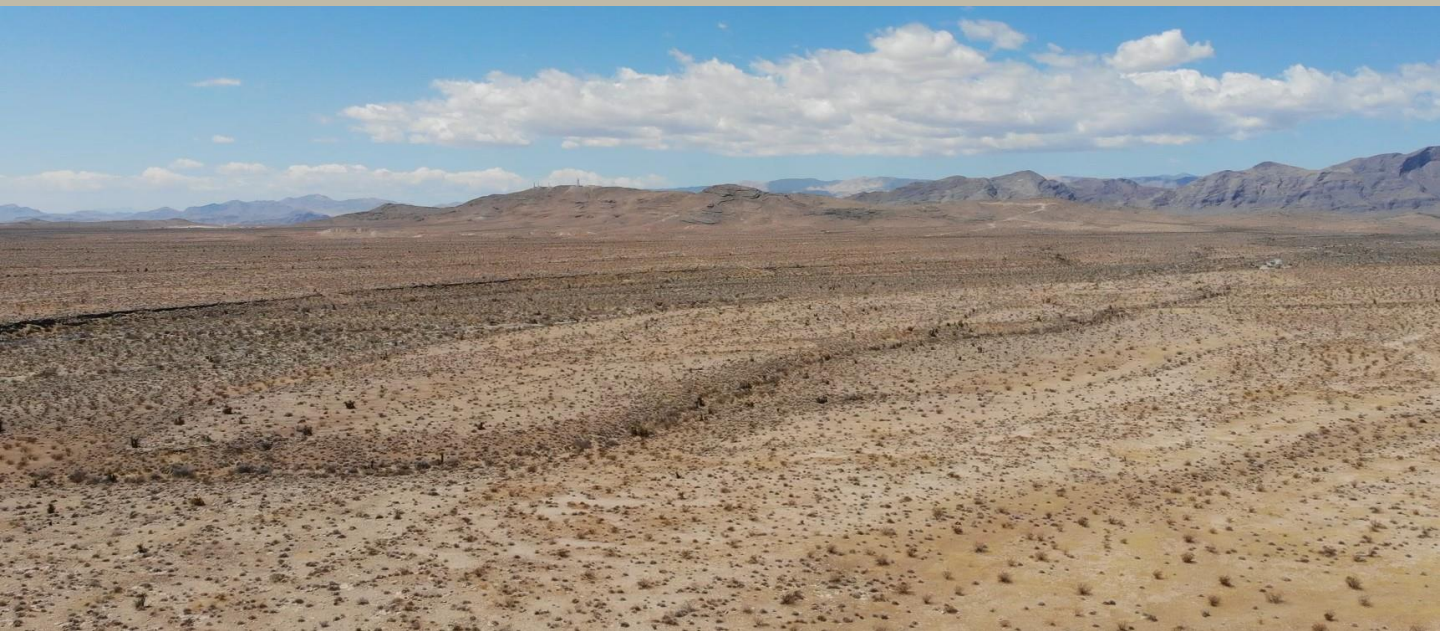


VOLUME 1

Draft
Environmental Impact Statement
Yahthumb Solar Project



On Behalf of:

**THE MOAPA BAND
OF PAIUTE INDIANS**

BUREAU OF INDIAN AFFAIRS
Bureau of Land Management
Environmental Protection Agency
US Fish and Wildlife Service
Nevada Department of Wildlife
Clark County

July 2022

**DRAFT
ENVIRONMENTAL IMPACT STATEMENT
(DEIS)**

**YAHTHUMB SOLAR
PROJECT**

On Behalf of:

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BUREAU OF INDIAN AFFAIRS
BUREAU OF LAND MANAGEMENT
ENVIRONMENTAL PROTECTION AGENCY
US FISH AND WILDLIFE SERVICE
NEVADA DEPARTMENT OF WILDLIFE
CLARK COUNTY

