP Project Alternative – AREVA Technology

The types of impacts to bat species from the construction and O&M of the CSP Alternative using the AREVA technology would be similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project. The evaporation ponds associated with this wet-cooled CSP technology would cover a larger area so could result in slightly higher risk to bats. However, these potential impacts would be mitigated in the same manner described for the Proposed Project.

4.8.4.1.4.3 eSolar CSP Technology Alternative

The 250-foot tall central receiving towers associated with this Alternative would present an increased risk of collision for foraging bats around the Project site. However, bats are typically able to avoid stationary objects like the receiving towers. Other than this slightly increased risk of collision, the impacts to bat species from the construction and O&M of the eSolar Alternative would likely be the same as the CSP Project using AREVA technology.

4.8.4.1.4.4 Dry-Cooling Alternative

The Dry-Cooling Alternative for the CSP Project would use approximately 10 percent of the water as the wet-cooled CSP alternatives and approximately double the water projected for the Proposed Project. This water usage would require evaporation ponds approximately 90 percent smaller than the wet-cooled CSP alternatives but similar to those required for the Proposed Project. This would result in a similar risk of bats ingesting the evaporation pond water potentially containing harmful dissolved solids as the Proposed Action but a lower risk that the wet-cooled CSP alternatives.

4.8.4.1.4.5 Access Route Alternative

The impacts on bat species from the construction and O&M of the alternative access road would likely be the same as those for the Proposed Project.

4.8.4.1.4.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to bat species.

4.8.4.1.5 Wild Burros

4.8.4.1.5.1 Impacts from the Proposed Action and Action Alternatives

Wild burros are “feral” rather than “wild” animals but are nevertheless protected under the Wild Free-roaming Horses and Burros Act. Wild burros would be susceptible to visual and noise disturbance during construction activities and O&M, potentially resulting in behavior alteration to avoid the site.

Given the site’s proximity to and fragmentation by I-15, it is highly unlikely that wild burros would be encountered on the Proposed Project area so no impact on burros is expected from either the Proposed Project or action alternatives.

4.8.4.1.6 Avian Species Protected by the Migratory Bird Treaty Act (MBTA)

4.8.4.1.6.1 Proposed Action

Construction of the Proposed Project could cause adverse impacts on avian species, including nesting raptors and birds protected by the MBTA. Impacts on these bird species would typically result from activities that would cause nest abandonment or take of chicks or eggs in active nests, mortality of adults due to collision, or reduction of potential forage and nesting habitat. For most species, the Proposed Project impacts would be confined to areas immediately adjacent to and within the SPGF boundary, the access road, the pipeline route, and the gen-tie routes. For other species such as raptors, Project-related impacts would have the potential to extend up to ten miles or more beyond the Proposed Project area depending on the foraging requirements of the raptor species.

Active bird nests in shrubs or near the ground would be susceptible to being crushed during ground-disturbing activities. Noise and visual disturbance caused by construction and Project-related traffic, including construction at work sites and traffic along Proposed Project access roads would have the potential to cause nest abandonment or habitat avoidance by birds nesting. Nest abandonment would result in mortality to chicks and eggs. The construction of new electric transmission lines could potentially increase the risk of mortality of raptors and non-raptor species by collision.

Also, construction could cause birds to avoid suitable habitat and nest or forage in less suitable habitat. Such impacts would cause potential energetic costs to these birds and could indirectly contribute to stress and eventual mortality. Decreased foraging success could decrease the survivorship of chicks in nests near the Proposed Project area.

Although no individuals or active nests were observed, burrowing owls may be present on the Proposed Project site (Heritage 2013). Construction activity could cause nest abandonment or take of chicks or eggs in active nests, mortality of adults due to collision, or reduction of potential forage and nesting habitat.

While there are no peer-reviewed publications documenting fatality risks to birds associated with PV arrays, there is concern that PV panels may pose a collision risk to some groups of birds. Bird mortalities in PV solar fields have been documented over the past year and USFWS has developed a database of these mortalities in an effort to better understand the circumstances surrounding them. Avian species found at other facilities include primarily waterbirds, and passerines (Nicolai pers. comm.). Because quantitative risk models for PV arrays have not been developed, precise estimates of avian mortality as a result of collision with PV panels are not possible at this time.

A BBCS that provides detail of the measures that would be used to minimize impacts to avian species (as well as bats) is included in **Appendix O**. A draft Habitat Restoration and Revegetation Plan defining the procedures for the revegetation and rehabilitation of areas disturbed by the Proposed Project has also been developed (**Appendix E**). The future removal of project infrastructure, the revegetation of disturbed areas, and the absence of a continual O&M presence would likely result in an increase of foraging and nesting habitat for avian species and a reduction in collision and ingestion hazards over those present during operation of the Project. The Applicant has incorporated the following measures to avoid or minimize impacts on bird species:

- SWPPP;
- SPCC Plan;
- Waste Management Plan;
- Weed Management Plan;
- Restoration Plan and Facility Decommissioning Plan;
- Bird and Bat Conservation Strategy; and
- Environmental Clearance.

Adverse impacts on MBTA protected species and raptors would occur with the construction/decommissioning of the Proposed Project and the O&M. These impacts would be both short- and long-term and would be localized. To further avoid and reduce impacts, the following mitigation measures would be implemented:

- Preconstruction surveys;
- Biological monitors;

- All transmission towers and poles would be designed to be avian-safe according to APLIC (2006);
- Installation of flight diverters;
- Perch deterrents;
- Survey for nests along transmission lines;
- Monitor for avian mortalities
- Lighting would be focused in toward the SPGF and downward to avoid lighting habitats beyond the Proposed Project site perimeter;
- Installation of netting over evaporation ponds;
- Proper disposal and storage of garbage;
- Closing of holes and spaces during construction to entrapment;
- Worker Environmental Awareness Program; and
- Scheduling site disturbing construction activities to avoid avian breeding and seasons to the extent practicable.

4.8.4.1.6.2 CSP Project Alternative – AREVA Technology

The types of impacts to avian species from the construction and O&M of the CSP Alternative using the AREVA technology would be similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project. The evaporation ponds associated with the wet-cooled CSP technology would cover a larger area so could result in slightly higher risk to avian species from the greater area of wastewater potentially being available to the birds. However, potential impacts would be mitigated in the same manner described in the BBCS for the Proposed Project, so the actual risk would be expected to be similar to the Proposed Project (**Appendix O**).

4.8.4.1.6.3 eSolar CSP Technology Alternative

The impacts on avian species from the construction and O&M of the eSolar CSP Technology Alternative would likely be slightly higher than that of the Proposed Project and the CSP Alternative using AREVA technology. The 250 foot tall central receiving towers present an increased risk of collision for foraging avian species and could provide additional perching resources to ravens and raptor species, which could result in increased foraging activity of these species within the Proposed Project site.

A pilot project built with similar technology (the Solar One/Solar Two facility) exhibited risk to birds (McCrary et al. 1986) with birds occasionally colliding with the heliostats and the towers. The risk of bird collision would exist for the eSolar CSP Alternative at this site but is anticipated to be lower than at Solar One/Solar Two. This is because the pilot project and its associated ponds were sited in an agricultural area with nearby surface water and relatively high bird abundance. The MSEC Project area is extremely arid with low bird abundance and diversity and very few year-round resident species.

Standby, maintenance, or test operations for CSP tower technologies require focusing mirrors on points away from the solar collecting tower. This can create 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 and by implementing measures to reduce the overall attractiveness of the area to birds.

Other impacts associated with this Alternative would be similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.6.4 Dry-Cooling Alternative

The Dry-Cooling Alternative for the CSP Project would use approximately 10 percent of the water as the wet-cooled CSP alternatives and approximately double the water projected for the Proposed Project. This water usage would require evaporation ponds approximately 90 percent smaller than the wet-cooled CSP alternatives but similar to those required for the Proposed Project. This would result in a similar risk of birds ingesting the evaporation pond water potentially containing harmful dissolved solids as the Proposed Action but a lower risk that the wet-cooled CSP alternatives.

Other impacts to avian species associated with this Alternative would be similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.6.5 Access Route Alternative

The impacts on avian species from the construction and O&M of the alternative access road would likely be the same as those for the Proposed Project.

4.8.4.1.6.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to avian species protected by the MBTA.

4.8.4.1.7 Avian Species Protected by the Bald and Golden Eagle Protection Act (BGEPA)

4.8.4.1.7.1 Proposed Action

There is the potential for golden eagles to use the Proposed Project area for foraging. These birds would be susceptible to visual and noise disturbance as described above, potentially resulting in alteration of foraging behaviors. Golden eagles are protected by the BGEPA, which includes the September 11, 2009 Eagle Rule (Rule) 50 CFR parts 13 and 22. The construction and O&M of the Proposed Project is not expected to result in take. The Proposed Project would impact suitable foraging habitat but the 960 acres of this habitat that would be lost is very small (0.04 percent assuming 10-mile foraging area) in comparison to available habitat within Dry Lake Valley.

The Proposed Project does not contain any nesting habitat for golden eagles and a review of golden eagle occurrences compiled by NDOW does not identify any sightings of golden eagles; however, remnant nests (their status is unknown) occur north and west of the Proposed Project, approximately 4.4 to 6.6 miles distant (NDOW 2013). Due to the distance between the Proposed Project and suitable nesting habitat, the Proposed Project is not expected to directly impact nesting golden eagles.

Golden eagles would be susceptible to injury and/or mortality from collision or electrocution associated with the gen-tie lines that are part of the Proposed Project - 1.5 miles of new 500-kV line and approximately 7.0 miles of 230-kV line. These new lines would represent a small percentage of the existing transmission lines in Dry Lake Valley and specifically in the vicinity of the BLM-managed utility corridor where additional transmission for the Proposed Project would be built. These lines would be developed in compliance with the *Suggested Practices for Raptor Protection on Power Lines: The State of the Art* in 2006 (APLIC 2006) and *Reducing Avian Collisions with Power Lines* by the USFWS and the APLIC (APLIC 2012) to minimize risks to raptor species including the golden eagle.

A draft BBCS that provides detail of the measures that would be used to minimize impacts to avian species (including golden eagles) is included in **Appendix O**. The implementation of the proposed Habitat Restoration and Revegetation Plan outlined in **Appendix E** upon the decommissioning of the Proposed Project would likely result in restoration of foraging habitat for golden eagles.

The Applicant has incorporated the following measures to avoid or minimize impacts:

- SWPPP;
- SPCC Plan;
- Waste Management Plan;
- Weed Management Plan;
- Restoration Plan and Facility Decommissioning Plan;
- Bird and Bat Conservation Strategy; and
- Environmental Clearance.

Adverse impacts on BGEPA protected species would occur with the implementation of the Proposed Project and the O&M. These impacts would be both short- and long-term and would be localized. To further avoid and reduce impacts, the following mitigation measures are being implemented:

- Preconstruction surveys;
- Biological monitors;
- All transmission towers and poles would be designed to be avian-safe according to APLIC (2006 and 2012);
- Installation of flight diverters;
- Perch deterrents;
- Survey for nesting along transmission lines;
- Lighting would be focused in toward the SPGF and downward to avoid lighting habitats beyond the Proposed Project site perimeter;
- Installation of netting over evaporation ponds;
- Proper disposal and storage of garbage;
- Closing of holes and spaces during construction to entrapment;
- Worker Environmental Awareness Program.

4.8.4.1.7.2 CSP Project Alternative – AREVA Technology

The impacts on golden eagles from the construction and O&M of the CSP Project alternative using AREVA technology would be similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project. The evaporation ponds associated with the wet-cooled CSP technology would cover a larger area so could result in slightly higher risk to golden eagles from the greater area of wastewater potentially being available to the birds. However, potential impacts would be mitigated in the same manner described in the BBCS for the Proposed Project so actual risk would be expected to be similar to the Proposed Project (**Appendix O**).

Other impacts to golden eagles associated with this Alternative would be similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.7.3 eSolar CSP Technology Alternative

The impacts on golden eagles from the construction and O&M of the eSolar CSP Technology Alternative would likely be slightly higher than that of the AREVA CSP Alternative. The 250-foot-tall central receiving towers present an increased risk of collision for foraging golden eagles.

Standby, maintenance, or test operations for CSP tower technologies require focusing mirrors on points away from the solar collecting tower. This can create 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 and by implementing measures to reduce the overall attractiveness of the area to birds.

Other impacts associated with this Alternative would be similar to the AREVA CSP Alternative.

4.8.4.1.7.4 Dry-Cooling Alternative

The impacts on golden eagles from the construction and O&M of the alternative Dry-Cooling Alternative for CSP Project would be similar to the Proposed Project. This alternative would use approximately 10 percent of the water as the wet-cooled CSP alternatives and approximately double the water projected for the Proposed Project. This water usage would require evaporation ponds approximately 90 percent smaller than the wet-cooled CSP alternatives but similar to those required for the Proposed Project. This would result in a similar risk of eagles ingesting the evaporation pond water potentially containing harmful dissolved solids as the Proposed Action but a lower risk that the wet-cooled CSP alternatives.

Other impacts to golden eagles associated with this Alternative would be similar to the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.7.5 Access Route Alternative

The impacts on golden eagles from the construction and O&M of the alternative access road would likely be the same as those for the Proposed Project.

4.8.4.1.7.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to avian species protected by the BGEPA.

4.8.4.1.8 Gila Monsters

4.8.4.1.8.1 Proposed Action

The BLM has recognized the Gila monster as a sensitive species since 1978. Most recently, the Gila monster was designated as an Evaluation species under Clark County's Multiple Species Habitat Conservation Plan (MSHCP). Gila monsters could be harmed or killed during ground-disturbing activities and as a result of vehicle travel on access roads during construction and operation of the facility. Proposed Project activities could result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Individual Gila monsters could be injured or entombed in their burrows. Disruption of Gila monster behavior could occur due to noise or vibration from the heavy equipment during construction or operation of facilities. Gila monsters could be harmed by inadvertent hazardous materials spills, including equipment fuel and hydraulic fluid leaks.

The implementation of the proposed Habitat Restoration and Revegetation Plan (**Appendix E**) upon the decommissioning of the Proposed Project would likely result in an increase of foraging habitat for Gila monsters.

The Applicant would implement the following measures to help avoid or reduce impacts on the Gila monster:

- SWPPP;
- SPCC Plan;
- Waste Management Plan;
- Weed Management Plan;
- Restoration Plan and Facility Decommissioning Plan;
- Environmental Clearance;
- Raven Control Plan;
- Worker Environmental Awareness Program;
- Pre-construction clearance surveys (in conjunction with desert tortoise surveys);
- Relocation, documentation and agency notification of Gila monsters found in harm's way.

Any observations of Gila monsters during field surveys would be reported according to NDOW's updated reporting protocol (NDOW 2012).

4.8.4.1.8.2 CSP Project Alternative – AREVA Technology

Effects to Gila monsters resulting from implementation of CSP Alternative using the AREVA technology would be the same as those identified for the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.8.3 eSolar CSP Alternative

Effects to Gila monsters resulting from implementation of eSolar CSP Alternative would be the same as those identified for the Proposed Project. The same site and ROWs would be disturbed and developed and the same BMPs would be employed as mitigation as for the Proposed Project.

4.8.4.1.8.4 Dry-Cooling Alternative

Effects to Gila Monsters resulting from implementation of the Dry Cooling Alternative would also be the same as those identified for the Proposed Project. The same 850-acre site footprint and ROWs would be developed and the same BMPs would be employed as mitigation.

4.8.4.1.8.5 Access Route Alternative

The Alternative Access Route would be approximately 0.1 mile less in length and would utilize approximately 1 mile more of existing roads than the Proposed Route. While this would result in slightly decreased impacts than the Proposed Project, the impacts to Gila monsters would be similar.

4.8.4.1.8.6 No Action Alternative

Under the No Action Alternative, the Project would not be constructed so there would be no effects to Gila monsters.

4.8.4.2 Residual Effects – Special Status Species

Construction and operation of the Proposed Project would result in residual effects to special status species similar to those described in the previous wildlife section. The construction of the perimeter fence would severely reduce access to resources within the fenced portions of the Proposed Project. The loss of access would not be mitigated by any of the recommended mitigation measures and would continue to affect special status species throughout the lifetime of the Proposed Project. This loss of habitat would cause affected special status species to rely more heavily on habitat within the surrounding area, increasing the pressure on these resources.

Relocation of desert tortoises could result in detectable residual effects. Even with the Applicant successfully implementing the recommended mitigation measures, the relocation process would still have the potential to adversely impact both the tortoises being relocated and those existing tortoises occupying the relocation area. Detailed information on proposed numbers and allowable take of desert tortoise would be detailed in the Biological Opinion (not yet available, pending completion of Section 7 Consultation).

4.9 Cultural Resources

As outlined in Chapter 3, historic, cultural and religious properties and archaeological resources are documented in the area surrounding the Proposed Project. Archaeological artifact scatters and features that have been previously reported in the Proposed Project have been recommended not eligible for the NRHP and do not qualify as historic properties. In addition, there are no historic standing buildings or significant religious properties identified in the Proposed Project area. Historic properties present in the Proposed Project area are historic linear transportation corridors and some associated artifact scatters and features. Although not in the Project area, the Congressionally-designated Old Spanish National Historic Trail lies east of I-15 in vicinity of the Proposed Project and crosses to the west side of I-15 approximately 9.5 miles east-northeast of the Proposed Project (See **Figure 3-12**).

4.9.1 Indicators

The Proposed Project would affect a historic property or a religious or traditional cultural resource if it would:

- Directly or indirectly displace or destroy important cultural artifacts, features, sites, buildings or structures that contribute to the eligibility of a historic property;
- Alter aspects of the character of cultural artifacts, features, sites, buildings, or structures that make a historic property significant;
- Alter important aspects of the historic setting or feeling of the period of significance of a historic property; or
- Alter the sacred or traditional character of a religious or traditional cultural resource, or impede access to or use of that site.

4.9.2 Direct and Indirect Effects by Alternatives

A Class I overview of the Proposed Project and adjacent areas was conducted and a Class III intensive pedestrian survey of all portions of the Area of Potential Effect (APE) of the Proposed Project was conducted in January 2013. The cultural resources inventory documented only four cultural resource sites and 22 isolated artifacts within the 1,850-acre APE. Two of the four sites have been evaluated as eligible for listing on the NRHP.

The four archaeological sites (26CK3848, 26CK6115, 26CK6528 and 26CK9851) are described in **Table 4-12** below. Three of the sites are historic in age, consisting of two wagon roads, and a sparse can scatter. The fourth site is a site of indeterminate age or association. Three of the sites have been previously recorded with previous NRHP recommendations (26CK3848, 6115, and 6528) and one site (26CK9851) is newly documented.

Table 4-12
Archaeological Sites in the Project Area and NRHP Recommendations

Site Number	Site Type	Condition	NRHP Recommendation
26CK3848	Mormon Wagon Road	Fair	Eligible No Adverse Effect Non-contributing Element
26CK6115	Historic wagon road, Mormon Wagon Road Alternative access alignment	Good	Eligible No Adverse Effect
26CK6528	Two rock rings with a possible trail.	Poor	Not Eligible
26CK9851	Historic tin can scatter	Poor	Not Eligible

Site 26CK3848 (the Old Spanish Trail/Mormon Road) has been studied in detail in the vicinity of the project area and multiple previous researchers have recommended the section crossed by the proposed access road as potentially eligible but a non-contributing element to the overall site. The segment lacks integrity and is highly disturbed and would not be adversely affected.

The Congressionally-designated alignment of the Old Spanish National Historic Trail is located in the vicinity but outside of the Project area. A visual assessment was conducted from the Congressionally-designated Old Spanish National Trail to determine whether the viewshed from the Trail would be potentially affected by the presence of the Proposed Project. Visual simulations were developed from two locations on/near the Trail and they are discussed in more detail in the visual resources section (Section 4.13).

Site 26CK6528 consists of two small rock rings and a possible trail with no associated artifacts and has been previously determined to be not eligible for the National Register with SHPO's concurrence.

Site 26CK9851 consists of redeposited historic material representing a mixture of time periods. The site is located down drainage from the Dry Lake Siding on the SP, LA & SL railroad, as well as in vicinity of the Arrowhead Highway and the Mormon Wagon Road. Because artifacts do not appear to be in their original context, their information potential is limited beyond what has already been recorded. Furthermore, the artifacts also cannot be associated with a specific event in history, nor can they be associated with a specific person. Therefore, it was recommended that site 26CK9851 is not eligible for the NRHP under any criteria and has been submitted to SHPO for concurrence.

The Proposed Project would not be expected to impact any significant or potentially eligible cultural resources. In addition, any unanticipated discoveries of cultural resources would be managed in accordance with an Unanticipated Discoveries Plan that would be developed in consultation with the BIA and BLM. Should any unrecorded cultural resources be discovered during construction, all activities within the immediate area of discovery would cease. The Chairman of the Moapa Tribal Council and the BIA Regional Archeologist shall be notified immediately and, consulting with BLM and SHPO as appropriate, they would make arrangements to assess the nature of discovered cultural resources and mitigate any damages to any unanticipated discoveries before construction would resume in the immediate vicinity of the find/discovery.

4.9.2.1 Action Alternatives

Potential impacts to cultural resources that would result from the construction, operation, and decommissioning of the three Action Alternatives would be generally the same as those identified for the Proposed Project. Project solar components would be located within the same

850-acre footprint and the same ROWs would be utilized except for a section of the alternative access road.

Site 26CK6115 (wagon road) occurs along the alternative access road alignment and has been recorded several times (White 2001 and Estes 2007). It was thought to represent a short-term route used to supply the railroad during construction which was not eligible for nomination to the NRHP. Evidence is present to suggest that this site is actually an alignment or variant of the Mormon Wagon Road (26CK3848), and requires that the eligibility of the site be revisited. The results of this eligibility determination and SHPO concurrence be finalized prior to the issuance of the Project's decision record. However, while this site is near the alternative access road route, it is outside the existing road footprint and the development of the access road alternative would result in no adverse effect to the resource.

The construction process associated with development of the action alternatives would be similar to the Proposed Action and the same mitigation would be applied.

4.9.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Project would not be developed and there would not be a direct or indirect change in terms of known effects to historic properties or cultural or religious resources.

4.9.3 Residual Effects

Direct effects to cultural resources are permanent and irreversible. Any direct effect to a historic property that cannot be avoided, including mitigation, would be a residual effect. No indirect effects to the historic setting or feeling of a historic property such as visual intrusion on the National Historic Trail would occur as the Project would not be visible from the trail as described in Section 4.13.

4.10 Socioeconomic Conditions

This section discusses effects on social and economic resources that may occur with implementation of the Proposed Project or alternatives. The additional jobs created by the Proposed Project would be a benefit to the Tribe and community. In addition to employment benefits, there would also be benefits to Reservation-area businesses from the demand for a wide range of supplies and services generated by the Project. The Tribe currently has relationships with local businesses, which would continue if the Proposed Project is built and operated.

4.10.1 Indicators

There are no specific Federal thresholds of significance for socioeconomic impact assessment. Significance varies based on the setting of the 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 that may yield 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 EIS, the Proposed Project would affect social and economic conditions if it would:

- Result in a permanent or temporary population increase larger than local services, infrastructure, or population can accommodate; or result in a tax burden to local residents not offset by the Proposed Project's generation of revenues.

4.10.2 Direct and Indirect Effects by Alternatives

This section describes effects under each alternative following the requirements described under NEPA. During the construction phase, the increased spending on wages, materials, and services should have beneficial direct and indirect effects on local businesses. These indirect impacts are anticipated to continue during the operational phase of the Proposed Project but at a lower rate because the facility workforce, payroll, expenditures on materials and services, and taxes would be at a lower level than construction. The Proposed Project should not result in any long-term change in the population size, number of housing units, transportation, or demand for services in the Moapa area but employment level and income would increase a small amount from the 20 members of the operational workforce.

4.10.2.1 Proposed Project

The socioeconomic impacts associated with the Proposed Project are discussed below under each resource section. Due to the similarities of the Action Alternatives and the associated socioeconomic issues, the beneficial or detrimental impacts would be similar to the Proposed Project.

4.10.2.1.1 Social

The Project is not expected to have potential effects on the social well-being of groups representing the concerns of area stakeholders. Potential social effects described in terms of effects to social well-being relate to how a particular social group, individual, or stakeholder interprets how the Proposed Project or any of the Action Alternatives may affect their environment and how such an effect relates to the integrity, quality, use, and enjoyment of socioeconomic resources. The Project would not affect historically used open spaces and quality habitat supporting recreation and wildlife appreciation and other resources necessary to maintain the historic quality of life that influences the social well- being of stakeholders. Social well-being can potentially be affected by each phase of the proposed Project (construction, O&M, and decommissioning). It is also not expected to affect the level of participation and perceived degree of control that stakeholders have over their environment, its resources, and the government institutions that have stewardship obligations to manage these resources in a sustainable manner.

4.10.2.1.2 Demographics and Social Trends Population

Construction. The construction phase is expected to have a short-term, negligible impact on the population of Clark County. During the peak construction, the workforce could reach 300 but the majority of workers would be expected to be local. This small temporary population influx could be accommodated by Clark County where infrastructure is designed for seasonal demands and fluctuations from global tourism. Therefore, the Project would not cause a temporary population increase that would necessitate additional local public services or investment in infrastructure capacities that could not be provided from existing resources.

Operations and Maintenance. The operational phase is expected to have no long-term, impact on the area's population level. When construction is completed and the Proposed Project or Action Alternatives are operational, 20 to 40 permanent staff would be required to operate and maintain the facility and provide plant security. Nearly all of these jobs would be expected to be filled by the local labor pool as total unemployment in Clark County as of June 2010 was 141,456 persons.

4.10.2.1.3 Housing

Construction. The construction phase is expected to have a small short-term beneficial impact on the Clark County permanent and temporary housing stock. The impact would not cause a temporary strain that would necessitate additional local public services or investment in public infrastructure capacities that could not be provided from existing resources. Clark County has a high vacancy rate for rental units, and a large hotel/motel room inventory. Therefore, sufficient temporary housing should be available within the Greater Las Vegas/Clark County area to accommodate non-local workers and their families/dependents during the duration of construction.