July 2022

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Acronyms Used in the EIS

AC	Alternating Current
ACSP	Arrow Canyon Solar Project
ACEC	Areas of Critical Environmental Concern
ac-ft	acre-feet
ADT	Annual Average Daily Traffic
AFY	acre-feet per year
APE	Area of Potential Effect
ASME	American Society of Mechanical Engineers
BACT	Best Available Control Technology
Band	Moapa Band of Paiute Indians
BBCS	Bird and Bat Conservation Strategy
BESS	Battery Energy Storage System
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
Blvd.	Boulevard
BMPs	Best Management Practices
BO	Biological Opinion
CAA	Clean Air Act
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	CO ₂ Equivalent
CT	Census Tract
CWA	Clean Water Act
DAQEM	Department of Air Quality and Environmental Management
DEIS	Draft Environmental Impact Statement
DEM	Digital Elevation Model
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
ESMSP	Eagle Shadow Mountain Solar Project
FSEIS	Final Supplemental 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
I-15	Interstate 15
IBC	International Building Code
IECC	International Energy Conservation Code
IPCC	Intergovernmental Panel on Climate Change
ITA	Indian Trust Assets
JD	Jurisdictional Determination
K Road	K Road Moapa Solar LLC
KOPs	Key Observation Points
kV	kilovolt
LEP	Limited English Proficiency
LOS	Level of Service
LWC	Lands with Wilderness Characteristics
m	meter
MBTA	Migratory Bird Treaty Act
mm	millimeter
MMT	million metric tons
MOA	Memorandum of Agreement
mph	miles per hour
MSDS	Material Safety Data Sheet
MSEC	Moapa Solar Energy Center
MSHCP	Multiple Species Habitat Conservation Plan
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
NO ₂	Nitrogen Dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NO _x	nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	National Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSR	New Source Review
NV	Nevada
O ₃	ozone
O&M	Operations and Maintenance
OHV	off highway vehicle
OSHA	Occupational Safety and Health Administration
Pb	lead
PBO	Programmatic Biological Opinion
PCEs	primary constituent elements
PCS	Plant Control System
PLC	Programmable Logic Controller
PM	particulate matter
PM ₁₀	particulate matter 10 microns or less
PM _{2.5}	particulate matter 2.5 microns or less
POD	Plan of Development
PPA	Power Purchase Agreement
PPE	personal protective equipment
Projects	Chuckwalla Solar Projects
psi	pound(s) per square inch
PV	photovoltaic
RCRA	Resource Conservation Recovery Act
Reclamation	Bureau of Reclamation
Reservation	Moapa River Indian Reservation
ROD	Record of Decision
ROW	right(s)-of-way
RPS	Renewable Portfolio Standard
SBSP	Southern Bighorn Solar Projects
SCADA	Supervisory Control and Data Acquisition

SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMA	Special Management Areas
SNWA	Southern Nevada Water Authority
SO ₂	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures Plan
SWPPP	Storm Water Pollution Prevention Plan
T&E	threatened and endangered
TDS	Total Dissolved Solids
TERO	Tribal Employment Rights Ordinance
TES	Thermal Energy Storage
Travel	Plaza Moapa Travel Plaza
Tribe	Moapa Band of Paiute Indians
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
U.S.C.	United States Code
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	United States Global Change Research Program
USGS	United States Geological Survey
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

The following sections summarize the Draft Environmental Impact Statement (DEIS) for the Yahthumb Solar Project (Yahthumb Project or Project), a solar project using photovoltaic (PV) solar energy technology with battery storage. The Project would be located on the Moapa River Indian Reservation (Reservation) about 30 miles northeast of Las Vegas in Clark County, Nevada.

Yahthumb Solar Project, LLC (Applicant) has entered into an option agreement with the Moapa Band of Paiute Indians (Moapa Band or Band) to lease up to 1,400 acres for the development of the solar project that would total up to 138 megawatts (MWs) of solar energy generation using photovoltaic (PV) technology and incorporating battery energy storage systems (BESS). The Yahthumb Project would include the solar project and all associated facilities. **Figure 1-1** (in **Appendix A**) shows the proposed general location for the Yahthumb Solar Project.

The Project would include a new generation interconnection (gen-tie) line up to approximately 10.3 miles long that would interconnect the Project to the regional electrical grid at the existing Reid-Gardner Substation. This gen-tie line would parallel the recently constructed Eagle Shadow Mountain (ESM) gen-tie (NVN 97443) for nearly all its length. It would cross lands managed by the Bureau of Land Management (BLM) – both within a federally designated utility corridor on the Reservation and federal lands near the Reid-Gardner Substation.