Operations and Maintenance. The operational phase would have a minimal long-term effect on the area's housing stock. The Proposed Project would permanently employ approximately 20 full-time workers that would be expected to be mostly from the region and permanent residents. Therefore, the housing impact would be negligible.

4.10.2.1.4 Economic Base Impacts: Employment, Earnings & Income

The construction phase would be beneficial to the local and regional economy. Construction spending would provide a short-term economic benefit within Clark County over the construction period. During operations, permanent direct employment, payroll, and O&M-related spending would provide a long-term positive recurring stimulus to the local Tribe and region's economy.

Economic impacts include both direct and indirect effects associated with the linked supply chain and spending from wages. Direct effects are direct expenditures from construction activity such as payroll spending and locally procured supplies and equipment to support the Project. As the direct spending is subsequently re-spent by employees, suppliers and vendors, indirect impacts would be created.

4.10.2.1.4.1 Employment

Construction. The construction phase is expected to have a short-term, beneficial impact on Clark County's and the Reservation's employment levels. The Clark County construction sector has been impacted by the recession and Project construction would provide a short-term boost to this sector since the majority of construction workers would be expected to be hired from the local region including the Tribe. Under the Tribal Employment Rights Ordinance (TERO) agreement between the Tribe and the Applicant, Tribal members would have first right of refusal for any job positions for which they are qualified. During peak construction activity, employment would reach approximately 300 workers. The construction phase is expected to last two years.

As mentioned above, it is likely that most of the workforce would be local and commute from the Clark County/Greater Las Vegas region. Therefore, most of their earnings would be recycled back into the Clark County regional economy through spending of disposable income. In addition, non-local workers would provide a temporary stimulus to the local economy as they spend per diem money on hotels, meals, and consumables but those who do not relocate to the area would be expected to spend most of their earnings outside of the region.

The construction jobs are expected to be relatively high-paying. These jobs are clean energy/renewable energy opportunities that are expected to grow at above-average rates and pay above-average wages. The Proposed Project would, therefore, help diversify the labor force of the Clark County and add capacity and valuable utility-scale solar installation experience to the local labor pool.

The direct spending from payroll and direct expenditures on locally-procured materials, equipment, and supplies would also create jobs.

Operations and Maintenance. During the operational phase, the Proposed Project is expected to employ approximately 20 full-time workers to operate and maintain the facility and to provide plant security.

4.10.2.1.4.2 Unemployment

The construction and operational phase of the Project is expected to have a short- and long-term, beneficial impact on Clark County's and the Reservation's unemployment levels. As mentioned above, Tribal members would have first right of refusal for any job positions for which they are qualified. As a result of this agreement, unemployment levels within the Reservation could decrease in the short and long term.

4.10.2.1.4.3 Earnings / Income

The Proposed Project and the Action Alternatives are expected to have a positive effect on employee earnings and personal income in Clark County and the Moapa area. Construction is expected to have a positive, short-term impact on Tribal and regional income and the economy of Clark County. The O&M phase is expected to have a long-term, beneficial impact to the Tribal and regional economy and area personal income. **Table 4-13** shows the estimated annual incomes of the O&M staff.

4.10.2.1.4 Tourism and Traffic

Given the remote, sparsely-populated area where construction would take place and the presence of other nearby power plants and electrical infrastructure, it is unlikely that tourism would be negatively impacted by construction or operational activity. There is a sufficiently large stock of available housing and motel/hotel room inventory (an oversupply) in the region that can accommodate both tourists and additional non-local workers who require temporary lodging. Construction workers, truckers, and others would likely increase the number of visitors to the Tribe's Travel Plaza, resulting in a beneficial increase in retail sales and gaming. A smaller but beneficial increase in expenditures could result from purchases and gaming by permanent O&M staff.

Traffic congestion would be unlikely during the construction phase or operational phase of the Project.

Table 4-13
Operations Worker Matrix

Worker Title	Salary	Comments
General Manager	$ 120,000	Overall Manager of Operations (P&L accountability)
Plant/Performance Engineer, EHS	$ 75,000	Plant Engineer with EHS Responsibilities
Power/controls Engineer	$ 90,000	Responsible for electrical systems
Maintenance Supervisor	$ 75,000	Manager of all Maintenance personnel
General labor	$ 30,000	Daily dust control& grounds maintenance
Maintenance Technicians	$ 45,000	Preventive maintenance& repairs
Machinist	$ 60,000	Responsible for providing machining support
Instrument &Controls Lead	$ 65,000	Very skilled Supervisor, computer skills
Instrument & Controls Technicians	$ 50,000	Controls systems and collection systems wiring
General Administration	$ 30,000	Maintains building, water treatment &hydrogen plants
Security/Misc.	$ 30,000	Maintains building and grounds(possibly outsourced)

4.10.2.1.5 Public Revenues

Construction. During construction, the Proposed Project or any of the Action Alternatives would generate a short-term, positive, non-recurring contribution to Tribe and non-tribal public revenues. The Tribe would benefit from the sale of water during the construction phase. In addition, the Tribe could benefit from increased sales at the Tribal Plaza restaurant and store.

During the construction phase, the local workforce would earn payroll and pay taxes on employee compensation that would flow to Federal, state, and local jurisdictional treasuries. In addition, tax revenues for Clark County would also be generated from the direct and indirect construction expenditures on materials, equipment, and supplies.

Operations and Maintenance. Over the 30-year lease agreement of the Proposed Project or any of the Action Alternatives, the Proposed Project would generate an annual fee to the Tribe as specified in the lease agreement. This long term predictable revenue would be used by the

Tribe to expand social programs, economic development, resource protection or other purposes for the Tribe. Payments would also be made to the Tribe by the Applicant in lieu of taxes in accordance with the Tribal Tax Agreement. The Tribe would also benefit from sale of water during the operational phase.

In addition, the BLM would obtain revenues from the annual rents for ROWs associated with the gen-tie lines and access road.

In addition, the annual O&M expenditures on materials and supplies would generate tax revenues to the Clark County Nevada during the up to 30-year operating life of the SPGF. Operational payroll would also generate revenue to Federal, state, and local treasuries.

Decommissioning. At the end of the 30-year lease, if the Project does not continue to operate under a lease extension, the solar plant and associated infrastructure would be dismantled and the impacted areas would be reclaimed. The potential effects on socioeconomic resources from decommissioning would be similar to construction for the duration of the decommissioning period. These activities would also provide a short-term stimulus to the local economy. In addition, the land occupied by the Project would become available for other potential uses, including the historic, traditional desert uses of the property under tribal stewardship.

The Project would have a negligible impact on public revenues from construction through decommissioning.

4.10.2.1.6 Community Infrastructure Public Services and Utilities

The incremental demand on public services during construction, operations, and decommissioning is not anticipated to result in stresses placed on service capacities or infrastructure. The existing and projected public resources within Clark County and the Moapa area can accommodate the service demands generated by the Project.

Furthermore, the Project would not result in a noticeable population increase in Clark County. In addition, over the long-term life of the SPGF, the assets would generate annual lease fees that would be sufficient to offset any new demands on tribal resources arising during operations.

4.10.2.1.6.1 Water and Wastewater

Construction and Decommissioning. During the construction and decommissioning phases, water would be used for dust control and to supply water for other construction needs. During these phases, one or more storage tanks would be located on the Project site and utilized for temporary storage of water. The storage tanks would allow for water use during peak water-usage periods without adversely impacting other uses.

Wastewater generated would include sanitary waste and equipment wash down water. During construction, portable toilets would be used for sanitary wastewater. Other wastewater would be processed and disposed of in accordance with the applicable laws governing these effluents.

Operations and Maintenance. During operations, water would be needed for domestic use by approximately 20 on-site personnel. For the Proposed Project, water would also be needed panel washing. It is estimated that these requirements would amount to 30 AFY. Water would be supplied by a nearby Reservation well. A permanent, aboveground water tank would be located in the O&M area to provide storage for operational water needs and water for fire protection.

The wastewater generated from panel/mirror washing would be non-hazardous and would drip to the ground and either evaporate or infiltrate into the ground. The O&M building would also generate on-site domestic water and sanitary sewer waste that would be treated and disposed of through an approved septic tank and drain field system. Given the small number of permanent staff operating the facility, these wastewater loads would be small.

The Project would have a negligible impact on water and wastewater services from construction through decommissioning.

4.10.2.1.6.2 Fire and Emergency Medical Services

Construction and Decommissioning. During a large-scale construction project (and decommissioning), there is the potential for emergencies and accidents. This risk would be managed by the implementation of the Project's health and safety plan. Clark County also has resources near the Proposed Project and the Tribe has an agreement with Clark County Fire Department to provide fire protection and emergency medical response to the Reservation. The Fire Department currently has five fire stations that are manned by volunteer firefighters providing service to the area, including Station 72 in Moapa Town about 17 miles to the northeast.

The Proposed Project and the other Action Alternatives would include fire control features. A permanent, aboveground water tank would be located in the O&M area to provide storage for operational water needs and water for fire protection.

Operations and Maintenance. During the operational phase, the on-site fire protection water system would be supplied from the above-mentioned water storage tank located near the O&M building. In addition, resources from the local stations could also be mobilized in the event of an emergency.

The Project would have a negligible impact on fire and emergency services from construction through decommissioning.

4.10.2.1.6.3 Police

Construction and Decommissioning. The Proposed Project's built-in security features would help place minimal demands on County or tribal police resources. Security at the SPGF would be achieved by a combination of fencing, lighting, and security patrols. The Project would provide 24-hour security during SPGF construction.

Operations and Maintenance. During operations, the SPGF would be staffed 24 hours per day, seven days per week. The staff would include full-time security, and regular security patrols would be conducted throughout the site. Lighting would also be provided at the O&M building and the main plant access road entrance. In addition, a perimeter security system could also be installed if necessary.

The Project would have a negligible impact on police services from construction through decommissioning.

4.10.2.1.6.4 Hospitals

Construction. It is possible that accidents requiring ambulance services and hospital treatment may occur during the construction phase. To minimize this possibility, the Applicant would require all construction contractors to operate under an approved health and safety program that meets industry standards. The closest hospital is UMC North Vista Hospital located at 1409 E. Lake Mead Blvd., North Las Vegas, NV 89030 approximately 20 miles south. There is also a small medical facility located at the Reservation.

Operations and Maintenance. It is possible that accidents could occur during Proposed Project operations. Given the small number of permanent staff manning the facility and the safety plan and protocols to be followed, the probability of occurrence of any accidents and their annual frequency is low. The regional hospitals and emergency medical service facilities are expected to be able to accommodate any medical needs with their current levels of staffing.

The Project would have a negligible impact on medical services from construction through decommissioning.

4.10.2.1.6.5 Public Schools

Construction and Decommissioning. The construction phase is expected to last two years. During that time, it is possible that some of non-local workers may relocate to the area with school-aged children. Clark County School District provides public education services to the County. Northeast Clark County is served by two high schools, two middle schools, and three elementary schools. Ute Perkins Elementary School is located in Moapa Town. All have class sizes and student teacher ratios that are below the school district averages for the South region suggesting that additional students could be accommodated by the existing school system.

Operations and Maintenance. The operation of the SPGF would not be expected to have any noticeable effect on public school services because the addition any children associated with the 20 to 40 permanent workers is accommodated by the existing school system.

4.10.2.1.6.6 Solid Waste

Construction and Decommissioning. Construction and decommissioning would generate nonhazardous solid waste, some nonhazardous liquid waste, and hazardous waste (solid and liquid). All of the hazardous wastes would be generated at the construction site.

The generated solid wastes could be easily accommodated by existing regional public facilities including waste management processing and recycling centers. Wastes would be recycled as feasible and non-recyclables would be disposed of at a permitted landfill. The waste would likely go to the APEX Regional Waste Management Center located at 13550 N. US Highway 93. The Applicant would prepare a Waste Management Plan describing the storage, transportation, and handling of wastes; recycling, and the identification the specific landfills that would receive wastes that cannot be recycled. Hazardous wastes would be managed in accordance with RCRA 42 United States Code (U.S.C.) 6901, et seq., RCRA's implementing regulations at 40 CFR 260, et seq., and other applicable state and local regulations.

Operations and Maintenance. During operations, the facility would generate small amounts solid wastes that could be handled easily by the existing capacities of local waste management facilities, transfer stations, and area landfills.

The Project would have a minor impact on solid waste management from construction through decommissioning.

4.10.2.2 CSP Project Alternative – AREVA Technology

Socioeconomic effects resulting from implementation of the CSP Technology Alternative using AREVA technology would be generally similar to those identified for the Proposed Project. This alternative would be located within the same site footprint and would utilize the same ROWs.

However, the construction timeframe would be approximately 12 months longer than the Proposed Project. The operational timeframe would be similar to the Proposed Project but the operational workforce would be larger (approximately 40 workers).

The AREVA CSP project would utilize water for the thermal cooling cycle. Up to 800 AFY of water would be provided by the Tribe for this alternative.

4.10.2.3 eSolar CSP Technology Alternative

Socioeconomic effects resulting from implementation of the eSolar CSP Technology Alternative would be the same as those identified for the CSP Project using AREVA technology. This alternative would be located within the same site footprint, would use the same amount of water, and would utilize the same ROWs. The construction and operational workforce and timeframe would be similar to the AREVA CSP alternative.

4.10.2.4 Dry-Cooling Alternative

Socioeconomic effects resulting from implementation of the Dry Cooling Alternative would also be the same as those identified for the wet-cooled CSP alternatives. This alternative would be located within the same 850-acre site footprint and would utilize the same ROWs. It would use only about 10 percent of the water. The construction and operational workforce and timeframe would be similar to the Proposed Project.

4.10.2.5 Access Route Alternative

The Alternative Access Route would result in similar socioeconomic effects as the Proposed Project.

4.10.2.6 No Action Alternative

Under the No Action Alternative, the Proposed Project and Alternatives would not be developed and no socioeconomic impacts (detrimental or beneficial) would occur.

4.10.3 Residual Effects

During construction phases of the Proposed Project, there would be short-term and beneficial residual effects on the regional economy, personal income and employment levels, and tax revenues. During O&M phases, there would be long-term and beneficial residual effects on the same parameters Effects on social and economic conditions from decommissioning are also expected to be beneficial.

4.10.4 Environmental Justice Impacts

This section discusses effects on environmental justice that may occur with implementation of the Proposed Project or alternatives. Data used for the environmental justice analysis were obtained from the 2000 and 2010 Census and are presented in detail in the Environmental Justice Section in Chapter 3. The Moapa Reservation (CT 59.02) contains a Native American population that is considered a minority. As Native Americans, residents on the Reservation meet the criteria of a minority population so any project-related impacts would affect a minority population. However, the Proposed Project would result in positive impacts on this population.

4.10.4.1 Indicators

Consistent with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994), this environmental justice analysis identifies and addresses any disproportionately high and adverse human health or environmental effects of actions on minority and low-income populations. The CEQ (1997) has issued guidance to Federal agencies on the definition of disproportionately high and adverse effects as used in EO 12898, as follows:

- When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:
  - Whether the health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms;
  - Whether the risk or rate of hazard exposure to a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and
  - Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposure to environmental hazards.

When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

- Whether there is or would be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment;
- Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceed or are likely to appreciably exceed those on the general population or other appropriate comparison group; and
- Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

4.10.4.2 Direct and Indirect Effects by Alternative

This section discusses potential direct and indirect effects on environmental justice populations under each alternative. Analysis for this section was completed by assessing potential temporary (i.e., construction) and permanent impacts due to the implementation of each alternative and comparing these impacts to the census tracts, block groups, and blocks within and in the vicinity of the Proposed Project.

4.10.4.2.1 Proposed Project

The footprint of the proposed SPGF is fully contained within the Reservation boundaries and the proposed water pipeline is within both the Reservation and BLM utility corridor boundary. Portions of the gen-tie line that would connect to the Crystal substation, the line to the Harry Allen substation, and the access roads would be located on BLM lands. The Proposed Project would not disproportionately affect minority and/or low-income populations except for the beneficial impacts discussed below and no displacements or permanent changes in populations would occur. As discussed above, it is anticipated that the Proposed Project would have a positive effect on Tribal members and the non-Indian local population, by creating both temporary and long-term jobs.

4.10.4.2.2 CSP Project Alternative – AREVA Technology

This alternative is located within the same census tract, block group, and blocks as the Proposed Project, so the associated environmental justice impacts would be the same as those described for the Proposed Project.

4.10.4.2.3 eSolar CSP Technology Alternative

This alternative is located within the same census tract, block group, and blocks as the Proposed Project, so the associated environmental justice impacts would be the same as those described for the Proposed Project.

4.10.4.2.4 Dry-Cooling Alternative

This alternative is located within the same census tract, block group, and blocks as the Proposed Project, so the associated environmental justice impacts would be the same as those described for the Proposed Project.

4.10.4.2.5 Access Route Alternative

The environmental justice impacts resulting from the access route alternative would also be the same as those described for the Proposed Action.

4.10.4.2.6 No Action Alternative

Under the No Action Alternative, the Proposed Project and the Action Alternatives would not be built. The land that would have been occupied by the Proposed Project would continue to be used in the manner designated by the Tribe. Under the No Action Alternative, there would be no temporary or permanent impacts and/or benefits (such as jobs or lease payments) to any potential minority, low-income, or Native American communities either within or in the vicinity of the study area.

4.10.4.3 Residual Effects

The Proposed Project would have an effect on minority, Native American populations but the effects would be positive on this population by creating both temporary and long-term jobs. These beneficial impacts would the primary residual effect on this population.

4.10.5 Indian Trust Assets

The Proposed Project would impact the Reservation lands where the SPGF and associated ROWs are constructed. As described in previous sections, there is likely to be adverse impacts associated with grading or clearing activities as well as construction vehicles on roadways. Vegetation and wildlife on or near the Proposed Project would also be adversely impacted. Indian Trust Assets, such as fishing rights and minerals would not be impacted by the Proposed Project implementation. The Project's proposed use of tribal water would exercise the Tribe's water rights demonstrating their legitimate need for these water rights against any adverse claims by others in the future.

4.11 Resource Use Patterns

This section discusses effects on lands and realty that may occur by implementing the Proposed Project or alternatives.

4.11.1 Indicators

The Proposed Project would affect land use and realty if it would:

- Conflict with existing Federal, Tribal, state, or local land-use plans or policies;
- Conflict with existing BLM land-use authorizations; or
- Change public land disposition.

4.11.2 Direct and Indirect Effects by Alternatives

4.11.2.1 Proposed Project and Action Alternatives

The Proposed Project and the other Action Alternatives would be constructed mostly on Reservation land and ROWs for the gen-tie line to the Crystal Substation, the gen-tie to the Harry Allen Substation, and the access road located on BLM lands. The water pipeline and portions of the gen-tie lines would be located within a designated utility corridor managed by BLM on both Reservation and BLM lands. Below is a discussion of potential impacts to lands and realty as a result of the Proposed Project or the Action Alternatives.

4.11.2.1.1 Utilities

There would be no impacts to existing utilities as a result of the Proposed Project or any of the Action Alternatives. The proposed utility infrastructure associated with the Proposed Project is mostly located within the approximately 4,000-foot wide utility corridor managed by the BLM. In addition, these lines have been designed to parallel existing and future transmission line and pipeline ROWs to the extent possible but would be required to cross some of the existing lines in a few locations. Continued access to existing transmission lines and pipelines by their owners would be accommodated minimizing the effects on existing utilities.

The utility corridor is an area designated for the location of linear utilities on lands managed by the BLM. The corridor also includes lands on the Reservation where BLM grants ROWs for proposed utilities. The Proposed Project site is located in an area designated by the Tribe for economic development. The Proposed Project is north of the Dry Lake Solar Energy Zone (SEZ) - BLM lands slated for renewable (solar) development.

The Proposed Project and action alternatives would not result in impacts to any Federal, state, or local land-use plans or policies, existing BLM land use authorizations, public land disposition, or land tenure adjustments.

4.11.2.1.2 Airports

Perkins Field Airport in Overton, Nevada is the closest airport at approximately 20 miles northeast of the Proposed Project. The airport was constructed to support emergency landings from aircraft leaving Nellis Air Force Base (NAFB) and today is used mostly for local traffic. The airport averages about 100 flights per week. The next-nearest airport is Echo Bay Airport at over 25 miles away. The Proposed Project and the other Action Alternatives construction and operations would have no impact to airports or airport operations.

Impacts from implementation of the Proposed Project to military training operations conducted by NAFB are not expected. The Proposed Project site is located under the primary route used by military aircraft using the Nevada Test and Training Range (NTTR). The area is located within the navigational aid flight path for approaching aircraft and is north of a controlled bailout area.

The Proposed Project and proposed CSP alternatives are not expected to create hazards for pilots. The profile of the PV and AREVA CSP technologies are low to the ground (less than 100 feet). They do not create significant glare as PV panels are designed to absorb as much light as possible and the CSP technology focus reflected light onto receivers. Also, for the same reasons, neither technology would create thermal boundaries that would affect aircraft operations. More discussion of potential glare effects is included in the **Section 4.13** (visual resources).

The 250-foot towers associated with the eSolar CSP technology would require FAA notification but would not be tall enough to create flight hazards. The other solar technologies and the proposed gen-tie lines would not require FAA notification. The gen-ties would not be expected to create additional air navigation hazards because there are multiple existing transmission towers in the area.

If pilots eject over the Proposed Project site, potential damage to the solar field may occur depending on the altitude and direction of the aircraft during an emergency ejection. If ejected pilots land within the solar field, they would not be expected to be affected by the solar components as they would be protected by their flight suits and helmets with glare shields.

4.11.2.1.3 Hunting, Fishing and Gathering

No hunting, fishing or gathering has been reported or documented by the tribe in the vicinity of the Proposed Project. Therefore, there would be no impacts to this activity as result of the Proposed Project or the other Action Alternatives.

4.11.2.1.4 Grazing Allotments

There are no grazing allotments within the Reservation near the Proposed Project site. The Proposed Project's gen-tie and access road ROWs would cross the Dry Lake (Allotment Number 15416) and Roach Lake (Allotment Number 02007) grazing allotments managed by the BLM. These ROWs would not have significant impact to the grazing allotments because they would have minimal associated disturbance and would not preclude grazing if it were to occur. Also, this area is highly developed with multiple utility lines and access roads. It is unlikely that grazing would occur in this location given the industrial nature of the BLM lands within the utility corridor and surrounding the Harry Allen and Crystal substations.

4.11.2.1.5 Mining

There are no active mines or surface quarries within 5 miles of the Proposed Project. On Reservation land, the Tribe has no future plans for mining within the area. The Proposed Project and the Action Alternatives would not inhibit access to leasable, locatable, and salable energy and mineral resources on BLM lands. In addition, it is unlikely that such development would be proposed to occur on the BLM lands associated with this Project as they are within or adjacent to the designated utility corridor. Therefore, the Proposed Project and Action Alternatives would not impact mining of public resources or limit the potential for mining on public lands.

4.11.2.2 No Action Alternative

Under this alternative, the Proposed Project would not be developed and there would be no effect on land use and realty.

4.11.3 Transportation/Motorized Vehicle Impacts

This section discusses effects on transportation could may occur with implementation of the Proposed Project or alternatives.

4.11.3.1 Indicators

The Proposed Project would affect transportation levels if it would:

- Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system;
- Produce an exceedance, either individually or cumulatively, of a level of service (LOS) standard established by the local county congestion management agency;
- Degrade existing road conditions as a result of construction.

4.11.3.2 Direct and Indirect Effects by Alternative

Traffic effects could result from physical changes to roads, such as closures and re-routing, construction activity, introduction of construction or O&M-related traffic on local roads, or changes in daily or peak-hour traffic volumes created by Project traffic.

4.11.3.2.1 Proposed Project

The Proposed Project would result in effects to traffic volumes, effects to the LOS, and effects to access.

1. Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.

<u>Construction.</u> Construction of the Proposed Project would require activities and equipment movement on public roadways including I-15 and the frontage road west of the highway. Heavy

equipment would be transported to the site and would likely remain for the duration of construction.

Construction would result in a short-term increase in traffic volume. A maximum of up to 600 trips per day would occur from the construction workforce using the 300 maximum workers on-site during the height of construction activities and assuming no ride sharing (300 morning trips and 300 evening trips) and assuming they all drive separately. Also, up to 100 trips per day (50 trips to the site and 50 trips leaving the site) would occur as a result of delivery of construction equipment and materials to the site. Combined, these would result in an increase of 700 vehicle trips per day during construction.

Access to the Proposed Project would be provided via I-15 to the US Highway 93 exit (Exit 64). From this exit, traffic would proceed north on the frontage road west of I-15 (North Las Vegas Boulevard) for about 6.5 miles to an existing road on BLM lands. This existing road would be improved with a gravel surface for approximately 2.5 miles between the frontage road and the site. Effects to local traffic patterns are discussed by road type and at intersection level.

Interstate 15 - Workers and delivery drivers would use I-15 as the primary access route to the Proposed Project via US Highway 93 (Exit 64) and the frontage road. An increase in traffic volume would occur on I-15, The I-15/US Highway 93 interchange, and the frontage road. The maximum (worst-case scenario) of 700 additional vehicle trips per day (350 trips in each peak period) would not be expected to degrade the LOS on these roads as the LOS values at all of these locations are currently at acceptable conditions (LOS B or better).

2. Produce an exceedance, either individually or cumulatively, of a level of service (LOS) standard established by the local county congestion management agency

Local Arterial Roadways. After exiting I-15, vehicles would access the site using local arterial roadways, US Highway 93 and the frontage road on the west side of the highway. There is moderate traffic on US Highway 93 and very low traffic on the frontage road under the existing conditions (Chapter 3). There are no residences in the vicinity and traffic on the frontage road primarily accesses a few industrial facilities in the area. Local road conditions are currently acceptable (LOS ranging from A to B), and the addition of a maximum of 700 vehicle trips would also not likely result in a substantial effect on these roads. The Proposed Project would result in short-term effects on traffic volume and would not adversely affect traffic flow on local roadways during peak construction.