Primary access to the Yahthumb site would be provided via an interchange on Interstate-15 to the existing Ute Road on the Reservation. This road would be upgraded as needed. Secondary access would be provided via an existing road within the designated utility corridor that would also be upgraded as needed. **Figure 1-3** shows the locations of the proposed gen-tie lines and access roads.

The water supply required for the Project would be leased from the Moapa Band and drawn from the Moapa Band's existing water rights. The water would be delivered to the site via temporary pipeline or truck.

ES.1 Purpose of the Project

The purpose and need of the proposed Project are to: (1) provide a long-term, viable economic revenue base (lease income) and job opportunities for the Moapa Band; (2) allow the Moapa Band, in partnership with the Applicant, to optimize the use of the lease site while maximizing the potential economic benefit to the Moapa Band; and (3) develop clean renewable electricity generation from the Moapa Band's solar resources to support the State of Nevada's 50 percent renewable portfolio standard requirement by 2030 and a goal of 100 percent carbon-free resources by 2050 (State Bill 358). The Project would also help meet the federal government's goals to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies.

The Moapa Band identified the proposed Project as viable opportunities to meet its economic development goals because the lease would provide much needed revenue to the Moapa Band while occupying a small portion of the Reservation (2.4 percent). The construction, operation and

maintenance (O&M), and decommissioning of the Project would afford employment opportunities to Moapa Band members. The Moapa Band has determined that the Project would also be consistent with the Moapa Band's tradition of respect for the land and would fulfill the purposes for which the 70,564 acres were restored to the Moapa Band by the federal government in 1980 (Moapa Band 1980). The proposed use of the Moapa Band's water by the Project would help the Moapa Band affirm and sustain its rights to the water.

ES.2 Agency Purpose and Need

This Draft EIS was prepared to thoroughly examine the potential environmental impacts of the proposed action and alternative actions in order to support informed decision-making. This Draft EIS is consistent with the purpose and goals of NEPA; the requirements of the Council on Environmental Quality's (CEQ) implementing NEPA regulations at 40 CFR Parts 1500-1508; longstanding federal judicial and regulatory interpretations; the Department of the Interior's NEPA regulations (43 CFR Part 46); and Administration priorities and policies including Secretary's Order No. 3399 requiring bureaus and offices to use "the same application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect."

The need for the BIA action is established by the BIA's responsibility to respond to a request for a business lease approval and right-of-way (ROW) application between the Moapa Band and the Applicant over or across lands held in trust for Indian tribes. The BIA must meet its responsibility to review and approve actions on tribal lands held in trust for the benefit of the Moapa Band (42 United States Code [U.S.C.] §§ 4321 et seq).

The need for the BLM action is established under Title V of the Federal Land Policy and Management Act ([FLPMA] 43 U.S.C. § 1761), where the BLM must respond to Applicant's ROW grant application for the gen-tie line, temporary water pipeline, and existing BLM-managed access roads. In accordance with Section 103(c) of FLPMA, public lands are to be managed for multiple uses that consider the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Department of Interior (DOI) is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501[a][4]).

Because the BIA has a jurisdictional trust responsibility over Indian lands, the Projects are a major Federal action and must comply with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. §§ 4321 et seq.). Because the Projects would be located on tribal trust lands, the BIA is the lead federal agency. The Band, BLM, Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), Nevada Department of Wildlife (NDOW), and Clark County are cooperating agencies on the EIS for the Project. The BIA will use this EIS to make their decision for approval of the solar ground leases on the Reservation. The cooperating parties will use this information to support their analyses and decisions, as needed.

ES.3 Public Involvement

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Project in the Federal Register on June 25, 2021. In addition, notices were placed in local newspapers and two virtual public scoping meetings were held for the Project on July 20 and July 21, 2021.

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

- Potential impacts to desert tortoise, birds, and other sensitive species
- Potential impacts to vegetation and need to control weeds
- Socioeconomic impacts to Band members and the regional economy
- Potential impacts to cultural resources
- Impacts to water resources including water use and effects on ephemeral drainages
- Visibility of the Projects on the landscape from I-15 and the Old Spanish National Historic Trail
- Emissions of fugitive dust and potential worker exposure to *Coccidioides* spores, if present
- Impacts from other projects in the vicinity of the proposed Project

ES.4 Alternatives

This document analyzes the proposed Project and 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.