Intersections. There are three, two-way, stop-controlled intersections at the intersection of I-15, US Highway 93, and the frontage road. The addition of a maximum of 700 daily vehicle trips (350 per each peak period) should not degrade the LOS to an unacceptable level (LOS D, E, or F) but it is possible that there could be some queue build up at the intersection of US Highway 93 at and the frontage road, which would eventually dissipate without much delay as the traffic on US-Highway 93 is minimal. Projected delays are within the acceptable ranges for the AM peak hour, so no mitigation would be recommended. Mitigation is recommended for the PM peak hour as the southbound left turn from I-15 to US Highway 93 experiences increase delay that results in a LOS D. **Appendix P** contains a draft traffic management plan that outlines potential mitigation.

3. Degrade existing road conditions as a result of construction

Construction. The traffic generated by construction of the Proposed Project could impact the condition of public roads through increased use. Because the Proposed Project is in a relatively undeveloped area with little current road use and construction would occur over a short time period, it is anticipated that Proposed Project construction would not result in any measurable effects to access or road conditions.

Operation and Maintenance. O&M of the Proposed Project would increase local traffic volume up to 60 trips per day (for 20 staff, 5 visitors and 5 delivery trucks, including morning and evening trips). There would also be additional irregular increases in traffic volume due to scheduled and unscheduled maintenance. Additional traffic volume generated during O&M would be a long-term increase but would not decrease or disrupt existing primary access to public roads throughout the area, nor would it affect the LOS.

Decommissioning. Typical activities during decommissioning are similar to construction. Short-term increases in the use of local roadways would occur during the decommissioning period similar to but less than those identified for the construction period.

4.11.3.2.2 Action Alternatives

Under the three Action Alternatives, the traffic patterns would be similar to those described for the Proposed Project. The two CSP alternatives would generate construction traffic for approximately 12 months longer than Proposed Project and would generate twice the operational traffic (100 daily trips). This traffic would utilize the same roads as the Proposed Project. The alternative access road would use the same access point from the frontage road and portions of the same road corridor as the proposed access road. Therefore, the traffic effects from the action alternatives would be minor and similar to those identified under the Proposed Project and the same mitigation would be applicable.

4.11.3.2.3 No Action Alternative

Under this alternative, development of the Proposed Project would not occur and there would be no effect on transportation or motorized vehicle access.

4.11.3.3 Residual Effects

Under all action alternatives, there would be short-term and long-term increases in traffic volume that could not be eliminated completely through mitigation. Both short-term and long-term traffic increases would not be likely to affect the traffic patterns or LOS at any of the roadway segments in the area.

4.12 Special Management Areas

This section discusses effects of the Proposed Project on Special Management Areas (SMAs) that would result with implementation of the Proposed Project or alternatives.

4.12.1 Indicators

The Proposed Project would affect SMAs if it would:

- Restrict public access to SMAs or Wilderness Areas;
- Impact desert tortoise populations in nearby DWMAs;
- Cause changes in air quality or other air clarity evaluations that could occur within SMAs in the area due to construction and operation activities;
- Conflict with the visual resource management (VRM) classifications of SMAs in the area having VRM classifications; or
- Cause changes to the darkness of the night sky as viewed from SMAs in the area due to construction and operation activities.

4.12.2 Direct and Indirect Effects by Alternatives

This section describes effects under each alternative and defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.12.2.1 Proposed Project

The Proposed Project is located approximately 19 miles west of the Valley of Fire State Park, 16 miles southeast of the Moapa Valley National Wildlife Refuge, 11 miles west of the Muddy Mountains Wilderness Area and 14 miles south of the Arrow Canyon Wilderness Area.

1. Restrict public access to Special Management Areas or Wilderness Areas

The Proposed Project is located mostly on the Reservation which is not accessible to the general public. There are no roads associated with the Proposed Project that would provide new access to public lands. The Proposed Project would not restrict access by the public to SMAs or Wilderness Areas.

2. Impact desert tortoise populations in nearby DWMAs

Areas of Critical Environmental Concern (ACECs) are areas designated by BLM where special management attention is needed to protect and prevent irreparable damage to unique natural values, or to protect human life and safety from natural hazards (BLM 2009b). Natural values include, but are not limited to, historic, cultural, scenic, and wildlife resources.

The southern boundary of the 151,360-acre Mormon Mesa ACEC is located 12 miles northeast of the Proposed Project. The Coyote Springs ACEC is located 17 miles to the west, and the Gold Butte ACEC is located 20 miles to the east. All three of these ACECs were established specifically for the management of desert tortoise habitat and recovery of the desert tortoise (BLM 1998).

The Project would not impact these locations and any needed desert tortoise relocation would take place within the Reservation.

3. Cause changes in air quality, conflict with visual resources or change the darkness of the night sky with respect to SMAs

The nearest SMA or similar natural area is approximately 7 miles from the Proposed Project. During construction off-site dust pollution would be minimized and controlled through implementation of a dust control plan. The remote location of the site and intervening topography limits visual impact from any SMAs. The construction of the Proposed Project would mostly take place during daylight hours and operational lighting would be minimal and directed in a downward manner to avoid light pollution. Therefore, the Proposed Project is not expected to have impact on the night sky or views from any SMAs.

4.12.2.2 Action Alternatives

The three Action Alternatives would utilize the same solar site footprint as the Proposed Project and the same or similar ROWs on BLM land. Therefore, the Action Alternatives would result in similar impacts to SMAs as the Proposed Project.

4.12.2.3 No Action Alternative

Under this alternative, the Project would not be developed and there would be no effect on SMAs.

4.12.3 Residual Effects

There would be no residual effects to SMAs as a result of the Proposed Project or alternatives.

4.13 Visual Resources

This section discusses effects of the Proposed Project on visual impacts that would result from implementation of the Proposed Project or alternatives.

4.13.1 Indicators

This assessment considered the regional visual character of the Project area, visual features of the Proposed Project, views of the Proposed Project from important vantage points, and changes in these views that would result from Proposed Project implementation.

The Proposed Project would affect visual resources if it would:

- Substantially degrade the existing visual quality of the site and its surroundings or the magnitude of change from the existing scenic quality of the landscape would be substantial;
- Impact areas with considerable public concern for scenic quality such as: recreational areas, natural areas, wilderness areas, wilderness study areas, wild and scenic rivers, scenic areas, scenic trails, and ACECs;
- Impact views from the Old Spanish National Historic Trail;
- Substantially damage scenic resources, including, but not limited to the view from major roadways such as I-15 or Route 40; or
- Create a new source of substantial light or glare that would affect day or nighttime views in the area

Visual Simulations

A visual simulation was prepared for each KOP to depict the view of the Project from each location. In order to exhibit the potential worst-case visual impacts, simulations were prepared for both the PV technology and the eSolar CSP technology. With the 250-foot receiving towers associated with the eSolar technology, it would represent the potentially most visible development that could occur on the Project site.

To produce the simulations, a three-dimensional (3-D) model was developed for each of the solar technologies and the gen-tie lines which were then superimposed on the DEM of the topography of the area. Each KOP was incorporated into the DEM to verify scale and viewpoint location and model renderings were combined with the high-resolution digital photographs.

As shown in the viewshed analysis and associated figures in Chapter 3, the Project could be visible from I-15 from the south and southeast. Potential views of the Project to southbound travelers north of the site would be blocked by intervening topography. The view available to northbound travelers on I-15 would be limited to very short durations (generally less than 1-2 minutes) because of the highway speeds at which the viewer is traveling and because the Project would be screened from view intermittently by guardrails or mounds associated with I-15 that would block the view to the west. This would vary by the lane the vehicle is traveling in and the local topography along the roadway. Visibility could be greater from the passing lane for north-bound travelers, as the guardrails would not screen views from vehicles.

Figures 4-2 through **4-6** show the visual simulations for the Proposed Project from KOPs 1 through 5.

Visual Contrast Rating

The BLM 's Visual Resource Contrast Rating (Handbook H 8431) process was used to evaluate the visual contrast created by the Proposed Project and the various alternatives with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the proposed activities. This assessment process was conducted for each KOP to document the comparison of the existing landscape with the way the landscape would appear following construction of a Proposed Project.

As discussed in Chapter 3, nearly all of the lands where the Proposed Project would be located are classified as Class IV under the BLM VRM system. These lands include areas within and near the designated utility corridor and where there is existing utility infrastructure (transmission lines, substations, power plants). The SPGF (on Reservation lands where these classifications do not apply) and all of the proposed 230 kV gen-tie line (on BLM-administered lands) and most of the 500 kV gen-tie route (on both Reservation and BLM-administered land) are located within VRM Class IV management objectives. The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape where the level of change to the characteristic landscape can be high. The management activities within these areas may dominate the view and be the major focus of viewer attention.

The Proposed Project meets the objectives for Class IV lands. As shown in the visual simulations from KOPs 2 and 3, from a distance of 2.0 to 3.5 miles, the solar facilities on the Reservation would be readily visible and would notably change the character of the landscape by adding some additional horizontal lines and darker colors. The gen-tie lines (on BLM land) are visible but do not change the landscape character as they follow the same form and lines of the multiple existing transmission lines visible in the area. From the greater distances represented by KOPs 4 and 5 (approximately 7 miles), the Project components are not readily visible and do not change the landscape character. This is discussed in more detail below.

4.13.2 Direct and Indirect Effects by Alternatives

4.13.2.1 Proposed Project

The Proposed Project is located approximately 1.8 miles west of I-15 where the terrain is relatively flat. Views of the Project from I-15are blocked by intervening topography in several locations as shown on **Figure 3-11** but there are locations on I-15 south of the Project from which the Project would be visible. The dominant man-made visual feature would be the solar field on the SPGF site and the gen-tie line. Views of the Project from I-15 or US Highway 93 include the other man-made features in the viewshed including the multiple high voltage transmission lines ranging from 230kV to 500kV in size and substations/power plants varying by viewpoint location.

1. Substantially degrade the existing visual character or quality of the site and its surroundings

The Proposed Project's solar site is located on the Reservation and is not open to public access. Therefore, there is little, if any, use by the public. As described in **Section 3.13**, there were five KOPs identified in the Project area in consultation with the BIA, BLM, and the NPS. KOPs 1 through 4 are located on public travel routes including I-15, US Highway 93, and the old Spanish Trail where it intersects Valley of Fire Road (State Route 40). KOPs 4 and 5 are representative of views from the Congressionally-designated location of the Old Spanish National Historic Trail.

The SPGF could potentially be visible from approximately 6.5 miles of US Highway 93 west of its intersection of I-15 but at a considerable distance from the Project. KOP 1 is located approximately 6.5 miles from the Project and a small rise in elevation north of the highway in this location would block views of all Project components as shown in the visual simulation from this location (**Figure 4-2**).

The Proposed Project would generally not be visible to southbound travelers on I-15 because of intervening topography northeast and east of the Project location. When the Project would be visible from the highway, it would be slightly behind the southbound travelers and not within their primary forward views as shown in **Figures 3-12** and **3-13**. Northbound travelers could see the Project from locations south and east of the site but the view would be intermittent and of short duration (less than 1-2 minutes) at highway speeds. **Figures 4-3** and **4-4** show visual simulations of the Proposed Project from KOPs 2 and 3 located on northbound I-15. KOP 2 is approximately 3.5 miles south of the site and from this location, the Proposed Project could be seen just above the guardrail of I-15 and below the mountains in the background. It would be noticeable but for a short time (less than 1-2 minutes) because of the highway speeds and periodic intervening topography. KOP 3 is approximately two miles southeast of the Project site and the simulation from this location is similar to KOP 2. However, the Project would be less noticeable to northbound travelers at this location because it would visible at an angle more perpendicular to the highway and not in the view of northbound travelers who would be traveling (and predominantly looking) to the northeast. Traveling in a direction away from the Project would make it less noticeable and it would be in the travelers' view for less time. The individual components of the Project would not be readily discernible.

The proposed gen-tie lines would be visible from I-15 but would not be noticeable because of the distance from the highway and because of the presence of the multiple existing transmission facilities located between the viewpoints and their location. Because the proposed gen-tie lines would be similar to existing facilities, they would not substantially degrade the existing visual character or quality of the site and its surrounding viewshed.

KOP 4 is on the Old Spanish Trail where it intersects Valley of Fire Road (State Route 40) approximately 6.75 miles east-southeast of the of the site near the location of the Congressionally-designated location of the Old Spanish National Historic Trail. **Figure 4-5** provides a visual simulation from this KOP and shows that no components of the Proposed Project would be visible because of the distance and slight rise in the intervening topography. KOP 5 is located approximately 7.0 miles southeast of the site also near the Old Spanish National Historic Trail. As shown in the visual simulation (**Figure 4-6**), like KOP 4, no components of the Proposed Project would be visible from this location.

The Proposed Project is not adjacent to any national parks or residential communities. Although the site would be located near a major highway, the surrounding topography of the area would obstruct views of the Proposed Project from most viewpoints within the surrounding area. Therefore, development of the Proposed Project would not substantially degrade the existing visual character of the site and its surroundings.

2. Impact areas of public concern for scenic quality such as: recreational areas, natural areas, wilderness areas, wilderness study areas, wild and scenic rivers, scenic areas, scenic trails, and ACECs.

The Proposed Project site is located on the Reservation and not used as a Nature Area, Wilderness Area or Wilderness Study Area, nor are there any Wild or Scenic Rivers in the area. The Arrow Canyon Mountain and Muddy Mountains Wilderness Areas are located in the area but the Project would not be readily discernible from these locations as shown by the viewshed analysis described in Chapter 3. The Arrow Canyon Mountain Wilderness is located in an area 6 to 15 miles north of the Project site where views are blocked by intervening topography. The Muddy Mountains Wilderness is located approximately 12 miles southeast of the site at which distance the Project would not be readily visible. Therefore, development of the Proposed Project would not have a substantial direct or indirect effect on areas of public concern for scenic quality.

The SPGF could possibly be viewed from short segments of the Old Spanish National Historic Trail, but at distance of five to seven miles. The visual simulations prepared for KOPs 4 and 5 near the Old Spanish National Historic Trail confirm that the visual impact from the Proposed Project to the Trail would be minimal because of the distance.

3. Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway.

There are no historic structures or historic buildings currently present on the Proposed Project site. The mountain ranges and rock outcroppings in the area and the surrounding viewshed would not be affected. As mentioned above, there are no designated scenic highways in the area nor is the Proposed Project visible from any scenic highway or byway.

4. Create a new source of substantial light or glare which would affect day or nighttime views in the area.

Light. The Proposed Project is located on the Reservation and adjacent to BLM lands. There is currently no source of light or glare within the Proposed Project footprint. Lighting could be used during construction if needed. During operations, sources of light would be located on the solar site primarily in the area of the O&M building or power block area. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward-facing and shielded to focus illumination on the desired areas only. Therefore, the Proposed Project is not anticipated to create a new source of substantial light which would adversely affect day or nighttime views in the area and would not impact users of the area (e.g., campers, stargazers, and recreational users of the desert).

Glare. PV modules are designed to absorb as much light as possible to maximize efficiency. In addition, PV modules use anti-reflective coatings to decrease reflection and increase conversion efficiency. The time and duration of any potential reflections from the panels are determined by the orientation of the panels and the position of the observer in relation to those panels. All PV solar projects, regardless of the type of mounting structure, orient the panels perpendicular to the sun or as close to perpendicular as much time as possible to maximize solar absorption and energy output. This results in the panels being oriented towards the sun as much as possible throughout the day and the course of the year as the position of the sun changes in the sky. This orientation towards the sun results in the portion of incoming light that is reflected to be directed back into the sky.

The amount of light reflected upwards would not be expected to potentially affect the training done at NAFB or other air traffic in the area. Two factors are relevant to the intensity of reflected light – the amount reflected and the distance from the source. Only 2 to 10 percent of ambient light is reflected by PV solar panels (Newton, 2007) and the index of refraction for the glass that covers most panels is generally the same as the windshield of a car. Therefore, the intensity of the reflected light would be low. Also, light intensity decreases with distance from the source (according to the inverse square law of light intensity where intensity is equal to the inverse square of the distance or $I = 1/d^2$). For example, each time distance is doubled from the source, the light intensity is decreased to one-quarter of its original value ($1/2^2$). Therefore, the intensity of light reflected from the PV solar panels at locations any distance from the source would be a small fraction of the original intensity at the point of reflection. Thus, any reflected light from the PV panels would be very low. Any viewers who could see the low intensity reflected light would also be exposed to significantly brighter ambient light.

The Proposed Project would not use materials such as fiberglass, or vinyl/plastic siding and brightly painted steel roofs, which have the potential to create on-and off-site glare. Therefore, future development of the project site is not anticipated to create a significant new source of glare that would adversely affect day or nighttime views in the area.

4.13.2.2 CSP Project Alternative – AREVA Technology

The visual impacts of the CSP Project using AREVA technology would be similar to the Proposed Project from all KOPs including the viewpoints along I-15 and US Highway 93. This is because the heights of the solar field would be similar and the small receivers used in the AREVA CSP technology would not be easily discernible due to the terrain and distance. The mirrors used in the AREVA CSP system are designed to reflect the incoming light but each mirror tracks the sun in order to reflect all light onto the receivers (to maximize energy transfer). Therefore, no light would be reflected into the surrounding environment.

Wet-cooled CSP technology could generate steam plumes from cooling towers under certain atmospheric conditions that would allow the water vapor to condense (relatively cool temperatures and high humidity). These conditions would be expected to occur very infrequently in this desert environment.

4.13.2.3 eSolar CSP Technology Alternative

The eSolar CSP technology alternative has the same footprint as the Proposed Project and would utilize the same proposed routes for the gen-ties, access road, and pipeline. Visual impacts associated with the eSolar CSP technology would be greater than the Proposed Project and AREVA CSP because the solar receivers would be mounted on 250-foot towers. Like the AREVA technology, the mirrors used in the eSolar CSP system are also designed to reflect the incoming light onto the 250-foot receivers. Therefore, if they are operating properly, little or no light would be reflected into the surrounding environment. Likewise, the potential for generation of steam plumes from the wet-cooling system would be expected to occur infrequently.

As shown in the viewshed analysis and associated figures in Chapter 3, the eSolar technology would be visible from a larger area than the Proposed Project because of the height of the towers, but like the Proposed Project, potential views from many areas would be blocked by intervening topography. Visual simulations were prepared for the eSolar CSP technology from each of the five KOPs to evaluate the potential visual impacts and these simulations are shown in **Figures 4-7** through **4-11**.

From KOP 1 on US Highway 93, the small rise in elevation north of the highway in this location would block views of the eSolar towers as it did for the Proposed Project (see **Figure 4-7**). This technology would also generally not be visible to southbound travelers on I-15 because of intervening topography until they would reach the location of KOP 3 at which point it would become visible approximately perpendicular to their direction of travel as they would be travelling away from the site. It would be more noticeable to northbound travelers on I-15 from locations south and east of the site as it would be in the travelers' field of view as they approach from the south. **Figures 4-8** and **4-9** show visual simulations of the eSolar technology from KOPs 2 and 3 located on northbound I-15 (KOP 3 also shows what southbound travelers would see when the Project first comes into view). As shown in the simulations, the eSolar project would look essentially the same as the Proposed Project except for the 250-foot solar receiver towers placed throughout the solar field which would make the Project much more noticeable. As with the Proposed Project, the view from the highway would be intermittent because of the berms associated with localized grading conducted as part of construction of the highway and because of the elevation differences between the northbound and southbound lanes of the highway. The views would also be of short duration at the highway speeds traveled by the viewers.

From KOP 4 on Valley of Fire Road (State Route 40) and the Congressionally-designated location of the Old Spanish National Historic Trail, the tops of the eSolar towers could be visible but because of the distance (approximately 6.75 miles) would not be noticeable to viewers (see **Figure 4-10**). From KOP 5 also located near the Old Spanish National Historic Trail, the tops of the towers could also be seen but would also not be noticeable because of the distance from the site (approximately 7.0 miles) (**Figure 4-11**).

Therefore, development of the eSolar alternative would not be expected to substantially degrade the existing visual character or quality of the site and its surroundings

4.13.2.4 Dry-Cooling Alternative

Development of dry cooling instead of wet cooling for the CSP technology would have essentially the same visual impacts as the Proposed Project. The air-cooled condensers associated with dry cooling would have a larger profile than the wet-cooled condensers. However, since the dry-cooled project would occur within the same SPGF boundary and because of the distances from which the Project would be viewed, the visual impacts associated with this alternative would be similar to the Proposed Project. The dry-cooled technology would eliminate the potential for the infrequent formation of steam plumes associated with the wet-cooled technology.

4.13.2.5 Access Route Alternative

Visual impacts resulting from this access alternative would be the same as those for access road component included with the Proposed Action.

4.13.2.6 No Action Alternative

Under this alternative, the Project would not be developed so there would be no impact to visual resources.

4.13.3 Residual Effects

As included in the project description, the gen-tie lines on BLM land would be constructed using no specular materials as appropriate. In addition, disturbed areas would be restored after construction is complete which would minimize the contrast between the disturbed areas and the surrounding native areas. No additional mitigation measures are proposed. Therefore, the residual impacts would be the same as the impacts described above.

4.14 Public Health and Safety

This section discusses effects on human health and safety due to exposure to or creation of hazards that may occur with implementation of the Proposed Project or alternatives.

4.14.1 Indicators

Significant effects to health and safety would occur if the Proposed 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 a substantial 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 the Federal Occupational Safety and Health Administration (OSHA) in 29 CFR §1910, or expose members of the public to direct or indirect contact with hazardous materials from the Proposed Project's construction or operations; or
- Expose people residing or working in the Proposed Project vicinity or structures to safety hazards and/or a significant risk of loss, injury, or death.

4.14.2 Direct and Indirect Effects by Alternatives

Analysis of direct and indirect effects focuses on potential effects on public safety due to exposure of the general public, workers, and the environment to hazards and hazardous materials.

The primary mechanisms of potential exposure to human health and safety hazards include improper handling or transport of hazardous materials, inadvertent spills or releases, soil or groundwater disturbance on sites with known and unknown contamination, and electrical and fire hazard.

4.14.2.1 Proposed Project

Construction and operation activities of the Proposed Project would take place mostly on the Reservation with the gen-ties and access road on BLM land.

The Applicant would be required by EPA regulations to develop a SWPPP to mitigate potential soil erosion and assist with the management and protection of water resources throughout construction and the operational life of the Proposed Project. The Applicant would also be required by Federal regulations to develop a SPCC Plan to reduce the risk of releases of oil and hazardous substances to the environment during operations. In addition, the following Plans would also be developed and followed to minimize risk and exposure to on-site staff, delivery personnel, and construction workers. There are no nearby residents as the nearest community is approximately 20 miles northeast of the Proposed Project and not at risk.

General Design and Construction Standards. The Applicant would design the Proposed Project in accordance with Federal and industrial standards including the American Society of Mechanical Engineers (ASME), National Electrical Safety Code (NESC), International Energy Conservation Code (IECC), International Building Code (IBC), Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC), the National Fire Protection Association (NFPA) standards, and OSHA regulations.

The Applicant would also comply with Federal regulations and industrial standards for activities mentioned above as they pertain to construction, as well as with applicable state and tribal codes. Local Clark County code would be considered by the Applicant on portions of the Proposed Project managed by or on BLM lands and could include meeting road specifications for Clark County.

Health and Safety Program. The Applicant would require all employees and contractors to adhere to appropriate health and safety plans and emergency response plans. In addition, all construction and operation contractors would be required to operate under a health and safety program written and administered by the EPC contractor and that meets industry standards. All contractors would be required to maintain and carry health and safety materials including the MSDS of hazardous materials used on-site.

Emergency Response Plan. The Applicant would prepare an Emergency Response Plan based on results of a comprehensive facility hazard analysis. In addition, specific response plans would be prepared for each identified hazard. Emergencies might include brush or equipment fires, transformer oil leaks or spills, back-up generator leaks, attempted acts of sabotage, and airplane crashes. The Emergency Response Plan would assign roles and actions for on-site personnel and responders and would designate assembly areas and response actions.

Hazardous Materials Management Plan. The Applicant would prepare a Hazardous Waste Management Plan that would describe the storage, transportation, disposal, and handling of hazardous materials and wastes and would emphasize recycling of wastes where possible. The Applicant would manage hazardous wastes in accordance with the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901, et seq. and RCRA's implementing regulations at 40 CFR 260, et seq.) and other applicable state and tribal regulations.

The program would identify types of hazardous materials to be used during construction and operations activities. A MSDS document control program shall be included within the Hazardous Materials program to provide the necessary information on all chemicals stored and used on site. All personnel would be provided with project-specific training. This program would be developed to ensure that all hazardous materials are handled in a safe and environmentally sound manner. Employees would receive hazardous materials training and would be trained in: hazardous waste procedures; spill contingencies; waste minimization procedures; and Treatment, Storage, and Disposal Facility (TSDF) training in accordance with OSHA Hazard Communication.

1. 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 a substantial risk to human health

During construction, operation and decommissioning on-site, delivery and off-site personnel could experience human health impacts as related to hazardous materials handling and spills.

Construction. The Proposed Project's construction activities would occur within fenced SPGF site and along the proposed ROWs. Potential human health and safety effects could occur from the use, transport, and disposal of hazardous materials during the construction process. The hazardous materials that may be used include gasoline, diesel fuel, oil, hydraulic fuels and lubricants, paints, solvents, adhesives, batteries, welding materials, and mineral oil for transformers.

Localized spills and leaks could occur which could result in exposure to human or local wildlife. Construction personnel would be trained in the handling and storage of hazardous materials in compliance with OSHA standards. The SPCC Plan would address hazardous materials management during Proposed Project construction and would include a hazardous material inventory, emergency response procedures, training program information, and basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed. Therefore, the potential risk to people or the environment during construction would be minor.

<u>Operations and Maintenance.</u> The O&M of the Proposed Project would also require the periodic use and transport of hazardous materials, hydraulic fluid, welding gases, and herbicides. In addition there would be one on-site, diesel-fueled backup firewater pump that would be located near the O&M building and the diesel-fueled backup generator at the power block of the CSP Alternative. Localized spills or releases of these hazardous materials could occur due to improper handling or storage or inadvertent release. Like construction, the potential risks to human health and the environment associated with the handling, storage, or releases of these materials would be minimized by the implementation of the required SPCC, health and safety, designs incorporating secondary containment, and hazardous materials management plans.

<u>Decommissioning.</u> Decommissioning of the Proposed Project components could occur at the end of the Project's expected life of 30 years or more. Closure activities would have similar effects to human health and safety as construction activities and would involve demolition of structures, removal of transmission poles and all electrical components, as well as closure of wastewater facilities and the septic system. The Applicant would develop a Site Restoration Plan for temporarily disturbed areas after construction and a Facility Decommissioning Plan for site closure activities to reduce impacts to human health and safety. Any project components that are not recycled would be disposed of in compliance with all applicable Federal, state, and local laws.

2. Expose human or ecological receptors to potentially hazardous levels of chemicals or explosives due to the disturbance or unearthing of contaminated soils or groundwater.

The Proposed Project is located on vacant land with no evidence of previous commercial or agricultural activity. The land was deeded to the Moapa Band of Paiute Indians in 1981 and the Tribe confirms that no potentially hazardous activity has taken place on or near the Proposed Project site. Currently there is no evidence to suggest that on-site soils or groundwater are contaminated so neither human nor ecological receptors would be exposed to potentially hazardous materials exposed during construction, O&M or decommissioning activities.

3. Expose workers to contaminated or hazardous materials at levels in excess of those permitted by the Federal Occupational Safety and Health Administration (OSHA), or expose members of the public to direct or indirect contact with hazardous materials from the Proposed Project construction, operations or decommissioning.

Construction, O&M, and decommissioning activities could temporarily expose workers to direct or indirect contact with hazardous materials. Workers who would handle hazardous materials are required under OSHA regulations to have a minimum level of training. The Applicant and/or contractors would implement a Health & Safety Program that would require all employees and contract staff to adhere to the appropriate health and safety plans and emergency response plans that meet industry standards.

4. Expose people or structures to a risk of loss, injury, or death involving electrocution or excessive exposure to wildland fires, including where wildlands are adjacent to urbanized areas.

<u>Construction.</u> During construction, the Proposed Project activities and related equipment could expose people to an increased risk of injury or death as a result of electrocution or exposure to wildland fires. The Proposed Project is a remote area, located approximately 20 miles southwest of the nearest residential/urban area. The threat of harm or loss to structures is low. The Community Hazard Assessment conducted by Clark County listed Moapa Town (located 20 miles northeast) as having “Moderate Fire Hazard” based on potential for strong fire behavior, limited water, and limited fire suppression resources.

Sources of fire at the Proposed Project includes combustion of wildland fuels from smoking, refueling, and operating vehicles and other equipment off designated roadways. A fire management plan would be developed for both those portions of the Project on Reservation and BLM lands to outline all activities undertaken to minimize potential fire risk. The Project ROWs would be constructed in proximity to natural gas pipelines in some locations and potential fire and explosion risks would be mitigated by close coordination with pipeline company personnel during Project design and construction.

Construction of the Proposed Project could also expose workers to potential electrocution hazards. All electric system and components would be developed in compliance with the National Electric Code (NEC) and NESC, as well as other industrial safety standards, including OSHA.

<u>Operation and Maintenance.</u> O&M of the Proposed Project would increase the potential for additional incidents related to fire and fire safety. Petroleum products would be the main flammable substances to be used during Proposed Project operations. Potential fire hazards could also result from electrical arcing and sparking from exposed wiring. The fire risk would be low on the SPGF because the site would be cleared of vegetation and graded. In addition, the facility would also incorporate a fire suppression system that would include a water tank dedicated to fire suppression.

O&M of the Proposed Project would also expose workers to potential electrocution hazards from the electrically energized equipment. The proposed electrical system would be designed and built to NEC and other Federal specifications and protective measures and equipment for employees working directly with or near electrical equipment would be implemented.

Decommissioning. Decommissioning of the Proposed Project would involve similar risks of fire as the construction phase. Electrical equipment would not pose a fire or electrocution risk during decommissioning as they would not be energized. Fire risks during decommissioning would be minimized by the implementation of the same plans discussed for construction.

4.14.2.2 Action Alternatives

Potential human health and safety effects that would result from the construction, operation, and decommissioning of the three Action Alternatives would be the similar to those identified for the Proposed Project. Project components would be located within the same 850-acre footprint and the same ROWs and expected construction and operations would be similar. The two CSP technologies would use water instead of a heat transfer fluid. If an energy storage component is included in the CSP project, the molten salt used in this system would an additional spill hazard, but its use would be confined to the power block area of the SPGF.

4.14.2.3 No Action Alternative

Under this alternative, the Proposed Project would not be constructed and no project-related effects on human health and the environment would occur.

4.14.3 Residual Effects

With proper implementation of the Applicant's design features and plans for prevention, management, and response to potential hazards, no residual effects due to exposure of human or ecological receptors to hazards and hazardous materials are anticipated.

4.15 Cumulative Impacts

This section analyzes cumulative impacts of the Proposed Project in conjunction with other developments that affect or could affect the area. Under NEPA, a cumulative impact is the impact on the environment that results from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions (40 CFR Section 1508.7). In order to facilitate the cumulative analysis, a cumulative scenario has been developed that identifies and evaluates projects that already exist within the vicinity of the Proposed Project, that are reasonably foreseeable, or would be constructed or commence operation during the timeframe of activity associated with the Proposed Project.

4.15.1 Cumulative Projects

The cumulative scenario includes projects within the same geographic and temporal scope as the Proposed Project. For the purpose of this study, the geographic scope for cumulative effects has been defined as within the Garnett and California Wash watersheds for physical and biological resources (soils/geology. water resources, air quality, wildlife, vegetation, cultural resources) and within the local community or county for socioeconomic impacts (employment, income, services, resource use patterns, etc.) unless specifically stated in the Geographic Extent summary section. The Tribe and BLM have full authority to regulate any current or foreseeable projects that take place within the Reservation or BLM-managed land respectively, so are able to manage local cumulative impacts.

As with the geographic scope of the cumulative analyses, the temporal scope of each analysis varies by resource area. For this analysis, the temporal scale has been limited to projects constructed within the last 5 years to projects that may be constructed within the next 10 years according to Tribe and BLM sources.

The cumulative scenario includes all renewable energy projects, transportation projects, infrastructure improvement projects, pipeline and electric transmission projects, and other projects that meet the following criteria:

- Projects that are closely-related and completed past projects;
- Projects approved and under construction;
- Projects approved but not yet under construction; and
- Projects that have been proposed but not approved.

Projects are included in this cumulative analysis if information on the project was available in the BLM's GeoCommunicator mapping system, identified during agency scoping, identified in the 2012 K Road FEIS, or provided in consultation with the BLM, BIA and the Tribe.

Table 4-14 contains a list of projects that could potentially occur within the townships surrounding the Proposed Project. This cumulative effects section evaluated the past, pending and current/future projects presented in this table and some of these projects are evaluated in the sections below.

4.15.2 Overview of Cumulative Projects

Through literature review, internet searches, industry reports and primarily through the application process required on BLM lands; the following projects were identified as past, current, or constructed in the foreseeable future within the geographic boundary of the cumulative effects areas. Small scale projects (less than 100 acres) are not described in detail but large scale projects have been identified in Section 4.15.3 if publicly available information could be obtained.

4.15.3 Large Scale Projects

4.15.3.1 Existing or Recently Completed Projects

UNEV Pipeline. UNEV is constructing and operating a 399-mile, 12-inch petroleum products pipeline that originates in Woods Cross, Utah with terminals northwest of Cedar City, Utah and near Apex, Nevada (northeast of Las Vegas). Two lateral pipelines are also proposed: One lateral would extend approximately 2.4 miles from the mainline to the Salt Lake City International Airport, and one would extend approximately 10 miles from the mainline to the proposed Cedar City Terminal. The southern-most 150 miles of the pipeline alignment (Milepost [MP] 250 to the Las Vegas Terminal) would generally follow the existing Kern River pipeline ROW, which contains two Kern River Pipeline Company natural gas pipelines, the newest of which was constructed in 2003. The Kern River Pipeline EIS was completed in 2002. The Kern River and UNEV pipeline are or would be within the 4,000-foot BLM-managed utility corridor that traverses the Reservation.   Permanent facilities would include access roads to all aboveground structures (including valves, launchers, and receiving equipment). Temporary facilities would include construction and equipment storage yards, extra workspace for pipe stringing, and additional construction access roads. The UNEV pipeline was constructed east of the project area in Oct/Nov of 2011.

Kern River Natural Gas Lines. This project, completed in 2005, incorporated expansion of the Kern River Gas Transmission Company natural gas pipeline system from one, 36- inch pipe to two, looped, 36-inch pipes. Portions of the pipeline ROW (particularly from Moapa Town south to US Highway 93) are within the Cumulative Effect Area.

Reid Gardner Coal Power Plant (NV Power Company). Reid Gardner Station is a 4- unit, 557 peak MW coal fired power plant located on 480 acres in Moapa Valley, Nevada. The Muddy River crosses the site, as does Union Pacific Railroad's Las Vegas - Salt Lake City line. The plant is surrounded by BLM land to the north and south, Paiute agricultural land and residences on the west, and an inactive dairy farm on the east. The Reid Gardner Generating Station is a coal-fueled, steam-electric generating plant with four operating units. The first two nearly identical generating units went into service in 1965 and 1968. A third similar unit was added in 1976. The plant’s largest generating unit is jointly owned by NV Energy and California Department of Water Resources. This 257-megawatt unit was commissioned in 1983 and uses a Foster Wheeler boiler to drive a Westinghouse turbine generator (NV Energy 2010).

Coal is brought in by rail from mines in Utah, Colorado and Wyoming. The water supply is taken from the Muddy River, and from a well field near its’ headwaters, with 8,300 acre feet per year used for steam generation, cooling, emission control scrubbers, bottom ash transport, and dust control (NV Energy 2010).

NV Energy announced plans in early April 2013 to decommission the Reid Gardner Plant starting in 2014.

Moapa Compost Facility. Clark County has one permitted compost facility: A-1 Organics. In 2006, A1 Organics relocated its composting operation to the Reservation on the east side of I-15 near the Travel Plaza. The site receives wood, greenwaste, foodwaste, manure, and other organic materials. These materials are processed into compost, mulch, biomass for alternative energy uses (Reid Gardner Power Plant), and special soil blends for home and commercial uses. A Composting Facility is defined as “a facility designed and operated to receive raw or waste organic by-products and transform the material through biological processes into biologically stable organic material. The operation is small in size, has a small number of truck deliveries and is a beneficial development for the area. The Moapa Compost facility was not included in this cumulative impacts analysis.

Silverhawk Generating Station. The Silverhawk Generating Station is a 520-MW, combined cycle, natural gas–fired power plant, consisting of two combustion turbine generators, two heat recovery steam generators, and one steam turbine generator. The plant is located within the Apex Industrial Park near the intersection of I-15 and US Highway 93. The station utilizes a dry-cooling system. The plant began operating in 2004. Approximately 30 workers are required to operate the facility (NVE 2009b).

Harry Allen Generating Station. The Harry Allen Generating Station is a two-unit, 144-MW, combined cycle gas-fired power plant. It was originally built as a “simple” cycle plant operating only during the hot summer months. The first combined cycle unit (60 MW) began operating in 1995 and the second unit (84 MW) went online in 2006. The plant is located within the Proposed Project area. Approximately 30 workers are required to operate the facility (NVE 2009c).

4.15.3.2 Proposed Projects

K Road Moapa Solar. The K Road Moapa Solar Facility would be located on approximately 2,153 acres of land within the Moapa Reservation and upon 10.5 acres of BLM land. The 2,000 acre photovoltaic solar facility is wholly within the Reservation as well as a proposed 6,000 acre desert tortoise relocation area. An additional 5,000 acres (2,500 acres north and south of the mesa adjacent to I-15 and on the Reservation) has also been set aside for potential desert tortoise relocation if needed. The remaining 153 acres is comprised of a high voltage transmission line up to 500 kV, a 16-24 feet wide access road approximately 8 miles long, an approximately 1-mile water pipeline and the approximately 3-mile 12kV transmission line linking the Moapa Travel Plaza (Travel Plaza) on the east side of I-15 to the K Road Moapa Solar Project substation which would facilitate access to the electric grid for the Travel Plaza. This PV project is in the pre-construction stage, with construction slated to begin June 2013. It would be constructed on the Reservation, and is approved for generation of 350MW.

Bright Source Energy Coyote Springs Project. Bright Source Energy is planning to build a 960-MW solar thermal-powered facility on private land at the Coyote Springs Investment Planned Development Project at the junction of US Highway 93 and State Route 168. The facility would utilize the Luz Power Tower, which consists of thousands of mirrors that reflect sunlight onto a boiler filled with water sitting on top of a tower. The high-temperature steam produced would be piped to a conventional turbine that generates electricity. The station would utilize a dry-cooling system. The site, approximately 7,680 acres, would be 10 miles north of the Proposed Project site (Bright Source Energy 2009).

Coyote Springs Investment (CSI) Development Project. CSI intends to develop a new town in southern Lincoln County at the junction of US Highway 93 and State Route 168. The town would be a master-planned community on 21,454 acres, and would include residential, commercial, and industrial land uses. Plans call for more than 111,000 residential dwelling units at a density of 5 units per acre. Also included in the community would be public buildings, hotels, resorts, casinos, commercial and light industrial areas, roads, bridges, and a heliport. Utilities and other infrastructure would be developed to serve the town, including power facilities, sanitary sewer and wastewater treatment facilities, stormwater facilities, solid waste disposal transfer stations, and telecommunications facilities. Water supply treatment facilities, monitoring wells, production wells, storage facilities, and transmission and distribution facilities would also be built. Approximately 70,000 ac-ft/year of water would be needed for the community at full build out, which may occur over a period of about 40 years. Currently, CSI and its affiliates hold approximately 36,000 ac-ft/year in certificated groundwater rights in various basins within Lincoln County. CSI currently owns the 21,454-acre development area and holds leases on an additional 7,548 acres of BLM land in Lincoln County and 6,219 acres of BLM land in Clark County within or next to the privately held land. These adjacent areas would be managed by BLM for the protection of federally-listed threatened or endangered species; activities would be limited to non-motorized recreation or scientific research.

Clark, Lincoln, and White Pine Counties Groundwater Development Project. The Southern Nevada Water Authority (SNWA) proposes to construct a groundwater development project that would transport approximately 122,755 ac-ft/year of groundwater under existing water rights and applications from several hydrographic basins in eastern Nevada and western Utah. The proposed facilities include production wells, 306 mi of buried water pipelines, 5 pumping stations, 6 regulating tanks, 3 pressure reducing stations, a buried storage reservoir, a water treatment facility, and about 323 miles of 230-kV overhead power lines, 2 primary and 5 secondary substations. The project would develop groundwater in the following amounts in two hydraulically connected valleys that are up-gradient of the Proposed Project area: Dry Lake Valley (11,584 ac-ft/yr) and Delamar Valley (2,493 ac-ft/yr). (SNWA 2010)

Dry Lake Groundwater Testing/Monitoring Wells. The SNWA intends to construct two to four groundwater wells within two 2.5-acre long-term locations and a 1.5-acre short-term location in Dry Lake, about 6 miles south of the Proposed Project site. The dimensions for the long-term ROW would be 168 feet by 260 feet, and the dimensions for the short-term ROW would be 330 feet by 330 feet for each site. Two 12-in. and two 20-inch wells would be drilled to between 2,200 and 2,400 feet in depth. Access to the well sites would be from both existing roads and a new 809-ft long access road. Water generated during the tests would be discharged into the natural drainage network around the sites. At the completion of hydraulic testing, the SNWA would continue to record data to establish baseline ranges of the groundwater levels in the area (BLM 2010).

NV Energy Microwave and Mobile Radio Project. NV Energy is proposing to install a new microwave and radio communications network at 13 sites. Two sites are located within about 6 miles south of the Proposed Project. These sites are small, about 0.1 acres. Each site would include a communication shelter, two propane tanks, and a generator. Two of the sites have a 160-ft self-supporting lattice tower, and one, an 80-ft tower (BLM 2010).

4.15.3.3 Foreseeable Projects

TransWest 600 kV Transmission Lines. The BLM and Western Area Power are currently preparing the Draft EIS for the TransWest Express Transmission (TWE) Project, a 600kV overhead direct current transmission line crossing 725 miles of public and private lands. The extra-high voltage line is designed to carry renewable power generated in Wyoming to the Desert Southwest. The project begins in south-central Wyoming, crosses northwestern Colorado, crosses Utah diagonally from northeast to southwest and ends south of Las Vegas at the Marketplace hub in the Eldorado Valley area (near Boulder City, Nevada). The project plans to provide 3,000 megawatts of capacity by 2015. The Proposed route is south and east of I-15 at the western edge of the Muddy Mountains and would not directly affect the Proposed Project.

Southwest Intertie Project (SWIP). Right of way has been issued and Idaho Power Company (IPCo) has begun construction of over 500 miles of single-circuit, 500 kV transmission line between the existing Midpoint Substation near Shoshone, Idaho, and a newly proposed substation in Dry Lake Valley northeast of Las Vegas, Nevada. The transmission line project, known as the Southwest Intertie Project (SWIP), would be within the transmission line corridor adjacent to the Moapa Solar site.

Power Transmission Lines (Lincoln City and Overton Power District. These transmission line projects are proposed and have active applications for ROW at the BLM. Specific information other than general location is not known for these projects and no public data exists. Total acreage impact is estimated at 1,711.

Reid Gardner Expansion Project. NV Energy had planned the Reid Gardner Expansion Project which would consist of the construction of a 240-acre fly ash landfill and a 320-acre evaporation pond to support the existing Reid Gardner Power Plant. The proposed expansion is adjacent to the southern boundary of the existing site near the town of Moapa (BLM 2008). With the announcement to begin decommissioning of the plant in 2014, it is unlikely that this expansion would occur.

Harry Allen Generating Station Expansion. The Harry Allen Generating Station is a 484-MW, combined cycle, natural gas–fired power plant that consists of two combustion turbine generators, two heat recovery steam generators, and one steam turbine generator. The heat rejection system would utilize a cooling system comprised of natural draft dry-cooling towers. The plant is located on the site of the existing plant north of I-15 and US Highway 93, within the Proposed Project area (NVE 2009c).

Locations of some of the above-referenced projects are included in **Figure 4-12**.

4.15.4 Cumulative Impacts by Resource

This section analyzes cumulative impacts of the Proposed Project combined with other proposed projects or developments that would affect or potentially affect the area. For the purpose of this section the Geographic Extent under consideration is shown in **Figure 4-12** unless specifically stated for a particular resource.

The cumulative effect of the Proposed Project was not analyzed for resources where it was determined that the Proposed Project would have little to no contributing impact before and after mitigation. If the Proposed Project or action alternatives were not built (the No Action Alternative), there would be no contribution to cumulative effects by the Proposed Project.

4.15.4.1 Geology, Topography and Geologic Hazards

The Proposed Project would not have impacts to geologic units, topography, or geologic hazards outside of the Proposed Project area and, therefore, would not contribute to cumulative impacts to geology and topography.

4.15.4.2 Soils

Ongoing and foreseeable development throughout the cumulative effects area that would have an impact upon soil includes the UNEV petroleum pipeline, K Road Moapa Solar Project, SWIP, TransWest transmission lines, Bright Source Solar, CSI Development Project and large scale electric transmission lines, as well as the recently developed Kern River Pipeline. With exception of the completed Kern River Pipeline, the other current or proposed projects could overlap in the construction period during which time soil impacts would be the greatest.

Construction of the Proposed Project would involve grading of the 850-acre solar site and disturbance of the associated Project ROWs. Erosion could occur in these areas due to the removal of vegetation and soil exposure. The Applicant would implement a SWPPP to minimize soil erosion during construction and a restoration plan to revegetate disturbed areas following construction.

All other proposed and foreseeable construction projects in the cumulative effects area for soils would also be required to implement similar control measures under the NPDES program and implement BMPs similar to the Proposed Project to prevent erosion. However, the acreage affected by the other foreseeable projects would contribute to an overall cumulative impact to soil resources over the life of the Proposed Project. Given the assumed time frame for completion of the UNEV pipeline, TransWest transmission line, and K Road Moapa Solar Project, impacts to soil within the existing BLM utility corridor could be localized and have a cumulative impact to vegetation and off-site erosion. The timing of these projects and implementation of appropriate BMPs could lessen some of the cumulative and localized impacts within the corridor.

All of the Action Alternatives would produce similar cumulative impacts as the Proposed Action because they would occur on the same site and would utilize the same ROWs.

4.15.4.3 Water Resources

This section describes cumulative effects on water resources that could occur with implementation of the Proposed Project along with other potential proposed projects in the area. The Proposed Project does not contain or drain to any wild and scenic river or Section 404 jurisdictional water; nor any FEMA 100-year flood zone on-site, although the two gen-tie lines cross a 100-year flood zone located on BLM lands. Therefore, cumulative effects would mainly be focused on groundwater quantity and quality.

Over time, the amount of water available regionally could be affected by climate change. The Nevada Climate Change Advisory Committee (NCCAC) Final Report (2008) indicates that the Colorado River basin could see less precipitation overall with a greater percentage of precipitation coming in the form of rain instead of snow. As the Las Vegas Valley receives over 90 percent of its drinking water from the Colorado River, this could present challenges to the municipal water supply. Additionally, western Nevada receives most of its water from upstream storage in Sierra Nevada rivers, which also face the same challenges of decreased precipitation with a greater percentage of that precipitation coming from rain. In both the Rocky Mountains and the Sierra Nevada Mountains, the melting season could grow shorter, with earlier spring snowmelt leading to increased spring runoff and decreased summer stream flow. Decreased stream flow in the summer could have an impact on the habitat of aquatic animals.

In addition, while the general area is largely undeveloped currently, a number of existing and proposed energy projects occur there. Ongoing and foreseeable development throughout the cumulative effects area for water resources includes the SNWA proposed groundwater development project, the existing Harry Allen Power Plant and proposed expansion, the existing Silverhawk Generating Station, UNEV petroleum pipeline, K Road Moapa Solar Project, SWIP, TransWest transmission lines, and Bright Source solar project. The potential for groundwater impacts associated with the Proposed Project could contribute to effects from others proposed.

The Proposed Project would use up to 30 AFY of water during its proposed 30-year operation if developed as a PV project. The source of this water is an existing Reservation well that can produce 60 gpm of water (> 2700 AFY). The Tribe's total water allocation for all sources is

2,500 AFY. There are no specific water demand data given for most of the proposed and foreseeable cumulative projects. The K Road Moapa Solar Project would use water from the same well, and the UNEV project would rely on a nearby existing well for short-term construction water. The proposed solar projects are of equal or larger size and therefore would have a similar or increased demand for water. Depending on water demands and sources of these foreseeable, proposed projects, alternative wells would need to be brought online to accommodate total water demands.

The estimated perennial yield for California Wash Basin is 2,200 AFY (where the supply well is located) and the committed use is over 3,000 AFY. At this time, it is not known what sources of water would be used for the foreseeable projects so it is not possible to assess the magnitude of the impacts. It is also expected that the foreseeable projects would be constructed on the Reservation or on BLM lands in which Section 7 Consultation with the USFWS would take place to determine cumulative impacts to groundwater and associated biological concerns with potential decreases in flow to local springs.

If total local water demands in the local groundwater basin from all proposed and foreseeable projects would be less than 7,000 AFY, the modeling results for the Calpine Company Moapa Paiute Energy Center based on water use of this magnitude suggests that there would be no foreseen cumulative impacts to groundwater (PBS&J 2001). Two recent studies have evaluated potential cumulative groundwater impacts in the area of the Project. The study conducted for the Proposed Project, Hydrogeologic and Groundwater Modeling Analysis for the Moapa Solar Energy Center (Mifflin 2013), evaluated the potential impacts of development of all 2,500 AFY of the Tribe's current water rights. This study showed that pumping at that rate for 75 years would result in drawdowns of only 0.5 to 2.0 feet and would not result in observable differences to flows at the Muddy River springs area.

The Department of Interior recently completed a regional groundwater study (TetraTech 2012) that evaluated groundwater in the region. The extent of the area of investigation for the expanded, updated model comprises all or portions of 13 contiguous hydrographic areas within the regional aquifer system of eastern and southeastern Nevada known as the Colorado Regional Ground-Water Flow System (CRGWFS).The modeling evaluated seven different cumulative groundwater use scenarios for the area including current pumping, withdrawal of all existing rights, and pending water applications and modeled the result of up to 1,000 years of pumping. Scenarios 1 and 2 were developed within the framework of existing permits. The first scenario evaluates the effects of existing pumping, assuming that the average of the reported pumping during the years 2009, 2010, and 2011 would continue at that rate in the future. The exception to this statement is that the rate for pumping of carbonate-rock aquifer wells in Coyote Spring Valley and the Muddy River Springs Area in 2011 would continue in the future.

The second scenario simulates pumping the full amount of all existing groundwater rights, continued into the future. Scenarios 3 through 7 simulate pumping the full amount of all existing groundwater rights, plus pending groundwater applications before the Nevada State Engineer's

Office through 2009, in five different steps. Scenario 3 simulates all existing groundwater rights plus all large (>1,000 af/yr) pending applications with filing dates up to and through 1989. Scenario 4 simulates all existing groundwater rights plus all large pending applications with filing dates up to and through 1994. Scenarios 5 through 7 continue similar cumulative simulations by including all large pending applications through 1999, 2004, and 2009, respectively.

The results showed that as pumping increased both the regional groundwater levels and surface water flows would be more greatly affected. With a continuation of current rates of pumping (Scenario 1), the model predicts that a new equilibrium may be established after more than 1,000 years, and the impacts on most springs would be less than a 35 percent reduction in discharge. If pumping were to increase to a rate equal to the total of all existing groundwater rights (Scenario 2), the Muddy River Springs would completely dry up in approximately 1,100 years. The scenarios with higher rates of pumping (3 through 7) showed an acceleration of time when the predicted impacts would occur.