Proposed Action

The Proposed Action would consist of a 138-MW PV solar project incorporating BESS, a gen-tie line that would interconnect the Project to the regional electrical transmission grid, access roads to the solar site from Interstate 15 (I-15), and possibly a temporary water pipeline. The solar field and most of the primary access road would be located on the Reservation. Most of the gen-tie line would be located within the utility corridor on the Reservation managed by the BLM.

Major on-site facilities would include a 138 MW alternating current (AC) solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, a BESS, and a project substation. The off-site facilities would include a gen-tie and associated facilities, site access roads, and a temporary water pipeline.

The gen-tie line would be a single-circuit 230 kilovolt (kV) line up to approximately 10.3 miles long and located on the Reservation, BLM-administered lands, and private lands. It would generally parallel the ESM gen-tie line (recently constructed) and most of it would be within a federally designated utility corridor on the Reservation managed by BLM.

The primary access for the site would be provided by the existing Ute Road from an interchange on I-15, and secondary access would be provided by the existing road network within the utility corridor. Temporary facilities that would be removed/reclaimed at the end of construction include a temporary water pipeline, laydown and construction areas, and temporary construction areas along the gen-tie line.

In addition to the federal agency jurisdictions, the approximately 5.3-mile portion of the gen-tie crossing BLM lands outside of the Reservation and private lands would be subject to Clark County jurisdiction.

Tables ES-1 summarizes the BIA and BLM jurisdiction and agency action required for each project component, respectively.

TABLE ES-1 SUMMARY OF AGENCY LANDS/JURISDICTION PROPOSED YAHTHUMB SOLAR PROJECT				
Agency	Project Component	Location	Agency Action	Mileage/Acreage¹
BIA	Solar Field	Reservation	Lease ²	Up to 1,400 acres
	230 kV Gen-Tie Line	Reservation	ROW	Up to 0.1 mile / 0.9 acre
	Primary Site Access Road	Reservation	ROW	3.7 miles / 10.8 acres
	TOTAL BIA			1,411.7 acres
BLM	230 kV Gen-Tie Line	Designated Utility Corridor on Tribal Lands	ROW ³	7.1 miles / 102.0 acres
	230 kV Gen-Tie Line	Federal Lands managed by BLM	ROW ³	4.2 miles / 26.6 acres
	Primary Site Access Road	Designated Utility Corridor on Tribal Lands	ROW	1.7 miles / 5.0 acres
	Secondary Site Access	Designated Utility Corridor on Tribal Lands	ROW	7.8 miles / 22.7 acres
	Secondary Site Access	Federal Lands managed by BLM	ROW	1.1 miles / 3.2 acres
	Temporary Water Pipeline	Designated Utility Corridor on Tribal Lands	ROW	4.7 miles / 10.3 acres
	TOTAL BLM			26.6 miles / 148.0 acres
PRIVATE	230 kV Gen-Tie Line	Private Lands owned by NV Energy	N/A	1.1 miles / 10.0 acres
	TOTAL Private			1.1 miles / 10.0 acres

¹ Acreage and mileage are approximate. Gen-tie acreage is based on a 75-foot ROW and the expected maximum length of the line (10.3 miles) - only a portion of the ROW would be disturbed. Primary access road and most of the secondary access road are existing (except 2.5-mile section of secondary access road where existing road would be upgraded). Only a portion of the 1,400-acre potential solar site and lease area would be disturbed by the final footprint of the solar project.

² Lease term would be 56.5 years

³ BLM ROW term would be 50 years and would need to be extended if Project life extends beyond that period.

No Action Alternative

Under NEPA, the BIA and cooperating agencies must consider an alternative that assesses the impacts that would occur if the Project was not constructed. The No Action Alternative assumes that the lease agreement would be denied, the BLM ROWs would not be issued, and the Project would not be built. Under the No Action Alternative, the purpose and need of the Project would not be met. The Moapa Band would not benefit economically from the energy production that would be obtained from the solar Project. The development of sustainable renewable resources would not occur, and the State of Nevada would not be assisted in efforts to meet its renewable energy goals.