With the addition of simulated pumping of all pending applications through 1989 (as represented by Scenario 3), impacts become greater and occur more quickly All discharge from the Muddy River Springs would cease within approximately 150 years, and the flow in the Muddy River at Moapa would cease in about 160 years.

The pumping simulated in Scenarios 4 through 7 is predicted to cause greater and faster impacts to the groundwater and surface-water resources. In some areas, the aquifers may not be able to sustain the projected pumping, regardless of effects elsewhere. In Scenarios 4 through 7, the maximum predicted drawdown exceeded 3,000 feet.

The potential for groundwater resources in the area to be impacted by cumulative projects withdrawing water from the local aquifers was the driver for development of a Memorandum of Agreement (MOA) and the *Intra-Service Programmatic Biological Opinion* (PBO) for the Moapa dace. This MOA and PBO was developed through intra-service consultation and identifies the monitoring and mitigation measures that must be undertaken to address the potential impacts from cumulative groundwater withdrawals. Detailed information on the MOA and PBO is included in Section 4.8.4.1.2 in this EIS.

In summary, this Project would have a negligible contribution to potential cumulative impacts and the potential overall cumulative impacts to groundwater in this area will be dependent on the number of water development projects that are implemented and their schedule for implementation. In addition, the cumulative impacts to groundwater could also be accelerated by the contribution of climate change to the reduction of precipitation in the basin and its contribution to groundwater recharge.

With successful implementation of spill prevention measures, any release from either the Proposed Project or any foreseeable, proposed project would not be expected to have measurable effects to groundwater quality because of the depth to groundwater in the area and requirements for spill prevention and cleanup.

4.15.4.4 Air Quality and Climate

Air quality impacts resulting from the Proposed Project would occur within the California Wash (HA 218). The operational phase of the Proposed Project would have minimal emissions of regulated air pollutants so this cumulative impact discussion would focus on the impacts associated with the construction phase. All effects on climate change caused by the release of GHG emissions are cumulative by nature and GHG emissions related to the Proposed Project are minimal. Operation of the proposed solar plants would offset electricity from fossil fuel energy projects and would be a net positive effect on GHG emissions.

Due to the localized impact of construction emissions, this analysis includes proposed projects that would be in close proximity to the Proposed Project. Emissions could also be generated from the following proposed sources in the area:

- UNEV Pipeline
- K Road Moapa Solar Project
- Southwest Intertie Proposed Project (SWIP)
- TransWest 600kV direct current transmission line
- Bright Source Solar 1,200 MW solar plant

The Proposed Project is located in an area designated as an ozone (O_3) non-attainment area; however, the Reservation is not included in the non-attainment status. Construction emissions from foreseeable, proposed projects included in the cumulative impact area have not yet been quantified, except for the K Road Moapa Solar Project. For that project, the estimated yearly emissions totals of O_3 precursors (NO_x and VOCs) would be less than the de minimis thresholds as specified under the Federal General Conformity Rule (40 CFR 93); thus, Proposed Project related emissions during the operational phase are assumed to conform to the SIP and the regional air quality plans.

It is assumed that the UNEV Pipeline, solar projects, and electric transmission proposed projects would also result in daily emissions of CO and PM_{10}; however, the HA 218 in which the projects would be located is an attainment area for CO and non-attainment for PM_{10}. The proposed projects would also generate VOC and NO_x in an area that is considered non-attainment for ozone and, thus, could potentially contribute to a cumulative impact to air quality. The Proposed Project would result in daily emissions of CO, PM_{10}, NO_x and VOC. If the Proposed Project were constructed during the same time period as either of the other proposed projects in the area, construction would potentially result in short-term, localized, and unavoidable impacts to air quality. However, no cumulative impacts are anticipated to occur at levels above existing air quality standards or at levels that would prevent the area from achieving attainment status.

Due to current upgrades at the Reid Gardner Power Plant and eventual decommissioning of units 1, 2 and 3, cumulative short term effects during the Proposed Project construction period are assumed to be minimal and long term effects negligible.

4.15.4.5 Noise

Other proposed projects within the vicinity include the UNEV Pipeline, K Road Moapa Solar Project, and the SWIP, and TransWest 600kV. Noise associated with equipment used to construct and operated each of these cumulative projects is unlikely to because of the distance between each proposed project and the distance to the nearest sensitive receiver. However, the increase in traffic volumes along highways and local roads from the construction and operation of multiple projects could cause an increase in the noise levels along the highways.

4.15.4.6 Biological Resources

Other projects that would affect Mojave Desert scrub/shrub vegetation as well as sensitive wildlife species within this region and habitat within the cumulative area of effect include the K Road Moapa Solar Facility Project, SWIP, TransWest 600kV, Bright Source Solar, projects that could be developed on the BLM's Dry Lake Solar Energy Zone, and collectively the linear transmission, road and pipeline proposed projects in the area.

The nature of the cumulative conditions can be separated into long-term effects and temporary and short-term effects. Proposed solar projects would result in relatively long-term loss of over 10,000 acres of vegetation and habitat for a variety of wildlife species including the desert tortoise. The linear pipeline and electric transmission projects would have a short-term effect on vegetation during the construction phase but would be allowed to re-vegetate or be restored and species such as desert tortoise would be able to reutilize the area for habitat and burrows. Use of the existing utility and transportation corridors for access and transmission focuses the impact to a previously impacted area, aids in reduction of impacts to historically undisturbed areas within the Reservation and allows for preservation of land further from I-15. Other than the anticipated projects, no other commercial or industrial projects are known to be planned for the remaining 60,000-plus acres within the Reservation.

Long-term impacts to yucca and cacti species would occur as a result of cumulative effects of multiple projects. The BLM also manages sensitive species as part of their review of the ROW agreement for transmission, pipelines, and utility roads within the existing utility corridor as well as large-scale projects on BLM lands. Mitigation measures would ensure that only minimal cumulative impacts to native vegetation would occur as a result of the current and foreseeable projects. No federally threatened or endangered plant species were found within the Proposed Project or along proposed road or transmission lines. As a result, it is highly unlikely that there would be a cumulative impact to threatened, endangered, or BLM sensitive plant species.

The Proposed Project would result in impacts on special status species that could result in cumulative impacts in conjunction with similar impacts from future projects. Impacts would include noise and increased human/vehicle presence during construction, operations, and maintenance, all of which could disrupt normal behavior patterns and may cause direct injury and/or mortality. Species potentially affected would include special status reptile and bird species with the potential for significant impacts to the desert tortoise. Depending on how many of the cumulative projects are developed and where they obtain their needed water, indirect significant cumulative impacts could result to the Moapa dace due to increased groundwater pumping in the region.

All foreseeable projects within the cumulative effects watersheds boundary would be required, under Section 7 of the Endangered Species Act, to implement similar controls and Plans to alleviate impacts to desert tortoise. The implementation of mitigation measures throughout the cumulative effects area and even large northeastern recovery unit would reduce impacts on desert tortoise populations. Also, those projects using water would likewise be required to implement similar mitigation for the Moapa dace to comply with the PBO.

Many of the cumulative projects would affect suitable foraging habitat for golden eagles. Loss of foraging habitat could impact foraging behaviors of the golden eagle, which could cause adverse impacts to the fitness of golden eagle populations within the known nesting grounds of Arrowhead Canyon. The proposed and existing transmission lines would be located near one another in or near the utility corridor. The existing lines have been in place for many years and golden eagle foraging flight patterns have most likely adapted to their presence. To mitigate any direct effects or potential cumulative effects, the Proposed Project and other cumulative projects would develop and implement a Bird and Bat Conservation Strategy. These mitigation measures would reduce the impacts that cumulative projects would have upon the golden eagle, although foraging habitat would still be lost.

4.15.4.7 Cultural Resources

There would not be any cumulative impacts to cultural resources as a result of the Proposed Project because there would be not any associated impacts to NHRP-eligible resources. Historic, cultural and religious properties and archaeological resources are documented in the Proposed Project, but the archaeological artifact scatters and features have been recommended not eligible for the NRHP and do not qualify as historic properties. Also, it was concluded that the Proposed Project would not affect the viewshed from the designated location of the Old Spanish National Historic Trail.

Past and present developments in the vicinity of the Proposed Project include the transportation corridors around the Proposed Project including I-15 and the Union Pacific Railroad to the south and east, US Highway 93 to the south and west, designated utility corridors, and two existing power plants in the Dry Lake Valley area. Reasonably-foreseeable developments in the general area of the Proposed Project include the BLM SEZ and associated solar projects in the Dry

Lake area, utility lines, and associated infrastructures such as electric substations. The majority of archaeological sites in the area are prehistoric rock shelters in the nearby hills, prehistoric camps associated with dune deposits in the Dry Lake Valley area, and historic sites associated with the railroad.

4.15.4.8 Socioeconomics

The socioeconomic impacts from the Proposed Project would be limited to the local and regional area (county) surrounding and including the Reservation and Las Vegas. The Proposed Project would have short-term and long-term beneficial impacts during construction, O&M, and decommissioning activities.

For the purpose of this analysis, all current and foreseeable projects are included since they would also contribute short-term and potentially long-term beneficial cumulative impacts to employment, housing, and local/regional tax base and sales. The type of proposed projects (renewable energy and corridor construction projects) would have a specific short-term socioeconomic impact as large numbers of employees would be needed during construction and a much smaller number for O&M of the facilities.

Most employees would come from the current employment pool including tribal members and those with specific renewable energy, pipeline, and electric transmission expertise also from other regions of the country. Local employment would result in local spending while employment from outside the area would boost hotel occupancy. The projects would also use local resources, materials, and commodities from local suppliers during construction having a short-term effect. The Tribe would benefit from use of their Travel Plaza for fuel, food and other supplies. The local community would benefit from clean energy projects and reduce the need for fossil fuel power plants.

Concurrent construction of the foreseeable projects would result in a beneficial, cumulative impact on the local and regional economy and could decrease unemployment during the periods of construction.

4.15.4.9 Resource Use Patterns

Cumulative impacts to Resource Use Patterns are not analyzed because the Proposed Project would result in no resource use impacts and, therefore, would not contribute to cumulative impacts to resource use.

4.15.4.10 Transportation/Motorized Vehicle Access

The Proposed Project would potentially impact traffic and transportation systems by increasing the volume of traffic during the construction phase of the project. Because impacts to traffic and transportation would result primarily from construction-related activities, this analysis is limited to cumulative projects that would have concurrent construction schedules.

Most local roads in the cumulative effects area are infrequently used and would not be adversely affected by a temporary increase in road traffic. Construction of the cumulative projects would increase use of I-15 and during certain periods, when these projects would have overlapping schedules, these additional vehicle trips could impact traffic flow on I-15 and associated on/off-ramps. After exiting I-15, vehicles would access the Proposed Project and cumulative project areas using local arterial roadways, US Highway 93, and North Las Vegas Boulevard. Traffic on these local roads is currently acceptable and the addition of vehicle trips from Proposed Project and cumulative projects would not adversely affect traffic flow during peak construction.

4.15.4.11 Special Management Areas

Cumulative impacts to Special Management Areas were not analyzed because the Proposed Project would not impact any SMAs, National Preserves, Parks, or Wilderness Areas and would not contribute to cumulative effects.

4.15.4.12 Visual Resource

Cumulative impacts to visual resources could occur if multiple projects are developed in the same viewshed and significantly changes the natural surroundings. The terrain of the Project area is relatively flat with the Arrow Canyon Range Mountains in the background. Vegetation is primarily desert scrub/shrub and the area surrounding the Proposed Project in all directions can be described as industrialized open desert land. Many electric transmission lines and pipelines traverse the area and several power plants and electric substations are visible throughout the area. I-15 and the UP railroad are also obvious man-made features in the area.

Planned development for the area that would have cumulative effects on visual resources would be confined to aboveground features such as solar projects and electric transmission lines. Other projects such as pipelines would have a short-term cumulative effect if construction took place at the same time as other foreseeable projects, but over the long term would not add to cumulative visual effects.

Renewable energy projects (solar) within the Reservation and the foreseeable transmission line projects within the adjacent BLM lands would have weak-to-moderate cumulative effects on viewshed. Given the high number of existing transmission lines currently within the Proposed Project area, future lines would likely blend together from most viewpoints and seemingly look like a single industrial corridor as is the goal for grouping linear projects. The K Road Moapa Solar project would be located approximately 10 miles east of the Proposed Project and would not be seen within the same viewshed as the Proposed Project from any vantage point.

Construction impacts to visual resources from the cumulative projects would be similar to the Proposed Project. Large machinery, vehicles, and fugitive dust could impair the viewshed if projects were constructed at the same time. Actual impacts from the Proposed Project would be minimized given its location and inability to see the site from most viewpoints. If not constructed concurrently with the other foreseeable projects, cumulative impacts to visual resources from construction would be minimal and temporary.

4.15.4.13 Public Health and Safety

Impacts to hazards and hazardous materials caused by the Proposed Project would be limited to the Proposed Project site and land directly adjacent to the site because impacts would result only from incidents associated with hazardous materials during construction or maintenance activities. Cumulative impacts could occur during construction and operation and would be limited to the areas of concurrent construction or maintenance.

Within the Project area, there are no residential developments and only commercial and industrial infrastructure. The remainder of the area is primarily undeveloped open space / desert scrub-shrub. Within the undeveloped and open space land, there is little likelihood of significant soil or groundwater contamination.

The Proposed Project would only contribute to hazardous cumulative effects if significant spills occurred at the same time and in the same locality as the current or foreseeable projects. Given the site-specific and linear nature of the foreseeable proposed projects, it is highly unlikely that the Proposed Project would contribute to cumulative effects to public health and safety. All projects would be required to follow regulatory procedures outlined in SPCC, SWPPP, and hazardous waste management plans to stop, contain, and clean up hazardous spills.

Fire hazards would be associated more with the construction phase of the Proposed and foreseeable projects. A cumulative risk would occur only if multiple projects were under construction at the same time and the likelihood of multiple project construction overlapping is moderate to high given the 3-5 year construction process for large-scale solar and utility projects. A Fire Management Plan would be required for all cumulative projects on Reservation and BLM lands, thereby reducing the potential cumulative fire hazard.

4.16 Unavoidable Adverse Impacts

The following section describes the unavoidable adverse impacts that would occur as a result of the construction, O&M, and decommissioning activities associated with the Proposed Project. This section also includes a discussion of the irreversible and irretrievable commitments of resources associated with the Proposed Project.

4.16.1 Air Quality and Climate

Construction, operational, and decommissioning activities would result in unavoidable adverse impacts on air quality. However, these impacts are anticipated to be below thresholds that define any noticeable change to air quality or the local/regional climate. Exhaust and fugitive dust emissions from construction equipment and mobile sources would increase ambient concentration of regulated air pollutants and fugitive dust would be generated following disturbances by construction activities.

GHG emissions associated with the Proposed Project would be small and the Proposed Project would be consistent with the state's goals of reducing GHG emissions. Generation of renewable electricity through solar power would have long-term air quality benefits by replacing forms of electricity production having much higher levels of air pollutant and GHG emissions.

4.16.2 Soil

The Proposed Project would impact soils during construction and O&M activities. Soil impacts could also occur from petroleum and other hazardous material spills. The application of erosion control measures, Stormwater Pollution Prevention (SWPP) and Spill Prevention, Control and Countermeasures (SPCC) plans would mitigate these impacts. Impacted soils would be reclaimed following construction and decommissioning but any loss in productivity would be considered an Irreversible and irretrievable impact on soil resources and an unavoidable adverse impact.

4.16.3 Water Resources/Hydrology

As discussed in **Section 4.5**, changes in drainage patterns may increase erosion and sediment flow. However, due to the fact that the ephemeral channels drain into the playa lake south of the Project site and the BMPs that would be implemented, the risk of flooding at the site or downstream would be negligible. The Proposed Project would also withdraw water for construction and O&M activities from an existing well on the Reservation.

Irreversible and irretrievable contamination of water could occur as a result of the Proposed Project, but implementation of BMPs described in the SPCC plan would make it unlikely. Potential overdraft of groundwater resources from cumulative projects would be an irreversible and irretrievable effect.

4.16.4 Noise

As discussed in **Section 4.7** there are no local sensitive human receptors, nor are there local noise ordinances within the Proposed Project area. There would not be unavoidable adverse impact or irretrievable or irreversible commitment of this resource.

4.16.5 Biological Resources

Loss of 889 acres of habitat by implementing the Proposed Project would result in an unavoidable adverse impact for the life of the project. However, this number of acres of lost habitat would be a very small percentage of available habitat in the area. Therefore, this loss of native vegetation would not be expected to cause an irreversible and irretrievable commitment of the resource on a regional basis.

Localized and long-term, unavoidable, adverse impacts on wildlife, including special status species, would occur. Impacts to cacti and yucca species and desert tortoise on-site would be considered irreversible and irretrievable commitment of the resource.

4.16.6 Cultural Resources

Construction of the Proposed Project is not anticipated to affect any properties eligible to the National Register of Historic Places (NRHP). No new cultural resources eligible for listing were identified during the pedestrian survey of the site. In the event that ground disturbance causes the inadvertent discovery of previously unidentified subsurface cultural resources they would be managed based on guidance from the appropriate agency and the Tribe. Therefore, no irreversible or irretrievable impacts to cultural resources are anticipated.

4.16.7 Social and Economic Conditions

The MSEC Project is expected to create up to 300 construction jobs for a period of up to 24 months. After the Proposed Project is commissioned, up to 20 staff would be required to operate and maintain the facility and provide plant security. This employment would have a beneficial impact on the local economy. The Proposed Project would increase local spending which would have a beneficial effect. Therefore, there would be no irreversible and irretrievable commitments of the economic resources.

4.16.8 Environmental Justice

As discussed above, it is anticipated that the Proposed Project would have a positive effect on the local population including members of the Tribe by creating both temporary and long-term jobs. No unavoidable adverse impacts or irreversible and irretrievable commitments of resources are expected.

4.16.9 Resource Use Patterns

The Proposed Project would limit future use of 889 acres of the Reservation and nearby BLM lands for other uses for the life of the Proposed Project. This would irreversibly and irretrievably commit the land resource to this use.

4.16.10 Energy and Minerals

There are no active mines or surface quarries within 5 miles of the Proposed Project. The Tribe has no future plans for mining within the Proposed Project. Therefore, no unavoidable adverse impacts or irreversible and irreversible commitments of energy and mineral resources are expected.

4.16.11 Transportation/Motorized Vehicle Access

Construction of the Proposed Project would result in short-term increases in the use of I-15 and local arterial roadways for the duration of construction. This would result in a short-term increase in traffic volume of up to 700 vehicle trips per day. The Proposed Project would not cause a change in the level of service for the affected roads and would not cause a permanent irreversible and irretrievable commitment of the resource.

4.16.12 Special Management Areas

The Proposed Project is located approximately 19 miles west of the Valley of Fire State Park, 16 miles southeast of the Moapa Valley National Wildlife Refuge, 11 miles west of the Muddy Mountains Wilderness Area and 14 miles south of the Arrow Canyon Wilderness Area. No SMAs or LWCs would be directly or indirectly affected by the Proposed Project, and no irretrievable and irreversible commitment of resources would occur.

4.16.13 Visual Resources

Views of the Project from I-15 are blocked by intervening topography in several locations but there are locations on I-15 south of the Project from which the Project would be visible. The dominant man-made visual feature would be the solar field on the solar site and the gen-tie line. Views of the Project area from I-15 or US Highway 93 include the other man-made features in the viewshed including the multiple high voltage transmission lines ranging from 230kV to 500kV in size and substations / power plants varying by viewpoint location. Construction of the Proposed Project would cause unavoidable, short-term and long-term, adverse impacts on visual resources by adding man-made features to the viewshed. However, this impact would not be irreversible or irretrievable commitment of visual resources as these features would be removed during Project decommissioning.

4.16.14 Public Health and Safety/Hazardous Materials

Hazardous materials may be used during construction activities and localized spills and leaks of hazardous materials from equipment, storage sites or vehicles/equipment could occur. O&M of the Proposed Project would also involve the periodic use and transport of hazardous materials. Mitigation measures would be implemented to reduce potential impacts and the Proposed Project would not be expected to cause an unavoidable adverse public health and safety.

4.17 Relationship between Short-Term Uses and Long-Term Productivity of the Environment

Construction and O&M of the Proposed Project would result in the loss of resources over the life of the Project. Impacts to biological, soil, water, public safety, visual, noise, and air quality resources would occur. Approximately 889 acres of habitat would be affected beyond the life of the Proposed Project, and some flora and fauna specimens in and around the Proposed Project would be impacted.

While there would be irreversible and irretrievable commitments of some resources, as noted above, there would be no permanent loss of the overall productivity of the environment due to the Proposed Project.

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
T 16 S, R 63 E				
Fed Aid Highway (Sec 317) Non-Energy Facilities	NV Dept of Transportation	N-60729	1381.39	Current/Future
Fed Aid Highway (Sec 317) Non-Energy Facilities	NV Dept of Transportation	N-61073	80	Current/Future
Indian Allotment-General	Morrison, Amike K	N-32711	160	Pending
Material Sites(Sec 317) Non-Energy Facilities	FAA	N-61635	4.48	Current/Future
No BLM Report/No Data	NV State Div of Lands	N4202/02	13095	Past
No BLM Report/No Data	Ryan, Barri Wayne	N-32715/01	160	Pending
No BLM Report/No Data	Ruth E Morris	N-62435/01	160	Pending
No BLM Report/No Data	Coyote Springs	N-82066/01	176.85	Pending
Recreation &Public Purposes Class/Public Purposes	NV State Div of Lands	N-4202	13095	Current/Future
ROW-Boulder Canyon/Other Energy	Lincoln Cnty Power Dist. #1	CC-20073	99393.41	Current/Future

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
ROW-Boulder Canyon/Other Energy	NV Power Co.	N-53399	588.87	Current/Future
ROW-Comm Site, FLPMA/Non-Energy Facilities	AT&T Network Real Estate Admin	N-57116	0.057	Current/Future
ROW-O&G Pipelines/Non-Energy Facilities	Coyote Springs	N-82066	169.96	Pending
ROW-Power Tran Line/Other Energy Facilities	Overton Power Dist	N-91614	148.97	Pending
ROW-Power Tran Line/Other Energy Facilities	Overton Power Dist	N-55887	148.97	Past
ROW-Power Tran/Other Energy Facilities	Great Basin Transmission LLC	N-49781	4917.6	Current/Future
ROW-Power Tran-FLPMA/Other Energy Facilities	Great Basin Transmission LLC, Nevada Power Co., Sierra Pacific Power Co.	N-85210	5670	Current/Future
ROW-Power Tran-FLPMA/Other Energy Facilities	Transwest Express LLC	N-86732	1	Pending
ROW-Solar Dev FAC/Solar Energy Facilities	First Solar, Inc.	N-84232	3214.57	Pending
ROW-Solar Dev FAC/Solar Energy Facilities	Bright Source Energy	N-84631	2000	Pending
ROW-Tel &Teleg/Fiber Optic Facilities	MCI Worldcom Network Svc Inc.	N-43923	205.119	Current/Future
ROW-Tel &Teleg/Fiber Optic Facilities	Level 3	N-63221	258.27	Current/Future
ROW-Water Facility Fed/Non-Energy Facilities	USGS	N-88145	0.354	Pending
ROW-Water Facility/Non-Energy Facilities	Clark County Reg Flood	N-53699	0.001	Current/Future
ROW-Water Facility/Non-Energy Facility	NV Power Co.	N-37952	86.68	Pending
ROW-Water Facility/Other Energy Facilities	Southern NV Water Authority	N-78803	6383	Pending
Sec 7 Class	Ryan, Barri Wayne	N-32715	160	Pending
Surface Mgt-Notice/Calcium, Limestone LCS	Holcim (US) Inc.	N-84480	2.1	Pending
Surface Mgt-Notice/Limestone LCS	Crystal Pass Cement Co LLC	N-77280	2.1	Past
WDL-BLM-Misc/Subject to prior rights	BLM	N-87208	162297	Pending
WDL-BLM-Special Designat/Subject to prior rights	BLM	N-83979	944343	Current/Future

Table 4-14 CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT				
Project Type	**Applicant**	**Serial Number**	**Acres**	**Status**
WDL-FERC/Subject to Prior Rights	FERC Mormon Peak Co. Inc.	N-50950	1	Current/Future
T 17 S, R 63 E				
Fed Aid Highway (Sec 317) Non-Energy Facilities	NV Dept of Transportation	N-60522	290.24	Current/Future
Fed Aid Highway (Sec 317) Non-Energy Facilities	NV Dept of Transportation	N-60729	1381.39	Current/Future
Material Sites(Sec 317) Non-Energy Facilities	NV Dept of Transportation	N-61072	148.14	Current/Future
No BLM Report/No Data	NV Power Co.	N--84052/01	1	Pending
No BLM Report/No Data	BLM	N-91775	2.04	Pending
ROW Temp Use Permit	Dry Lake Water LLC	N-65768/01	2.06	Pending
ROW Temp Use Permit	Coyote Springs	N82066/01	176.85	Pending
ROW-Boulder Canyon Project /Other Energy	Lincoln County Power Dist. #1	CC-20073	99393.41	Current/Future
ROW-Boulder Canyon/Other Energy	NV Power Co.	N-53399	588.87	Current/Future
ROW-Comm Site, FLPMA/Non-Energy Facilities	GTP Infrastructure 1 LLC	N-81551	1.44	Current/Future
ROW-Misc & Special/Non-Energy Facilities	Harry Reid Center	N-58644	640	Current/Future
ROW-Misc & Special/Other Energy	BLM	N-52787	4479.43	Current/Future
ROW-O&G Pipelines/Non-Energy Facilities	Coyote Springs	N-82066	169.96	Pending
ROW-O&G Pipelines/Oil & Gas Facilities	NV Power Co.	N-85073	0.11	Current/Future
ROW-Pipeline-Other/Non-Energy Facilities	NV Power Co.	N-81555	11.4	Current/Future
ROW-Power Tran Line/Other Energy Facilities	NV Power Co.	N-67348	459.26	Current/Future
ROW-Power Tran-FLPMA/Fiber Optic Facilities	NV Power Co.	N-85072	0.303	Current/Future
ROW-Power Tran-FLPMA/Fiber Optic Facilities	NV Energy Co.	N-91637	35.74	Pending
ROW-Power Tran-FLPMA/Non-Energy Facilities	NV Power Co.	N-74575	6.67	Pending
ROW-Power Tran-FLPMA/Non-Energy Facilities	NV Power Co.	N-75025	705.9	Current/Future
ROW-Power Tran-FLPMA/Non-Energy Facilities	NV Power Co.	N-75607	11.708	Current/Future