ES.5 Environmental Consequences

The proposed Yahthumb Project would be one of the several utility-scale PV solar projects on the Reservation to be recently evaluated in an EIS. The previously evaluated solar projects on the Reservation include:

K Road Moapa Solar Facility (K Road)/Southern Paiute Solar Project – The K Road Final Environmental Impact Statement (EIS) and Record of Decision (ROD) was published in 2012 and is a 350 MW PV solar project (BIA 2012a). K Road was sold after the completion of the Final EIS and ROD and the site was renamed the Southern Paiute Solar Project. The Southern Paiute Solar Project has been constructed and is currently in operation. The Southern Paiute Solar Project is located about 1.8 miles south of the proposed Yahthumb Solar Project.

Aiya Solar Project (Aiya) – The Aiya Final EIS and ROD was published in 2016 and is a 100 MW PV solar project (BIA 2016). Aiya has no power purchaser and has not been constructed. If constructed, it would be in the northern portion of the Reservation, approximately 7.6 miles northeast of the proposed Yahthumb Project.

Eagle Shadow Mountain Solar Project (ESMSP) – The ESMSP Final EIS was published in December 2019 and the ROD was signed in February 2020 and is a 300 MW PV solar project (BIA 2019a, 2020d). The ESMSP is currently under construction and is located approximately 1.3 miles southwest of the proposed Yahthumb Project.

Moapa Solar Energy Center (MSEC) / Arrow Canyon Solar Project (ACSP) – MSEC Final EIS and ROD was published in 2014 and is a 200 MW PV solar project (BIA 2014). In March 2017, the MSEC Project was purchased by EDFR and renamed the Arrow Canyon Solar Project (ACSP). This project was evaluated in a Supplemental EIS for the expansion of the solar field on Reservation lands and the Final SEIS was issued in December 2020 (BIA 2020c). The ACSP is located approximately 5.0 miles southwest of the proposed Yahthumb Project.

Southern Bighorn Solar Project I (SBSP I) and Southern Bighorn Solar Project II (SBSP II) – The SBSP I and SBSP II Projects were recently evaluated through the National Environmental Policy Act (NEPA) process. The Final EIS was published in June 2021 (BIA 2021). They are located about 0.8 miles south and 0.8 miles east-southeast of the proposed Yahthumb Project.

Chuckwalla Solar Projects – The Chuckwalla Solar Projects are currently being evaluated through the NEPA process. They include up to four PV solar projects totaling 700 MWs and located within a 6,500-

acre lease study area in the southeast corner of the Reservation approximately 4.4 miles southeast of the proposed Yahthumb Project.

Figure 1-4 shows the relative location of these projects. While the solar site and gen-tie lines associated with the proposed Yahthumb Project would occupy a different footprint than the previously evaluated PV solar projects on the Reservation, the size of the previously analyzed facilities, location, and many of the resources/uses evaluated would be similar to the Yahthumb Project. Analyses from the previous resource investigations are incorporated by reference in this EIS, where applicable. The EISs for these previous projects can be found at the following link:

<https://www.yahthumbsolarprojecteis.com/previous-eiss.html> .

Referencing allows the BIA to prepare environmental documents without duplicating relevant portions of the previous EISs and RODs. Since potential impacts to resources/uses from construction, O&M, and decommissioning of these previous solar energy generating facilities have been analyzed in previous NEPA documents, the analysis of the relevant resources/uses will not be repeated in this EIS. Table 3-1 in Chapter 3 identifies all the resources/uses considered by the BIA and cooperating agencies and describes which resources are evaluated in detail in subsequent sections of this EIS and provides the rationale for eliminating some resources/uses from further analysis.

Table ES-2 provides a comparative summary of the environmental impacts resulting from constructing, operating, maintaining, and decommissioning the Yahthumb Project and the No Action Alternative. This table summarizes the impacts on the resources evaluated in detail in Chapter 3 and those resources from **Table 3-1** with minor impacts.