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
ROW-Power Tran-FLPMA/Other Energy	NV Power Co.	N-12873	6217.744	Current/Future
ROW-Power Tran-FLPMA/Other Energy	NV Power Co.	N-73754	149	Current/Future
ROW-Power Tran-FLPMA/Other Energy	NV Energy Co.	N-73866	31.4	Current/Future
ROW-Power Tran-FLPMA/Other Energy	NV Power Co.	N-76327	784.39	Current/Future
ROW-Power Tran-FLPMA/Other Energy Facilities	Great Basin Transmission LLC, Nevada Power Co., Sierra Pacific Power Co.	N-85210	5670	Current/Future
ROW-Power Tran-FLPMA/Other Energy Facilities	Moapa Solar LLC	N-88870	168	Pending
ROW-Power Tran-FLPMA/Other Energy Facilities	NV Energy Co.	N-89453	1.21	Pending
ROW-Power Tran-FLPMA/Other Energy Facilities	NV Energy Co.	N-91604	0.78	Current/Future
ROW-Pwr Facilities/Other Energy Facilities	NV Power Co.	N-61363	284.1	Current/Future
ROW-Pwr Facilities/Other Energy Facilities	NV Power Co.	N-74510	223.9	Current/Future
ROW-Solar Dev FAC/Solar Energy Facilities	NV Power Co.	N-84052	2218.67	Pending
ROW-Solar Dev FAC/Solar Energy Facilities	First Solar, Inc.	N-84232	3214.57	Pending
ROW-Tel &Teleg/Fiber Optic Facilities	MCI Worldcom Network Svc Inc.	N-43923	205.119	Current/Future
ROW-Tel &Teleg/Fiber Optic Facilities	Level 3	N-63221	258.27	Current/Future
ROW-Tel &Teleg/Fiber Optic Facilities	NV Power Co.	N-75060	34.53	Past
ROW-Tel &Teleg/Fiber Optic Facilities	NV Energy Co.	N-75437	2.1	Current/Future
ROW-Tel &Teleg/Fiber Optic Facilities	NV Energy Co.	N-91300	6.79	Current/Future
ROW-Water Facility/Non-Energy	NV Power Co.	N-37952	86.68	Pending
ROW-Water Facility/Non-Energy	Dry Lake Water LLC	N-66025	1	Past
ROW-Water Facility/Other Energy Facilities	Dry Lake Water LLC	N-90731	0.52	Pending
ROW-Water Facility/Other-Energy Facilities	NV Power Co.	N-77251	9.54	Current/Future

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
ROW-Water Facility/Other-Energy Facilities	Southern NV Water Authority	N-78803	6383	Pending
Sale-Public Land	Clark County	N-59594	11421.08	Current/Future
Sale-Public Land	Clark County	N-60834	11421.08	Current/Future
WDL-BLM-Misc/Subject to prior rights	BLM	N-87208	162297	Pending
WDL-Special Designat/Subject to Prior Rights	BLM	N-83979	944343	Current/Future
T 17 S, R 64 E				
Communication Site	Genscape Inc.	N-76124	1	Current/Future
Federal Aid Highway	NV Dept of Transportation	CC -20450	1	Current/Future
Federal Aid Highway	NV Dept of Transportation	N-45278	339.39	Current/Future
Federal Aid Highway	NV Dept of Transportation	N-45565	1	Current/Future
Fiber Optic Facilities	FTV Comm C/O Level 3	N-62093	88.29	Current/Future
Material Sites	NV Dept of Transportation	CC -16459	480	Current/Future
Material Sites	NV Dept of Transportation	CC -18222	40	Current/Future
Material Sites	NV Dept of Transportation	N-45562	80	Current/Future
Material Sites	NV Dept of Transportation	N-45566	210	Current/Future
Material Sites	NV Dept of Transportation	N-46488	80	Current/Future
No BLM Report/No Data	NV Power Co.	N39815/01	16.83	pa
No BLM Report/No Data	FTV Comm C/O Level 3	N-62093/01	89.636	Pending
No BLM Report/No Data	NV Power Co.	N-7457501	11.25	Pending
No BLM Report/No Data	NV Power Co.	N-84052/01	1	Pending
Other Federal Facilities	Nellis AFB	N-49861	640	Current/Future
Power Facilities	NV Power Co.	N-61363	284.1	Current/Future
Power Transmission Line	Bureau of Reclamation, OR, LA City, NV Power Co	N4790	2562.17	Current/Future
Power Transmission Line	LA City Dept Water Pwr	N-10683	1	Current/Future
Power Transmission Line	NV Power Co.	N-12873	6217.744	Current/Future
Power Transmission Line	NV Power Co.	N-39815	175.86	Current/Future
Power Transmission Line	NV Power Co.	N-63151	28.65	Current/Future

Table 4-14 CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT				
Project Type	**Applicant**	**Serial Number**	**Acres**	**Status**
Power Transmission Line	NV Power Co.	N-74510	223.9	Current/Future
Power Transmission Line	NV Power Co.	N-74575	6.67	Pending
Power Transmission Line	Great Basin Transmission LLC, Nevada Power Co., Sierra Pacific Power Co.	N-85210	5670	Current/Future
Power Transmission Line	Moapa Solar LLC	N-88870	168	Pending
Power Transmission Line	K Road Moapa Solar LLC	N-89176	100	Current/Future
Power Transmission Line	NV Dept of Transportation	N-61985	1040.556	Current/Future
Power Transmission Line	NV Dept of Transportation	N-67348	459.26	Current/Future
Railroad & Stations	Los Angeles and Salt Lake Railroad Co.	CC -0360	6609.7	Current/Future
ROW-O&G Pipelines/Oil & Gas Facilities	Kern River Gas Transmission	N-42581	727.831	Current/Future
ROW-O&G Pipelines/Oil & Gas Facilities	Holly Energy Partners	N-82385	1	Current/Future
Solar Energy Facilities	NV Power Co.	N-84052	2218.67	Pending
Solar Energy Facilities	Bright Source Energy	N-84631	2000	Pending
Solar Energy Facilities	Power Partners Southwest	N-86159	1751.44	Pending
Telephone & Telegraph	Central Tele DBA Century Link	N-57781	12.97	Current/Future
Telephone & Telegraph	Central Tele DBA Century Link	N-0886	0.212	Current/Future
Water Facility	NV Power Co.	N-77251	9.54	Current/Future
WDL-BLM-Misc/Subject to prior rights	BLM	N-87208	162297	Pending
Wind Energy Facilities	Pioneer Green Energy	N-89219	20680	Pending
T 18 S, R 63 E				
Boulder Canyon	Lincoln County Power Dist. #1	CC -20073	99393.41	Current/Future
Boulder Canyon	NV Power Co.	N-53399	588.87	Current/Future
Communication Site	Genscape Inc.	N-88576	0.001	Current/Future
Communication Site	Genscape Inc.	N-88578	0.001	Current/Future
Communication Site	Genscape Inc.	N-88579	0.001	Current/Future
Communication Site	Genscape Inc.	N-88585	0.001	Current/Future
Dept of Air Force/Complex Reservation	Air Force, COE	N-54510	5789.5	Pending
Federal Aid Highway	NV Dept of Transportation	CC -20450	1	Current/Future

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
Federal Aid Highway	NV Dept of Transportation	N-45565	1	Current/Future
Federal Aid Highway	NV Dept of Transportation	N-57852	346.09	Current/Future
Federal Aid Highway	NV Dept of Transportation	N-60522	290.24	Current/Future
Fiber Optic Facilities	MCI Worldcom Network Svc Inc.	N-43923	205.119	Current/Future
Fiber Optic Facilities	NV Energy Co.	N-75437	2.1	Current/Future
Fiber Optic Facilities	NV Power Co.	N-75060	34.53	Past
Material Sites	NV Dept of Transportation	N-58485	200	Current/Future
Millsite	Georgia Pacific Corp.	N-57796	30	Pending
No BLM Report/No Data	Clark Cnty, Republic Dumpco	N-51810/04	467.82	Current/Future
No BLM Report/No Data	Clark County	N51810/01	3351.07	Current/Future
No BLM Report/No Data	Clark County	N-51810/02	1716.64	Current/Future
No BLM Report/No Data	Clark County	N-51810/03	467.82	Current/Future
No BLM Report/No Data	Diamond Solo LLC	N-85185/01	3.65	Past
No BLM Report/No Data	FTV Comm C/O Level 3	N-62093/01	89.636	Pending
No BLM Report/No Data	Mountain View Solar	N-90989/01	11.02	Current/Future
No BLM Report/No Data	NV Power Co.	N-06068/03	0.11	Past
No BLM Report/No Data	NV Power Co.	N-51925/02	0.17	Current/Future
No BLM Report/No Data	NV Power Co.	N-84052/01	1	Pending
Oil & Gas Facilities	Holly Energy Partners	N-82385	1	Current/Future
Oil & Gas Facilities	Kern River Gas Transmission	N-42581	727.831	Current/Future
Oil & Gas Facilities	Southwest Gas Corp	N-54088	66.92	Current/Future
Oil & Gas Facilities	Southwest Gas Corp	N-88267	11.68	Current/Future
Oil & Gas Facilities	Southwest Gas Corp	N-45762	27.488	Current/Future
Permits Sec 302 FLPMA/Other	Mountain View Solar	N-91564	1.03	Current/Future
Pipeline	NV Power Co.	N-81555	11.4	Current/Future
Power Facilities	NV Power Co.	N-06068	1.823	Current/Future
Power Facilities	NV Power Co.	N-61363	284.1	Current/Future
Power Transmission Line	Fotowatio Nevada Solar LLC	N-88313	1.47	Current/Future
Power Transmission Line	FTV Comm C/O Level 3	N-45167	0.03	Current/Future
Power Transmission Line	Level 3	N-63221	258.27	Current/Future

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
Power Transmission Line	Mountain View Solar	N-90989	10.98	Current/Future
Power Transmission Line	Mountain View Solar	N-91130	71.27	Pending
Power Transmission Line	NV Cogeneration	N-50909	67.322	Current/Future
Power Transmission Line	NV Energy Co.	N-73866	31.4	Current/Future
Power Transmission Line	NV Energy Co.	N-86638	0.378	Current/Future
Power Transmission Line	NV Energy Co.	N-87764	0.517	Current/Future
Power Transmission Line	NV Energy Co.	N-91604	0.78	Current/Future
Power Transmission Line	NV Power Co.	N-10623	29.78	Current/Future
Power Transmission Line	NV Power Co.	N-12873	6217.744	Current/Future
Power Transmission Line	NV Power Co.	N-39815	175.86	Current/Future
Power Transmission Line	NV Power Co.	N-51925	1.453	Current/Future
Power Transmission Line	NV Power Co.	N-63151	28.65	Current/Future
Power Transmission Line	NV Power Co.	N-73754	149	Current/Future
Power Transmission Line	NV Power Co.	N-73942	0.648	Current/Future
Power Transmission Line	NV Power Co.	N-75025	705.9	Current/Future
Power Transmission Line	NV Power Co.	N-75758	28.62	Current/Future
Power Transmission Line	NV Power Co.	N-76165	3.39	Current/Future
Power Transmission Line	NV Power Co.	N-12581	58.294	Past
Power Transmission Line	NV Power Co.	N-61985	1040.556	Current/Future
Power Transmission Line	NV Power Co.	N-66160	2.6	Current/Future
Power Transmission Line	NV Power Co.	N-66160/05	0.16	Past
Power Transmission Line	NV Power Co.	N-67348	459.26	Current/Future
Power Transmission Line	Silver State Energy Assoc.	N-86357	882.42	Pending
Roads	Clark County	N-80619	2.41	Current/Future
Roads	Clark County	N-86127	0.13	Current/Future
Roads	Diamond Solo LLC	N-85185	3.8	Current/Future
Roads	Roads & Rail Roads LLC	N-76322	2.41	Pending
ROW-Misc & Special/Other Energy	BLM	N-52787	4479.43	Current/Future
ROW-Other FLMPA/Non-Energy Facilities	Clark County Health Dist	N-51991	0.041	Current/Future
ROW-Other-FLPMA/Non-Energy Facilities	BLM	N-85012	0.007	Current/Future
ROW-Power Tran-FLPMA/Non-Energy Facilities	NV Power Co.	N-75607	11.708	Current/Future
ROW-Water Plants/Non-Energy Facilities	Chemical Lime Co.	N-06012	3.214	Current/Future

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
Sale-Public Lands-FLPMA/None	Clark County	N-59594	11421.08	Current/Future
Sale-Public Lands-FLPMA/None	Clark County	N-60834	11421.08	Current/Future
Solar Energy Facilities	NV Power Co.	N-84052	2218.67	Pending
Surface Mgt-Plan/Gypsum	Western Mining & Minerals, Johnson Charles	N-66569	20	Current/Future
Surface Mgt-Plan/Limestone	Chemical Lime Co.	N-72031	116	Current/Future
Telephone & Telegraph	Central Tele DBA Century Link	N-41586	2.424	Current/Future
Telephone & Telegraph	Central Tele DBA Century Link	N-47768	0.17	Current/Future
Telephone & Telegraph	Central Tele DBA Century Link	N-52539	0.46	Current/Future
Telephone & Telegraph	Central Tele DBA Century Link	N-57781	12.97	Current/Future
Telephone & Telegraph	Central Tele DBA Century Link	N-77197	0.14	Current/Future
Telephone & Telegraph	FTV Comm C/O Level 3	N-62093	88.29	Current/Future
Telephone & Telegraph	NV Energy Co.	N-91300	6.79	Current/Future
Telephone & Telegraph	NV Energy Co.	N-91637	35.74	Pending
Tram & Log Road-Pub Land/Non-Energy	Pabco Gypsum	N-49658	2.611	Current/Future
Water Facility	Southern NV Water Authority	N-78803	6383	Pending
WDL-BLM-Misc	BLM	N-87208	162297	Pending
WDL-BLM-Special Designat	BLM	N-83979	944343	Current/Future
Wind Energy Facilities	Pioneer Green Energy	N-89219	20680	Pending
T 18 S , R 64 E				
Federal Aid Highway	NV Dept of Transportation	CC -20450	1	Current/Future
Federal Aid Highway	NV Dept of Transportation	N-45565	1	Current/Future
Federal Aid Highway	NV Dept of Transportation	N-46487	0.001	Current/Future
Material Sites	NV Dept of Transportation	CC -23618	96.55	Current/Future
Material Sites	NV Dept of Transportation	N-45563	90	Current/Future
Material Sites	NV Dept of Transportation	N-46447	145.48	Current/Future
No BLM Report/No Data	Clark Cnty, Republic Dumpco	N-51810/04	467.82	Current/Future

Table 4-14
CUMULATIVE PROJECTS THAT COULD OCCUR WITHIN TOWNSHIPS SURROUNDING PROPOSED PROJECT

Project Type	Applicant	Serial Number	Acres	Status
No BLM Report/No Data	Clark County	N-51810/02	1716.64	Current/Future
No BLM Report/No Data	Clark County	N-51810/03	467.82	Current/Future
Oil & Gas Facilities	Holly Energy Partners	N-82385	1	Current/Future
Oil & Gas Facilities	Kern River Gas Transmission	N-42581	727.831	Current/Future
Power Transmission Line	BOR, LA City, NV Power Co	N-04790	2562.17	Current/Future
Power Transmission Line	LA City Dept Water Pwr	N-10683	1	Current/Future
Power Transmission Line	NV Power Co.	N-39815	175.86	Current/Future
Power Transmission Line	NV Power Co.	N-51925	1.453	Current/Future
Power Transmission Line	NV Power Co.	N-61363	284.1	Current/Future
Power Transmission Line	NV Power Co.	N-63151	28.65	Current/Future
Power Transmission Line	NV Power Co.	N-76165	3.39	Current/Future
Power Transmission Line	NV Power Co.	N-76327	784.39	Current/Future
Power Transmission Line	NV Power Co.	N-61985	1040.556	Current/Future
Power Transmission Line	NV Power Co.	N-67348	459.26	Current/Future
Power Transmission Line	Transwest Express LLC	N-86732	1	Pending
RR & Stations Outside AK/Non-Energy Facilities	LA & SL RR Co	CC -0360	6609.7	Current/Future
Sale-Public Lands-FLPMA/None	Clark County	N-59594	11421.08	Current/Future
Sale-Public Lands-FLPMA/None	Clark County	N-84631	11421.08	Current/Future
Solar Energy Facilities	Bright Source Energy	N-86159	2000	Pending
Solar Energy Facilities	Power Partners Southwest	N-71742	1751.44	Pending
Surface Mgt-Notice/Limestone LCS	Great Star Cement Co.	N-52539	12.2	Past
Telephone & Telegraph	Central Tele DBA Century Link	N-57781	0.46	Current/Future
Telephone & Telegraph	Central Tele DBA Century Link	N-83247	12.97	Current/Future
Water Facility	Republic Services	N-87208	11	Current/Future
WDL-BLM-Misc/Subject to prior rights	BLM	N-84631	162297	Pending
Wind Energy Facilities	Pioneer Green Energy	N-89219	20680	Current/Future

FIGURE 4-2
VISUAL SIMULATION OF PV PROJECT FROM KOP 1
LOOKING NORTHEAST FROM HIGHWAY 93 ABOUT 6.5 MILES SOUTHWEST OF THE MSEC SITE

FIGURE 4-3
VISUAL SIMULATION OF PV PROJECT FROM KOP 2
LOOKING NORTH FROM I-15 ABOUT 3.5 MILES SOUTH OF THE MSEC SITE

FIGURE 4-4
VISUAL SIMULATION OF PV PROJECT FROM KOP 3
LOOKING NORTHWEST FROM I-15 ABOUT 2.0 MILES SOUTHEAST OF THE MSEC SITE

FIGURE 4-5
VISUAL SIMULATION OF PV PROJECT FROM KOP 4
LOOKING WEST FROM ROUTE 40 / OLD SPANISH TRAIL ABOUT 6.75 MILES EAST-SOUTHEAST OF THE OF THE MSEC SITE

FIGURE 4-6
VISUAL SIMULATION OF PV PROJECT FROM KOP 5
LOOKING NORTHWEST FROM THE OLD SPANISHTRAIL ABOUT 7.0 MILES SOUTHEAST OF THE OF THE MSEC SITE

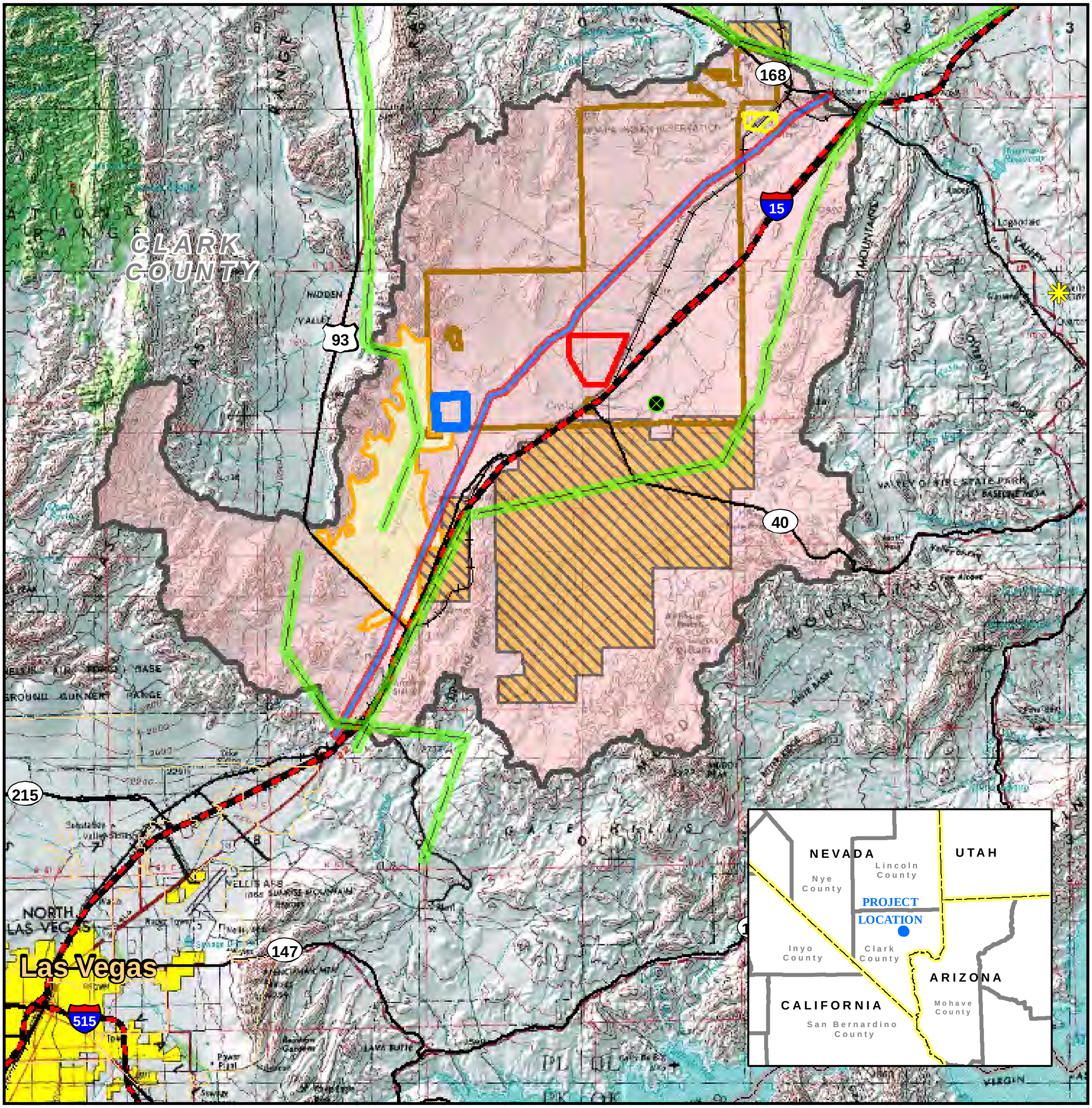
FIGURE 4-7
VISUAL SIMULATION OF eSOLAR CSP PROJECT FROM KOP 1
LOOKING NORTHEAST FROM HIGHWAY 93 ABOUT 6.5 MILES SOUTHWEST OF MSEC SITE

FIGURE 4-8
VISUAL SIMULATION OF eSOLAR CSP PROJECT FROM KOP 2
LOOKING NORTH FROM I-15 ABOUT 3.5 MILES SOUTH OF THE MSEC SITE

FIGURE 4-9
VISUAL SIMULATION OF eSOLAR CSP PROJECT FROM KOP 3
LOOKING NORTHWEST FROM I-15 ABOUT 2.0 MILES SOUTHEAST OF THE MSEC SITE

FIGURE 4-10
VISUAL SIMULATION OF eSOLAR CSP PROJECT FROM KOP 4
LOOKING WEST FROM ROUTE 40 / OLD SPANISH TRAIL ABOUT 6.75 MILES EAST-SOUTHEAST OF THE MSEC SITE

FIGURE 4-11
VISUAL SIMULATION OF eSOLAR CSP PROJECT FROM KOP 5
LOOKING NORTHWEST FROM THE OLD SPANISH TRAIL ABOUT 7.0 MILES SOUTHEAST OF THE OF THE MSEC SITE



Legend

	Private Solar Energy Development Project		K Road Moapa Solar Project
	Moapa Compost Facility		Reid Gardner Power Plant
	Proposed Large-Scale Power Transmission		BLM Solar Energy Study Areas
	UNEV/ KERN River Pipeline		Proposed Large Scale Solar Development
	Interstate		Cumulative Impacts Area
	US/ State Highway		
	Railroad		
	Municipal Boundary		Jurisdictional Land Ownership
	Proposed Solar Site Boundary		Indian Reservation

0 1 2 3 4 5

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center EIS

FIGURE 4-12
CUMULATIVE PROJECTS

Map Extent: Clark County, Nevada

Date: 06-06-13		Author: djb

I:\Moapa Solar/MXD's/Cumulative Projects 8.5x11 043013_EIS Figure 4-X.mxd

Chapter 5

Mitigation

CHAPTER 5
MITIGATION

Per the BIA Handbook (2012), analysis of alternatives must include a discussion of mitigation measures where mitigation is feasible, and of any monitoring designed for adaptive management. Mitigation measures are included to provide a full and accurate comparison of environmental effects of alternatives. These measures include design features and additional mitigation.

Mitigation of adverse environmental impacts is not required to implement a proposed action. The purposes of NEPA are to analyze these impacts, disclose them to the public in the EIS, and help public officials make decisions that are based on an understanding of environmental consequences and take actions that protect, restore, and enhance the environment. Mitigation measures represent best management practices and technologies, and the most current regulatory guidance to reduce adverse impacts to environmental resources such that the overall impacts resulting from the Proposed Project will minimized to the extent feasible. The analyses determined that mitigation measures would be implemented for the following resources to further minimize impacts: Soils, Water Quality, Air, Biological Resources, Cultural Resources, Transportation, and Public Health & Safety.

Several of the mitigation plans referenced in this section are included as appendices in this EIS. These include:

- Appendix C –Weed Management Plan
- Appendix D –Decommissioning Plan
- Appendix E –Restoration and Revegetation Plan
- Appendix M –Raven Control Plan
- Appendix N –Biological Assessment
- Appendix O – Bird and Bat Conservation Strategy (BBCS)
- Appendix P – Traffic Management Plan

5.1 Mitigation Measures – Soils

The Proposed Project could result in adverse impacts to soils as a result of increased erosion rates and reduction of soil productivity from removal of vegetation and grading activities. The Applicant would implement the following mitigation measures to reduce overall impacts to soil resources:

- Grading on the solar site would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project. Where no grading occurs, existing vegetation would be left in place and trimmed where necessary to avoid conflicts with panel operation.

- Construction and operational activities will be conducted in compliance with a SWPPP that would include BMPs and other erosion-control measures designed to minimize soil erosion and limit sheet flow and downstream sedimentation. The SWPPP would also incorporate adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site.

- To minimize wind erosion, all construction activities shall comply with the Fugitive Dust Control Plan that would be developed and implemented for the Proposed Project. Measures such as watering and 'stop work' periods during high winds would be incorporated into the plan.

- A Site Restoration and Revegetation Plan would be implemented to limit impacts to native, on-site vegetation as much as practicable. The Plan would define construction limits and BMP measures for soil restoration and re-planting and establish monitoring and success criteria.

5.2 Mitigation Measures – Water Quality / Quantity

Potential adverse impacts to water are related to soil erosion and downstream sedimentation as well as water transport of hazardous material through soil erosion. As mentioned above, soil erosion would be managed via the SWPPP and erosion controls within ephemeral washes to reduce velocity of flood flow and limit downstream sedimentation. The measures below would be implemented to reduce overall impacts to water quality:

- Grading on the solar site would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project – such as where leveling is necessary, the driveways among the rows of panels, etc. The drainage plan will be designed to allow all surface flows upstream of the site to flow to the ephemeral drainages downstream of the site.

- Final grading and drainage plans will be completed and submitted for approval prior to construction. The final drainage and grading plans would demonstrate that downstream flows would not be adversely impacted due to any proposed changes to natural washes resulting from proposed grading, drainage management measures or the addition of retention ponds.

- The paths for all stormwater flows would be identified and modeled as part of the final grading and drainage plan.

- As part of the minimization of grading in the final design, ephemeral drainages would be avoided to the extent practical. Specifically, the major on-site drainage that runs north-south in the eastern portion of the site would be targeted for avoidance with a vegetative buffer maintained on both sides. The retention of other smaller drainages would be maximized to the extent practical where they can remain stable with project operation.

- The number of drainage crossings would be minimized to the extent possible and each would be designed to accommodate adequate flow.

- Adaptive management techniques will be implemented via the SWPPP to maintain BMPs utilized to decrease sediment erosion and downstream transport of such during large rain events.

- Permanent channel monitoring stations would be incorporated into the final SWPPPs.

- Weekly and post-storm monitoring of erosion and sedimentation would be conducted during construction. If localized gullies were to develop or result in increased rates of erosion and sedimentation, repairs would be made and erosion and sedimentation control measures would be updated.

- Existing vegetative buffers would be maintained as much as practical along perimeter edges of major drainages.

- Placing Project facilities in washes would be avoided by all alternatives to minimize direct and indirect impacts to the washes from erosion, migration of channels and local scour. All larger ancillary facilities will be located outside of drainages. Some PV supports could be placed within ungraded drainages where technically feasible.

- Where fencing would be built across drainages, breakaway fencing would be installed and would be designed to avoid interference with flows through those drainages. Breakaway fencing would be inspected and repaired as needed within 48 hours of large flood events.

- A SPCC plan would be developed and implemented during construction and the operations phase of the Proposed Project. Adequately-sized secondary spill containment would be incorporated with all chemical storage vessels to ensure proper capture and control measures for potential spills. The Plan would also provide for hazardous material spill prevention and clean-up measures, were a spill to occur.

- To conserve water, xeric landscaping would be used if applicable.

5.3 Mitigation Measures – Air

The primary impact upon air would occur during the construction and decommissioning periods from increased vehicle emissions and fugitive dust. The following mitigation measures would be incorporated into construction contracts by the Proponent and would be implemented to reduce overall air impacts that would result from the Proposed Project:

- The area of grading and vegetation removal would be limited to only that area required for Project construction and operation. Where grading is not necessary, vegetation will be trimmed as needed to allow the surface soils and local drainage to be left undisturbed. Ground disturbance would be scheduled to occur in advance of construction to minimize the amount of time areas would be exposed to wind erosion.

- Vehicular speeds on non-paved roads would be limited 25 miles per hour.

- When hauling material and operating non-earthmoving equipment, spillage would be prevented and speeds would be limited to 15 miles per hour and speed of earth-moving equipment to 10 mph.

- Wind fencing capable of maintaining natural hydrological flows would be installed where needed, grading operations would be phased where appropriate to limit the amount of disturbance at any one time, and water trucks would be used for stabilization of surfaces under windy conditions.

- Water would be applied to disturbed areas to control dust and to maintain moisture level at optimum levels for compaction, as needed. Water will be applied using water trucks and application rates would be monitored to prevent runoff and ponding.

- Exposed stockpiled material areas would be covered during windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater).

- Dust control measures such as watering and the application of palliatives approved by the USFWS would be applied to access roads and other Project roads to adequately control fugitive dust.

- Excavation and grading would be suspended during periods of high wind.

- All trucks hauling soil and other loose material would be covered or at least 2 feet of freeboard would be maintained.

- All paved roads would be kept clean of objectionable amounts of mud, dirt, or debris, as necessary. Gravel or other similar material would be used where non-paved access roads intersect paved roadways to prevent mud and dirt track-out.

- Air pollutant emissions from the emergency diesel generators and fire water pump engines would be minimized by an operating limitation of no more than 50 hours per year, per engine for routine testing and maintenance of these components. These engines would be compliant with current EPA tier emission performance criteria.

- Recommend that all contractors maintain and tune engines per manufacturer's specifications to perform to EPA certification levels, where applicable.

- Any tampering with engines would be prohibited and continuing adherence to manufacturer's recommendations would be required.

- Recommend that contractors lease new, clean diesel burning equipment. In general, the best available emissions control technology would be used - Tier 4 engines should be used for project construction equipment to the maximum extent feasible.

- Limit unnecessary idling, and perform periodic and unscheduled inspections to ensure that construction equipment is properly maintained.

- Recommend that contractors use EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutions at the construction site.

- A traffic and parking management plan would be developed to minimize traffic interference and maintain traffic flow.

5.4 Mitigation Measures – Biological Resources

The following measures will minimize, reduce, and mitigate impacts to biological resources from implementation of the Proposed Project:

- As identified in the Biological Opinion (**Appendix R**), the following measures will be implemented in order to mitigate potential effects to desert tortoise:

    - Oversee establishment and functionality of sediment control devices as outlined in the Storm Water Pollution Prevention Plan. Ensure that Best Management Practices (BMPs) are in place and working properly on a weekly basis.

- Awareness training for desert tortoise would be provided to everyone onsite and performed by qualified personnel only.
- Biologists would monitor the construction activities daily during the initial site disturbance (including installation of temporary and permanent desert tortoise exclusion fencing) and at weekly intervals after all tortoises have been removed from the site. Biologists shall be onsite daily to respond to tortoise issues. Exclusionary fencing would be checked monthly and after any substantial rain event to ensure that they are effective barriers for desert tortoise.
- Implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation within the project area from an outside source. Trucks and other large equipment would be randomly checked before entering the site for any invasive species debris or seed.
- A permanent perimeter of tortoise-exclusionary fencing will be constructed around the solar facility boundary. Pre-construction clearance surveys to remove tortoises from the construction area will be conducted following Service protocol (2010). Construction of the exclusionary fence will be monitored by a qualified biologist in order to eliminate impacts to tortoise burrows or live tortoises. The fence shall be maintained in accordance with Service standards. Tortoise guards shall be placed at all road access points, where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the road and solar facility.
- Biological monitors to monitor the various construction crews in the active construction areas will be assigned until 100-percent tortoise clearance is confirmed. Biological monitoring will also occur during access road improvements and gen-tie and water pipeline construction in occupied desert tortoise habitat.
- The Applicant will pay a fee based on acreage of disturbance to the Tribe for disturbance of Tribal lands and to the BLM for disturbance of BLM lands. The fees will be assessed at a rate to be determined by the Tribe, BLM, and Service. The Tribe, BLM, and Service have agreed that the funds will be used to implement conservation measures established in the Reservation-wide desert tortoise management and conservation plan prepared for the K Road Moapa Solar Project and approved by the Tribe, BIA, and Service.
- A biological monitor will be present during maintenance activities if occurring outside of the perimeter fence. Pre-maintenance clearance surveys followed by temporary exclusionary fencing may also be required in desert tortoise habitat if the maintenance action requires ground or vegetation disturbance.
- Speed limits within the project area will be restricted to less than 25 miles per hour (mph) during construction and operation. Speed limit signs will be posted along the access road. Lower speed limits may be imposed to protect tortoises if determined necessary by the Service.
- Lighting will be focused in toward the solar facility and downward to avoid lighting habitats beyond the SPGF perimeter.

- Any trenches or excavations will be covered if left overnight or have escape ramps to allow wildlife to safely exit.
- A Raven Control Plan will be prepared for the project. This plan will prescribe the following measures to limit the impacts of common ravens and other avian scavengers on desert tortoise:
  - Monitoring for the presence of ravens and other potential human-subsidized predators of special status wildlife will be conducted.
  - BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.
  - If ravens are seen building nests, this nesting material will be removed prior to an egg being laid.
  - To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for wildlife. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.
- A Weed Management Plan, which must be approved by the BIA, BLM, and the Tribe will be implemented prior to the initiation of ground disturbing activities. Mitigation measures in the Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; re- establishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration.
- A designated field contact representative (FCR) will be assigned to the construction phase of the solar project components; additional FCRs will be assigned for the linear project components including the transmission line and water pipeline.
- Desert tortoises will be relocated to BLM-managed lands or Tribal lands following the Terms and Conditions in this Biological Opinion. Reporting of relocations and other information pertaining to desert tortoise will be completed per the Terms and Conditions in this Biological Opinion issued by the Service. Desert tortoise relocation is considered a take and requires an incidental take authorization from the Service.
- If a tortoise is injured as a direct or indirect result of project activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility.
- Tortoises within the solar facility footprint will be translocated to secure areas outside the fence on Tribal lands as approved by the Service. The disposition of displaced desert tortoises will be evaluated and reported on

following the Terms and Conditions of this Biological Opinion.

- Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is encountered on the project site. Project activities may resume after an authorized desert tortoise biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.
- The Applicant and Tribe will coordinate to salvage and relocate cacti, yuccas, and shrubs on linear ROWs and plant them back on temporarily disturbed portions of the ROWs similar to the efforts undertaken on adjacent BLM lands. If the Tribe chooses to salvage plants from the solar facility, these plants may be held in a nursery or other temporary holding location until needed; no monitoring is required for these plants.
- All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible.
- The Applicant will develop a habitat restoration plan to be implemented for all temporary disturbances associated with construction of the project to be approved by the BIA, BLM (for disturbance of BLM land), Tribe, and the Service.

All trenches and holes will be covered, fenced or backfilled to ensure desert tortoises do not become trapped unless alternate measures are in place as agreed by BLM, BIA, and the Service. If trenches or holes are to remain open during construction, they will be checked for tortoises at least four times a day, at the start of day, at mid-morning, early afternoon, and at the end of the work day. The trenches or holes will also be checked immediately before backfilling regardless of the season. Tortoises found in the trench will be reported and moved out of harm’s way in accordance with handling protocols (Service 2009). In addition, wildlife escape ramps in open trench segments will be no greater than every 0.25 mile.

The following reasonable prudent measures (RPMs) and terms and conditions are required as part of the project’s BO (**Appendix R**). To be exempt from the prohibitions of section 9 of the Endangered Species Act, the BIA, BLM, Tribe and Applicant, including all agents, consultants, and contractors, must comply with the following terms and conditions, which implement the reasonable and prudent measures described above, and are intended to minimize the impact of incidental take on the Moapa dace and desert tortoise. These terms and conditions are non-discretionary.

1. Moapa Dace

<u>RPM 1</u>: *The BIA shall ensure that measures are implemented to minimize potential impacts to Moapa dace that may result from groundwater pumping associated with construction and O&M of the proposed solar project.*

Terms and Conditions – The following terms and condition implements RPM 1:

The BIA and Tribe shall implement all conservation measures outlined in the Muddy River MOA that are specific to the project applicant, as well as those measures to be carried out in conjunction with other Parties to the MOA. The specific measures applicable to the Tribe are detailed in the PBO (File No. 1-5-05-FW-536).

2. Desert Tortoise

RPM 2: *The BIA and BLM shall ensure the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.*

Terms and Conditions – The following terms and conditions implement RPM 2:

2.a. To ensure that the conservation measures are effective and properly implemented, the Service and BLM shall be informed immediately upon discovery of a desert tortoise that has been killed or injured within the Action Area of the project. At that time, and in coordination with the Service, the BIA or BLM must review the circumstances surrounding the incident to determine whether additional protective measures are required. Project activities may continue during the outcome of the review, provided the conservation measures included as part of the proposed action (see "Conservation Measures" section) and the T&Cs in this biological opinion have been and continue to be fully implemented.

2.b. Authorized desert tortoise biologists (ADTBs) will be employed to monitor project activities within desert tortoise habitat and are responsible for locating desert tortoise and their sign (i.e., conduct clearance surveys). ADTBs must ensure proper implementation of protective measures, and make certain that the effects of the project on the desert tortoise and its habitat are minimized in accordance with this biological opinion. All incidents of noncompliance in accordance with this biological opinion must be recorded and reported.

Potential authorized desert tortoise biologists must submit their statement of qualifications to the Service's Nevada Fish and Wildlife Office for approval, allowing a minimum of 30 days for Service response. The statement form is available on the internet at: *http://www.fws.gov/nevada/desert_tortoise/auth_dt_form.htm*. Within 3 days of employment or assignment, the Applicant, BLM, or BIA shall provide the Service with the names of FCRs and biological monitors who will assist the authorized desert tortoise biologist.

2.c. FCRs will be assigned to the construction phase of the solar project components; additional FCRs will be assigned for the linear project components including the transmission lines, water pipeline, and access road, as needed. The FCR will be responsible for ensuring compliance to BMPs and other mitigation and minimization measures. Authorized desert tortoise biologists and the FCRs shall be onsite during all construction activities to ensure compliance with this biological opinion, including avoidance of inadvertently harming any desert tortoises that may wander onto the construction site. The authorized desert tortoise biologist and FCRs shall be responsible for: (1) enforcing the litter-control program; (2) ensuring that desert tortoise habitat disturbance is restricted to authorized areas; (3) ensuring that all equipment and materials are stored within the boundaries of the construction zone or within the boundaries of previously-disturbed areas or designated areas; (4) ensuring that all vehicles associated with construction activities remain within the proposed construction zones; and (5) ensuring compliance with the T&Cs of this biological opinion.

2.d. All desert tortoises in harm's way may be moved out of harm's way by an authorized desert tortoise biologist (T&C 3a). We do not expect that take, in the form of capture or collection, required to move desert tortoises out of harm's way during construction of the linear project components will result in mortality or injury of any individuals. However, we are establishing a notification requirement for the number of individuals that are moved out of harm's way during construction of linear project components to establish a reinitiation criterion for the BIA and BLM.

2.e. The BIA or BLM must reinitiate consultation on the proposed action if any of the following occur: more than 10 subadult or adult desert tortoises are identified for relocation during clearance surveys of the SPGF; desert tortoise mortalities exceed thresholds in Table 3; or desert tortoise incidental take along the linear ROWs in the form of capture and handling exceed the number identified in Table 3.

2.f. Desert tortoises that are determined to be sick or injured, will be transferred to an appropriate facility as directed by the Service. The Applicant is responsible for paying for care of desert tortoises taken to the Desert Tortoise Conservation Center or other facility.

<u>RPM 3</u>: *The BIA or BLM shall ensure that desert tortoises and their eggs in harm's way are located, properly handled, and moved to safety.*

Terms and Conditions – The following terms and conditions implement RPM 3:

3.a. A desert tortoise education program will be prepared and presented by an authorized desert tortoise biologist to all personnel onsite during construction activities. The program will contain information concerning the biology and distribution of the desert tortoise, its legal status and occurrence in the proposed project area, the definition of take and associated penalties, measures designed to minimize the effects of construction activities, the means by which employees can facilitate this process, and reporting requirements to be implemented when desert tortoises are encountered.

3.b. Tortoise-proof fencing shall be installed around the boundary of the SPGF. Fence specifications will be consistent with those approved by the Service in the Desert Tortoise Field Manual (Service 2009). Shade stations will be installed along the outside of the tortoise fence for tortoises that may travel along this area. Once exclusion fencing is installed, an authorized desert tortoise biologist will survey the area following standard protocols (Service 2009) to ensure that no tortoises or active burrows are present in the fenced area. Fencing will be checked monthly and after precipitation that could result in erosion along the base of the fence. Repairs will be made in a timely manner upon discovery of potential breaches in the fencing. Monitoring and maintenance of the fencing shall include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried.

Tortoise guards shall be placed at all road access points, where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the road and solar facility. The Applicant shall coordinate with the Service on placement and design of tortoise guards and their connection with the fencing, to ensure that the guards provide a functional barrier to desert tortoises. Tortoise guards will be inspected quarterly and maintained to ensure they continue to function as a tortoise barrier.

3.c. Prior to surface-disturbing activities, authorized desert tortoise biologists, potentially assisted by project monitors, shall conduct a clearance survey in accordance with Service-approved protocol (Service 2009) to locate and remove all desert tortoises from areas to be disturbed or in harm's way using techniques that provide full coverage of all areas. Two passes of complete coverage will be accomplished. The authorized desert tortoise biologists shall also capture, handle, and relocate desert tortoises from harm's way in accordance with the Desert Tortoise Field Manual (Service 2009), as appropriate. Any tortoises encountered after clearance surveys in the SPGF will be handled in the same manner to those encountered during clearance surveys. Any desert tortoise eggs observed in harm's way will be relocated from harm's way by an authorized desert tortoise biologist in accordance with Service-approved protocol (Service 2009). Desert tortoise burrows that occur immediately outside work areas that can be avoided by project activities shall be clearly marked or flagged to prevent crushing. Burrows occupied by adult females will be examined thoroughly for nests and eggs during the months of May through October. For those burrows that can be avoided, no desert tortoises shall be prevented from exiting their burrows by placing rocks or other obstructions at their burrow entrances without written authorization from the Service.

3.d. All burrows detected within areas proposed for disturbance, whether occupied or vacant, shall be excavated by an authorized desert tortoise biologist and collapsed. All burrows will be excavated with hand tools to allow removal of desert tortoises or desert tortoise eggs. All desert tortoise handling and excavations, including nests, will be conducted by an authorized desert tortoise biologist in accordance with Service-approved protocol (Service 2009).

3.e. *Project areas outside the fenced solar facility:* All desert tortoises in harm's way shall be relocated to safe areas up to 1,000 feet from the point of capture in accordance with the Desert Tortoise Field Manual (Service 2009). If a tortoise is injured as a direct or indirect result of project activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility and the Service will be notified by the close of the first business day subsequent to the incident.

Project areas inside the fenced solar facility: The Applicant will complete health assessments and a disposition plan for each tortoise encountered in the SPGF following Service-approved protocol (Service 2013). Disposition plans must be submitted to and approved by the Service's Desert Tortoise Recovery Office and Las Vegas office prior to relocating any tortoises. Tortoises encountered within 1,000 feet outside of the fence boundary also may be considered for relocation to secure areas outside the fence if approved by the Service.

3.f. Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is encountered on the project site. Project activities may resume after an authorized desert tortoise biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.

3.g. If a tortoise is encountered and relocated to a safe area, an authorized desert tortoise biologist, biological monitor, or FCR shall inform workers in the area to be particularly watchful for the tortoise as it may return to the work area.

3.h. Areas underneath parked project vehicles and equipment will be inspected for desert tortoises before moving them.

3.i. Vehicle speed within the project area will not exceed 25 mph. Speed limits will be clearly marked and all workers will be made aware of these limits.

3.j. Water used for fugitive dust control will not be allowed to pool on access roads or other project areas outside the fenced area, as this can attract desert tortoises. Similarly, leaks on water trucks and water tanks will be repaired to prevent pooling water.

3.k. Should any desert tortoise be injured or killed, all activities that have the potential for take will be halted, and the FCR or authorized desert tortoise biologist will be immediately contacted. The BIA, BLM, FCR or authorized desert tortoise biologist will notify the Las Vegas office of the Service by the close of the first business day subsequent to the incident.

3.l. The BIA, BLM, Tribe, and Applicant shall implement appropriate measures, which may include measures not specified in this biological opinion, to ensure that desert tortoises captured and moved, or occur in harm's way do not die or become injured as a direct or indirect (e.g., predation, maladjustment to release areas) result of the project. Measures in this biological opinion may require modification or additional measures may be necessary in response to conditions and situations that pose a threat to the well-being of desert tortoises, in consultation with the Service.

RMP 4: *The BIA or BLM shall ensure implementation of measures to minimize predation on desert tortoises by ravens or other desert tortoise predators attracted to the action area.*

Terms and Conditions – The following terms and conditions implement RPM 4:

4.a. A litter control program shall be implemented to reduce the attractiveness of the area to opportunistic predators such as desert kit fox, coyotes, and common ravens. Trash and food items will be disposed properly in predator-proof containers with re-sealing lids. Trash containers will be emptied and construction waste will be removed daily from the project area and disposed of in an approved landfill.

4.b. The Applicant will monitor for the presence of ravens and other potential human-subsidized predators will be conducted and a control plan will be developed and implemented in coordination with the Service if predator densities substantially increase in the vicinity of the facility. In addition to trash management, the Applicant will implement BMPs to discourage the presence of ravens onsite including elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens. Raven nesting material may be removed if no eggs or young are present in the nest.

4.c. Dogs will be prohibited in all project work areas.

RMP 5: *The BIA or BLM shall ensure implementation of measures to minimize loss and long-term degradation of desert tortoise habitat, such as soil compaction, erosion, crushed vegetation, or introduction of non-native invasive plants or weeds as a result of project activities.*

Terms and Conditions – The following terms and conditions implement RPM 5:

5.a. Perennial native vegetation will be flagged and avoided to the maximum extent practicable.

5.b. Cross-country travel and travel outside designated areas shall be prohibited.

5.c. The Applicant and Tribe will coordinate to salvage and relocate cacti, yuccas, and shrubs on linear ROWs and plant them back on temporarily disturbed portions of the ROWs similar to the efforts undertaken on adjacent BLM lands. If the Tribe chooses to salvage plants from the 850-acre solar facility, these plants may be held in a nursery or other temporary holding location until needed; no monitoring is required for these plants.

5.d. All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible.

5.e. The Applicant will develop a habitat restoration plan prior to construction of the project to be implemented for all temporary disturbances associated with construction of the project to be approved by the BIA, BLM (for disturbance of BLM land), Tribe, and the Service.

5.f. The proposed Weed Management Plan will be developed and implemented (Conservation Measure 15).

5.g. Final power transmission tower and associated spur road locations will be adjusted to avoid potentially active tortoise burrows to the maximum extent practicable.

5.h. In accordance with the project description, the Applicant will pay remuneration fees for the acres disturbed on Tribal and BLM lands, accordingly, prior to surface-disturbing activities associated with the MSEC. BLM shall collect remuneration fees for compensation of 215.5 acres of desert tortoise habitat loss (Appendix A). For disturbance desert tortoise habitat on BLM lands, the fee would be assessed at the rate of $824 per acre of disturbance (Hastey et al. 1991). The next adjustment will occur March 1, 2014. Total fees for project disturbance of desert tortoise habitat on BLM lands will be (215.5 acres x $824) $177,572. Remuneration fees shall be used for management actions, as identified by the BLM and Service, expected to promote recovery of the desert tortoise over time. Actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species' biological requirements, reducing loss of individual animals, documenting the species status and trend, and preserving distinct population attributes.

This fee will be paid directly to BLM. The payment shall be accompanied by the Section 7 Fee Payment Form (Appendix A) and completed by the payee. Payment shall be certified check or money order payable to BLM, and delivered to:

DOI/BLM
ATTN: Information Access Center
The Bureau of Land Management
1340 Financial Boulevard
Reno, Nevada 89502
Contact: (775) 861-6400

The Tribe shall collect remuneration fees for compensation of 860.8 acres of desert tortoise habitat loss (Appendix A). Total fees for project disturbance of desert tortoise habitat on Tribal lands will be (860.8 acres x $824) $709,299.20. Remuneration fees shall be used for management actions, as identified by the Tribe, BIA, and Service, expected to promote recovery of the desert tortoise over time.

RPM 6: *The* BIA or *BLM shall ensure implementation of measures to ensure compliance with the RPMs, Terms and Conditions, reporting requirements, and reinitiation requirements contained in this biological opinion.*

Terms and Conditions – The following terms and conditions implement RPM 6:

6.a. Construction and O&M Reporting Requirements: The BIA and BLM will be responsible for providing quarterly reports during construction and annual reports during O&M activities for actions on lands managed by the respective agency. The BIA and BLM may delegate this responsibility to the Tribe or Applicant. In addition, a final construction report will be submitted to the Service within 60 days of completion of construction of the project. All quarterly reports are due by the 10^{th} of each of the following months (January, April, July, October) 10 days following the end of the month, and annual reports are due February 1 of each year. The Service anticipates the first annual report by February 1, 2015, if construction or project activities occur in 2014. Annual reports shall be provided to the Service during O&M activities for the life of the facility.

Tortoise monitoring reports are required quarterly during the duration of construction and annually during O&M for the life of the facility. Specifically, all reports must include Table 4 (see below) information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring. Additionally, the reports should provide detailed information regarding each desert tortoise handled or observed. Information will include the following: location (GPS), date and time of observation, whether desert tortoise was handled, general health and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures.

Table 4
Desert Tortoise Actual Incidental Take
for the Moapa Solar Energy Center Project
Clark County, Nevada

Activity	**Actual Mortality, Injury, and Destruction**		**Actual Harassment: Capture and Removal**		**Actual Habitat Loss (ac)**	
	Adults / Subadults	Juveniles / Hatchlings	Adults / Subadults	Juveniles / Hatchlings	Critical	Non-critical
Construction						
Operation and Maintenance						
Predation					None	

Minimization Measure Implemented	**Effectiveness and Recommendations**

6.b. Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist or biological monitor to be in non-compliance with this biological opinion will be documented immediately by the authorized desert tortoise biologist and included in the monitoring report.

General Biological Mitigation Measures

- Preconstruction surveys will be conducted by qualified biologists according to the most current USFWS, BLM or NDOW protocols, where available, by species. These surveys would confirm the presence of special status plants, noxious weeds, and general and special status wildlife species, to help prevent direct loss of vegetation and wildlife and to prevent the spread of noxious plant species.

- Biological monitors will be assigned to the Proposed Project in areas of sensitive biological resources and along all roads used by Project personnel. Biological monitors would be in place along the access road during construction and/or temporary fencing utilized during the construction period to minimize any impacts from vehicles during construction. The monitors will be responsible for ensuring that impacts to special status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. Where appropriate, monitors will flag the boundaries of areas where activities would need to be restricted to protect native plants and wildlife or special status species. Those restricted areas will be monitored to ensure their protection during construction.

- Oversee establishment and functionality of sediment control devices as outlined in the SWPPP. Placement of these devices may need to be adjusted and placed further from roads to minimize risk to tortoises using them for shade. Ensure that BMPs are in place and working properly on a weekly basis.

- The Applicant will implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation to the Proposed Project site from an outside source. Trucks and other large equipment will be randomly checked before entering the site for any invasive species debris or seed.

  The Applicant will pay a fee based on acreage of disturbance to the Tribe for disturbance of Tribal lands and to the BLM for disturbance of BLM lands. The fees will be assessed at a rate to be determined by the Tribe, BLM, and Service who will agree upon how the funds will be spent prior to initiation of consultation and included in the proposed action for the Biological Opinion. Funds will be used to implement conservation measures established in the Reservation-wide desert tortoise management and conservation plan prepared for the K Road Moapa Solar Project and approved by the Tribe, BIA, and Service.

- Any trenches or excavations should be covered if left overnight or have escape ramps to allow wildlife to safely exit.

- Monitoring for the presence of ravens and other potential human-subsidized predators of desert tortoises will be conducted and a Raven Control Plan will be implemented. BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, removal of nesting material prior to an egg being laid, and active monitoring of the site for presence of ravens.

  - To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for wildlife. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.

- All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible. Crushing of perennial vegetation in work areas will be avoided to the maximum extent practicable.

- All transmission towers and poles will be designed to be avian-safe in accordance with the *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006) and the Avian Power Line Interaction Committee (APLIC 2006) and *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC 2012). Additionally, a post-construction bird study will be implemented to monitor for incidents of bird strikes during the operation of the Proposed Project. The scope and protocol of the post-construction surveys for the monitoring and reporting of bird strikes were determined in the Bird and Bat Conservation Strategy (BBCS) developed in coordination with USFWS. If the tubular-H design type transmission pole structures are used the horizontal member of the structure will be fitted with an inverted-Y bar to discourage perching. Similar measures will be used to deter nesting if lattice structures are utilized. The following measure identified in the Bird and Bat Conservation Strategy will also be put into place:

    - Areas along the transmission line(s) with a high potential for collision would incorporate flight diverters on the static line to make it more visible. Static lines are the smallest diameter lines, and potentially the most difficult for birds to see and avoid. Where any pole requiring guy wires is located near areas of concentrated bird activity, guy wires would be marked to increase visibility where possible. Currently, guy wire locations are not known. Post-construction monitoring and adaptive management will clarify areas of concentrated avian and/or bat use as well as areas experiencing a high degree of avian or bat mortality. Flight diverter types and locations would be determined through consultation with the BLM, USFWS, and/or NDOW. The number of structures requiring the use of guy wires would be kept to a minimum.

    - To reduce perching along segments of the transmission line, perch deterrents would be installed during construction. Anti-perching and nesting devices are important tools for reducing the risk of avian electrocution and keeping the entire electrical system running smoothly. These deterrents also preclude the use of transmission lines and transmission line towers as hunting perches for raptor species, limiting the predation of other avian species or animals which use surrounding vegetation for foraging and nesting. Exact locations of perch deterrent poles would be determined in consultation with wildlife agencies prior to construction of the line.

    - Inspections of lines and other areas where raptor or corvids (e.g. crows and ravens) might nest would be conducted annually. Inactive nests are not protected by the MBTA and removal would be conducted prior to the next breeding season. Should nesting activity become a long-term issue, alternate measures to discourage nesting activities and removal of nesting materials prior to eggs being laid would be implemented. Prior to removing or relocating any nests, facility personnel would consult with USFWS and when necessary, proper permitting would be obtained. More details are provided in the Raven Control Plan that has been developed for the project.

- Vegetation clearing and ground-disturbing activities would be conducted outside the migratory bird nesting season when practical. If ground-disturbing activities cannot be avoided during this time period, a qualified biological monitor will conduct pre-construction nest surveys.

    - For all bird species, surveys would cover all potential nesting habitat in and within 300 feet of the area to be disturbed (as landowner access allows). Any disturbance or harm to active nests would be reported within 24 hours to the USFWS and the BLM, if on BLM lands. The biological monitor would halt work if it is determined that active nests are being disturbed by construction activities and the appropriate agencies would be consulted.
    - Qualified biologists would relocate or destroy bird nests only after young have fledged and perform any mitigation measures necessary to reduce or eliminate negative effects to birds inhabiting the construction area.

- A qualified biologist will conduct pre-construction surveys within 30 days prior to construction for Western Burrowing Owls within suitable habitat during the breeding season (February 1 through August 31). All areas within 250 feet of the Proposed Project will be surveyed (if landowner access allows), per USFWS 2007 Burrowing Owl guidance.

    - If an active nest is identified, there will be no construction activities within 250 feet of the Burrowing Owl nest location to prevent disturbance until the chicks have fledged or the nest has been abandoned, as determined by a qualified biologist. Buffers may be increased or reduced as needed with the approval of the BLM, and USFWS.

    - The occurrence and location of any Western Burrowing Owls will be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. The authorized biologist will report all incidents of disturbance or harm to Burrowing Owls within 24 hours to the USFWS.

- Lighting would be designed to provide the minimum illumination needed to achieve O&M objectives and not emit excessive light to the night sky by installing light absorbing shields on top of all light fixtures, and focusing desired light in a downward direction (Reed et al. 1985). This would reduce the visibility of the lights to migratory birds traveling through the area. Downward facing lights would also reduce the number of insects attracted to lights resulting in a decrease of potential concentrated feeding areas for bats. Any additional lighting needed to perform activities such as repairs would be kept to a minimum and only used when these actions are in progress.

- The on-site evaporation ponds would accumulate discharge that would be temporarily held for the Project's operations. The discharge would include materials that could potentially harm birds or bats if used as a water source. To eliminate avian and bat use of the evaporation ponds at the project site, the ponds would be covered with bird proof netting.

    - To minimize the potential risk of entanglement posed by the netting itself, the netting used would be a fine black twine mesh (as opposed to monofilament). Netting would be suspended more than 5 feet above the water surface upon installation so that the net will not dip into the water should sagging develop later. During the biological monitoring of SPGF, the Applicant would also include an assessment of the netting, ensuring that no birds or bats are entangled and no holes have developed that would increase the risk of ingestion of dissolved solids or entanglement in the netting. If the netting were deemed to be an entanglement hazard, the biological monitors would then use Adaptive Management strategies found in the Bird and Bat Conservation Strategy (**Appendix O**) to reduce the hazard. After the designated post-construction biological monitoring has ceased at the Proposed Project site (3 years following the completion of construction), O&M staff at the SPGF would regularly check and maintain the netting to ensure no holes develop.

- A Worker Environmental Awareness Program (WEAP) will be prepared. All on-site personnel will be required to participate in WEAP training prior to starting work on the Proposed Project. The WEAP training will include a review of the special status species and other sensitive resources that could exist in the Proposed Project, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel will be maintained.

  Construction vehicles and equipment will be cleaned of soil and plant material prior to entering and leaving the work site to minimize the introduction and spread of weeds.

- The following measures are intended to mitigate potential impacts to Gila monsters:
    - Field workers and personnel will know how to: (1) identify Gila monsters and be able to distinguish it from other lizards such as chuckwallas and western banded geckos; (2) report any observations of Gila monsters to the Nevada

Department of Wildlife (NDOW); (3) be alerted to the consequences of a Gila monster bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law.

- Live Gila monsters found in harm’s way on the SPGF site will be captured and then detained in a cool, shaded environment (<85°F) by the project biologist or equivalent personnel until a NDOW biologist can arrive for documentation, marking and obtaining biological measurements and samples prior to releasing. A clean 5- gallon plastic bucket with a secure, vented lid; an 18"x18"x4" plastic sweater box with a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location, GPS coordinates in Universal Transverse Mercator (UTM) using the North American Datum (NAD) 83 Zone 11. Date, time, and circumstances (e.g. biological survey or construction) and habitat description (vegetation, slope, aspect, substrate) will also be provided to NDOW.

- Gila monsters found in harm’s way along the gen-tie ROWs, pipeline ROW or access road would hazed off the immediate disturbance area and monitored. Written information identifying the mapped observation location, GPS coordinates in Universal Transverse Mercator (UTM) using the North American Datum (NAD) 83 Zone 11. Date, time, and circumstances (e.g. biological survey or construction) and habitat description (vegetation, slope, aspect, substrate) will also be provided to NDOW. The Gila monster may be captured using the methods outlined above if hazing is not effective or if the biologist determines that the individual has a high probability of returning to the project area.

- Injuries to Gila monsters may occur during excavation, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation and appropriate treatment. Rehabilitation or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified of any injury to a Gila monster and which veterinarian is providing care for the animal. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, date, time, habitat, and mapped location (GPS coordinates in UTM using NAD 83 Zone 11).

- Should NDOW’s assistance be delayed, biological or equivalent acting personnel on site should detain the Gila monster out of harm's way until NDOW personnel can respond. The Gila monster should be detained until NDOW biologists have responded. Should NDOW not be immediately available to respond for photo- documentation, a digital camera will be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The pictures will be provided to NDOW with specific location information including GPS coordinates, date, time and habitat description

- A Facility Decommissioning Plan would be developed and provided to the Tribe and BLM addressing the Project facilities under their respective management. This plan would be submitted for approval at least six months prior to commencement of site closure activities.

- Potential closure activities could include re-grading and restoration of original site contours and re-vegetation of areas disturbed by closure activities in accordance with the Site Restoration Plan. Revegetation seed mixes will be composed of native plant species.

- Any and all additional measures identified in the Biological Opinion to mitigate impacts to sensitive species will be implemented as prescribed.

5.5 Mitigation Measures – Cultural Resources

The alternative access road could result in impacts to Site 26CK6115 (wagon road) which could be an alignment or variant of the Mormon Wagon Road (26CK3848). If the alternative access road is selected, the following mitigation measures would be implemented prior to the final alignment survey and construction of this road:

- Whether found to be eligible or not, prior to final survey and construction of this road alignment, authorized personnel will flag the location where the road would cross this site so that impacts could be minimized.

- During construction near this site, an archaeological monitor will be in place to ensure no direct or indirect effects take place at the recorded site.

- Should any unrecorded and unanticipated cultural resources be discovered during construction, all activities within the immediate area of discovery shall cease. The Chairman of the Moapa Tribal Council and the BIA Regional Archeologist shall be notified immediately and, consulting with BLM and SHPO as appropriate, they will make arrangements to assess the nature of discovered cultural resources and mitigate any damages to any unanticipated discoveries.

5.6 Mitigation Measures – Transportation

The short-term impacts to traffic during construction would be reduced by implementing the following mitigation:

- A Traffic Management Plan would be finalized that identifies BMPs to minimize construction-related traffic impacts. A draft of this plan is available in **Appendix P**.
- Deliveries of materials would be scheduled for off-peak hours, when practical, to reduce effects during periods of peak traffic.
- Truck traffic would be phased throughout construction, as much as practical.
- Carpooling or mass transportation options for construction workers would be encouraged.
- Before construction, the Applicant and agency representatives will document the pre-construction condition of the access route, noting any existing damage. After construction, any damage to public roads will be repaired to the road's pre-construction condition, as determined by the agency representatives.

5.7 Mitigation Measures – Public Health & Safety

The potential for exposure to hazards exists during transportation of materials, direct handling of substances, inadvertent release of hazardous material to the soil and groundwater, and general fire and electrical hazards. In addition to the previously discussed SPCC Plan, the Applicant would implement the following measures to reduce significant impact to public health and safety:

- General Design and Construction Standards - The Project would be designed in accordance with federal and industrial standards including the American Society of Mechanical Engineers (ASME), National Electrical Safety Code (NESC), International Energy Conservation Code (IECC), International Building Code (IBC), Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC), the National Fire Protection Association (NFPA) standards, and OSHA regulations.
- Health and Safety Program - All employees and contractors would be required to adhere to appropriate health and safety plans and emergency response plans. All contractors would be required to maintain and carry health and safety materials including the MSDS of hazardous materials used on site.

- Emergency Response Plan - An Emergency Response Plan would be developed and implemented based on the results of a comprehensive facility hazard analysis.

- Hazardous Waste Storage Plan - A Hazardous Waste Storage Plan would describe the storage, transportation, and handling of wastes and emphasize the recycling of construction wastes where possible.

- The Project would coordinate with the holders of all existing ROWs that would be crossed or paralleled by the Project ROWs (transmission lines, access roads, water pipeline) to minimize encroachment conflicts and possible effects to existing transmission lines and pipelines.

Chapter 6

Consultation and Coordination

CHAPTER 6
CONSULTATION AND COORDINATION

6.1 Summary of Public Scoping and Issue Identification

6.1.1 Public Scoping Period

On August 6, 2012, the BIA published the Notice of Intent (NOI) to prepare an EIS for the Proposed Moapa Solar Energy Center Facility in Clark County, Nevada in the Federal Register, Vol. 77, No. 151. The NOI announced a public scoping period for alternatives, issues, impacts, and planning criteria. The 30-day scoping period for the Proposed Project was initiated by the NOI and was completed on September 5, 2012.

The BIA identified that the following resources would be evaluated during the NEPA study: air quality, geology and soils, surface and groundwater resources, biological resources, threatened and endangered species, cultural resources, socioeconomic conditions, land use, aesthetics, environmental justice, and Indian trust resources. In addition, 49 letters were sent to federal, state, and local agencies, as well as individuals or organizations that could be interested or may be affected by the Proposed Project, to request their participation in the scoping process.

In addition, over 75scoping letters were sent by the BIA on August 7, 2012 to other various non-governmental organizations and other interested stakeholders. The scoping letter briefly explained the project (including maps), outlined the federal review process, announced the public scoping meetings, and described the various ways to provide comments. A project website: http://www.moapasolarenergycentereis.com/ was also available to the public and provided project information as well as an online comment form.

The scoping letters, mailing lists, and other scoping materials are contained in the Scoping Report included as **Appendix A**.

6.1.2 Scoping Meetings

To facilitate collection of the comments, the BIA held two public scoping meetings near the Proposed Project. Notices were published in the Moapa Valley Progress, Las Vegas Sun, and Las Vegas Review-Journal newspapers two weeks prior to the public meetings. **Appendix A** contains a copy of the scoping notice published in the papers.

The first meeting was held on the Reservation on August 21, 2012 from 5:30 pm until 7:30 pm. The first meeting had 40 attendees. The second meeting was held at the BLM North Las Vegas Office on August 22, 2012 from 5:30 pm until 7:30 pm. The second meeting had 29 attendees.

Figure 6-1 – Newspaper Notice

Public Meeting Announcement

The U.S. Bureau of Indian Affairs (BIA) and the Moapa Band of Paiute Indians invite you to attend a scoping meeting to help identify the range and scope of issues related to the proposed Moapa Solar Energy Center. The issues identified during the scoping process will be considered and addressed during preparation of the Environmental Impact Statement (EIS).

Please plan to attend one of the following meetings:

Tuesday, August 21, 2012
Moapa River Indian Reservation Tribal Hall,
One Lincoln Street, Moapa, NV 89025-0340

Wednesday, August 22, 2012
U.S. Bureau of Land Management (BLM) Conference Room,
4701 N. Torrey Pines Dr., Las Vegas, NV 89130

Both meetings will be held between 5:30 pm and 7:30 pm with a brief presentation at 5:45 pm. Light refreshments will be served.

The proposed Moapa Solar Energy Center will have a capacity of up to 200 MW to meet the needs of offtakers or utilities. The proposed project will be located on approximately 1,000 acres within the Moapa River Indian Reservation in Clark County, Nevada, west of Interstate 15 and approximately 30 miles northeast of Las Vegas. The project would also include the construction across BLM property of an access road and power transmission lines to interconnect the project to the regional grid.

For more information on how to participate, contact *Ms. Amy Heuslein, Regional Environmental Protection Officer, at amy.heuslein@bia.gov (602.379.6750)* or *Mr. Paul Schlafly, Natural Resource Officer, at paul.schlafly@bia.gov (435.674.9720).*

The public scoping meetings started with an open house lasting approximately 30 minutes. Handouts were available for the public and posters on display described the project and EIS process. Attendees were able to ask questions to agency and project representatives while viewing posters. Following the open house, a formal presentation was provided. The program opened with Chairman William Anderson of the Moapa Band of Paiute Indians providing a brief history of the Reservation, what he envisions will be the future of his people and the importance of the Proposed Action to the Tribe. BIA agency staff members then introduced themselves, and gave a presentation explaining the purpose and need of the EIS, EIS schedule, and the NEPA process. Following this, the EIS consultant presented the Proposed Action with an overview of the technical aspects and the environmental issues already identified to be addressed in the Draft EIS.

Following the presentation, the attendees were invited to provide verbal comments or ask questions about the Proposed Action. A court reporter was present at the August 21 meeting held on the Reservation and detailed notes were taken at the August 22 meeting held at the BLM offices in Las Vegas to record the public comments expressed. The scoping meeting presentation, transcripts and public meeting summaries are provided in **Appendix A**.
In addition to verbal comments and written comments received during these scoping meetings, the BIA received 12 comment letters/forms through a variety of means.

6.1.3 Scoping Response

Transcripts and detailed meeting notes for the public scoping meetings can be found in the Scoping Report (**Appendix A**). **Table 1-2** in Chapter 1 provides a summary of the key issues identified by the comments provided during scoping for the Moapa Solar Energy Center Project. These issues will be the focus of the EIS analysis.

6.2 Public Participation Summary

6.2.1 Distribution of the Draft EIS

The DEIS review period was initiated by publication of the Notice of Availability (NOA) for the DEIS in the *Federal Register* on September 13, 2013. Two amended notices were published in the *Federal Register* extending the public comment period for the Draft EIS to December 10, 2013 - one on Friday October 25, 2013 and a second one (in order to amend/correct the October 25th notice) on Friday November 1, 2013. In addition, notices were placed in local newspapers and two public meetings were held to receive comments on the DEIS for the Proposed Project - one on the Reservation on September 25, 2013, and the other at the BLM offices located in Las Vegas, Nevada on September 26, 2013. Documents were made available for public review at BIA Offices (Western Regional Office and Southern Paiute Agency) and the BLM office in Las Vegas. The DEIS was also available on the project Website http://www.moapasolarenergycentereis.com/ .

Appendix Q outlines the comments received on the DEIS and provides a table summarizing responses to the comments and how they were addressed in this FEIS.

6.2.2 Final EIS Preparation and Distribution

The availability of this FEIS was announced by publication of the Notice of Availability (NOA) in the *Federal Register* and notices placed in local newspapers. The FEIS was made available for public review at BIA Offices (Western Regional Office and Southern Paiute Agency) and the BLM office in Las Vegas and on the project Website at http://www.moapasolarenergycentereis.com/ . In addition, a copy was sent, at their request, to any party who provides comments to the DEIS and/or requests that they be added to the mailing list. The FEIS will also be distributed to the BIA Western Regional Office, the BIA Southern Paiute Agency in St George Utah, the BLM Southern Nevada District office in Las Vegas, the EPA, the NPS, the BIA solicitor's office in Washington, DC, and the Tribe.

6.2.3 Record of Decision

The BIA will prepare a Record of Decision (ROD) on their decision on the Lease Agreement. The ROD will be posted on the project Website (http://www.moapasolarenergycentereis.com/). The ROD will be mailed to the cooperating agencies and to the parties that requested a copy. Publication of the ROD will commence after the 30-day appeal period.

6.2.4 Appeal Rights

Within 30 days of the signing of the ROD, any adversely affected party could have the right of appeal, in accordance with the regulations in 43 CFR 4.400 unless the ROD is signed by the Secretary of the Interior.

6.3 Consultation with Others

6.3.1 Federal, State, and Local Agencies

The following federal, state, and local agencies were provided an opportunity to consult during preparation of the DEIS:

- Bureau of Indian Affairs
- Bureau of Land Management
- City of Mesquite
- Clark County Department of Comprehensive Planning
- Clark County Regional Flood Control District
- Conservation District of Southern Nevada
- Federal Aviation Administration
- U.S. Fish and Wildlife Service
- Department of Defense (Nellis Air Force Base)
- National Parks Service

- Nevada Division of Environmental Protection
- Moapa Band of Paiute Indians
- Nevada Department of Conservation and Natural Resources
- Nevada Department of Air Quality and Environmental Management
- Nevada Division of Environmental Protection
- Nevada Natural Heritage Program
- Nevada Energy
- Natural Resources Conservation Service (Mojave Special Projects Office)
- US Environmental Protection Agency, Region 9
- Nevada Department of Transportation
- U.S. Army Corps of Engineers
- Nevada Department of Wildlife
- Nevada State Historic Preservation Office
- Southern Nevada Water Authority
- The Honorable Dean Heller, US Senate
- The Honorable Harry Reid, US Senate
- The Honorable Dina Titus, US House of Representatives
- The Honorable Mark Amodei, US House of Representatives
- The Honorable Joe Heck, US House of Representatives

6.3.2 Non-Governmental Organizations

The following NGOs were provided an opportunity to consult during preparation of the EIS:

- The Nature Conservancy
- Red Rock Audubon Society
- Lahontan Audubon Society
- Desert Tortoise Council
- Friends of Nevada Wilderness
- Nevada Wilderness Project
- Sierra Club
- Center for Biological Diversity
- Sierra Nevada Alliance
- Nevada Clean Energy Campaign
- Center for Energy Efficiency and Renewable Technologies
- Desert Tortoise Council
- Environment America
- Great Basin Resource Watch
- Nevada Wildlife Federation
- Nevada Natural Resource Education Council
- Natural Resources Defense Council
- Nevada Conservation League

- Western Resource Advocates
- Environmental Defense Fund
- Conservation District of Southern Nevada
- The Conservation Alliance
- Friends of Gold Butte
- Union Pacific Railroad Company
- Kern River Pipeline
- Nevada Environmental Coalition, Inc.

Several NGOs, private citizens and several state and federal agencies provided comments during the public scoping period. See **Appendices A and Q** for details on the comments received during scoping and on the DEIS, respectively.

6.3.3 Native American Tribes

The following Tribes were given notice of the Proposed Project during the NOI phase:

- Las Vegas Paiute Tribe
- Kaibab Band of Paiute Indians
- Hualapai Indian Tribe
- Fort Mojave Indian Tribe
- Hopi Tribe
- Colorado River Indian Tribes
- Chemehuevi Indian Tribe
- Paiute Indian Tribe of Utah

The Hopi and Hualapai tribes responded. The Hopi indicated that they would be interested in further consultation if the Proposed Project would potentially have an adverse effect on National Register eligible prehistoric sites. The cultural resource survey of the Project area identified no potentially eligible prehistoric sites. The Hualapai Tribe indicated that they would like to defer to the Moapa Band of Paiutes in all matters pertaining to development of the Project.

Chapter 7

List of Preparers and Reviewers

CHAPTER 7
LIST OF PREPARERS AND REVIEWERS

The following individuals participated in the preparation and review of the FEIS.

Name	Responsibility
Bureau of Indian Affairs, Western Regional Office	
Amy Heuslein	BIA Project Lead / Regional Environmental Protection Officer
Garry J. Cantley	Regional Archeologist
Raymond Roessel	Hydrologist
Tamera Dawes	Realty Specialist
Charles Lewis	Environmental Protection Specialist
Southern Paiute Agency	
Kellie Youngbear	Agency Superintendent
Paul Schlafly	Natural Resource Specialist
Moapa Band of Paiutes	
William Anderson	Chairman – Tribal History
Eric Lee	Vice Chairman
Darren Daboda	Environmental Office
BLM Las Vegas Office	
Brenda Wilhight	Realty Specialist, Visual Resources
Greg Helseth	Renewable Energy
Mark Boatwright	Archaeologist
Fred Edwards	Biologist
National Park Service	
Amee Howard	Renewable Energy
Michael Elliott	National Historic Trails
US Environmental Protection Agency	
Karen Vitulano	Environmental Review
US Fish and Wildlife Service	
Michael Burroughs	Threatened and Endangered Species
Susan Cooper	Threatened and Endangered Species
RES-America	
Daniel Menahem	Senior Development Manager, Solar
Joseph Grennan	Permitting Director

Name	Responsibility
EIS Consultant	
Randy Schroeder	Project Manager
Jeanette Lostracco	Socioeconomics, Land Use
Patrick Golden	Biological Resources
Scott Yanco	Biological Resources
Derrik Berg	Visual Resources, GIS
Mark Button	Visual Simulations
Rachel Clark	GIS Mapping
Chris Harper, HRA	Cultural Resources
Marty Mifflin, M&A	Water Resources
Cady Johnson, M&A	Water Resources
Nick Mathis	Hazardous Materials
Sheila Rygwelski, CH2M Hill	Air Quality
Candice Hein, CH2M Hill	Traffic and Transportation
OTHERS	
Grant L. Vaughn	DOI Solicitor
Jennifer Carleton	Counsel for Tribe
Caitlin Quander	Counsel for Tribe
Nancy Shelton, LSD	Consultant to BIA
Diane Simpson-Colebank, LSD	Consultant to BIA
Beau Goldstein	Consultant to BIA

Chapter 8

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CHAPTER 8
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