Table ES-4		
Comparison of Alternatives		
Resource	Proposed Project	No Action Alternative
Climate Change	<p>Short-term negligible GHG emissions from construction and long-term, negligible beneficial impacts on climate change from the reduction of primary contributors to GHG emissions offset by the generation of renewable energy.</p> <p>See Section 3.1 for additional information on climate change.</p>	Negligible long-term adverse effects on GHG emissions because there would be no offset from the generation of renewable energy.
Cultural Resources	<p>The Yahthumb Project site did not include archaeological sites and the gen-tie crosses one site that is currently recommended eligible for inclusion in the NRHP. This site's features would be avoided by construction of the gen-tie. Mitigation of any unanticipated sites that cannot be avoided would include data recovery and curation with some non-invasive testing, if necessary. There would be no adverse effect to the Old Spanish Trail.</p> <p>See Section 3.2 for additional information on cultural resources.</p>	No impacts
Migratory Birds	<p>Impacts on migratory birds would occur as the result of implementing the Proposed Action but these impacts would not affect populations and the implementation of design features and BMPs (Appendix C) and the BBCS (Appendix H) would minimize impacts.</p> <p>See Section 3.3 for additional information on migratory birds.</p>	No impacts
Socioeconomics	<p>Short- and long-term, direct and indirect, beneficial impacts on socioeconomics from the increase in employment, income, expenditures, and tribal and public revenues. Effects would be greatest during the construction and decommissioning phases due to the size of the workforce required. Although long-term benefits to employment and income would be less during O&M, the lease revenue generated by the Projects would have a long-term, beneficial effect on tribal revenue. The beneficial effects to socioeconomics on the Reservation would be major, while the beneficial effects on the regional economy would be negligible.</p> <p>See Section 3.4 for additional information on socioeconomics.</p>	Moderate adverse effect on socioeconomics for the Moapa Band because there would be no increase in employment and income on the Reservation

Table ES-4		
Comparison of Alternatives		
Resource	Proposed Project	No Action Alternative
Threatened and Endangered Species	<p>No direct impacts on Moapa dace due to the lack of suitable habitat in the Project area; minor, regional, short- and long-term, indirect, adverse impacts on the Moapa dace from groundwater withdrawals.</p> <p>Moderate, localized, short-term, adverse impacts on Mojave desert tortoise during construction and decommissioning due to harm, harassment, injury, and possible death to tortoise from ground-disturbing activities and tortoise translocation. Minor, localized, long-term, adverse impacts on Mojave desert tortoise during O&M due to permanent disturbance of 309 acres of suitable habitat for Mojave desert tortoise.</p> <p>Negligible, localized, short- and long-term, adverse impacts on southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail due to the low numbers of these three species that occur in the vicinity of the Projects and the lack of suitable habitat</p> <p>See Section 3.5 for additional information on threatened and endangered species, Appendix M for the Biological Assessment.</p>	No impacts to threatened and endangered species would occur.
Vegetation	<p>Minor, localized, short- and long-term, direct, adverse impacts from temporary loss of approximately 1,184 acres of vegetation and the permanent loss of 309 acres of vegetation. Minor, localized, short- and long-term, indirect, adverse impacts on vegetation from shifts in the composition of vegetation communities due to vegetation management practices, increased water inputs, fugitive dust, and the potential introduction or spread of invasive plant species and noxious weeds.</p> <p>See Section 3.7 for additional information on vegetation.</p>	No impacts
Visual Resources	<p>Minor to moderate, short-term impacts during construction and decommissioning based on the viewing distance, type of activity taking place, and time of day. Moderate, long-term, localized, adverse impacts and minor, regional, adverse impacts during O&M because the landscape would appear to be substantially altered and would begin to dominate the visual setting of the visual resource study area.</p> <p>See Section 3.8 for additional information on visual resources.</p>	No impacts
Water Resources	<p>Minor, regional, short- and long-term, adverse impacts because of increased soil erosion and sediment loads during storm events and altered stormwater flows within floodplains. The withdrawal of groundwater for the Projects would not impact the availability of groundwater in the region.</p> <p>See Section 3.9 for additional information on water resources.</p>	No impacts

CHAPTER 1

Purpose and Need

1.1 Introduction

Yahthumb Solar Project, LLC (Applicant) has entered into an option agreement with the Moapa Band of Paiute Indians (Moapa Band or Band) to lease up to 1,400 acres for the development of a solar project referred to as the Yahthumb Solar Project (Yahthumb Project or Project) to be located on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. The solar project would total up to 138 megawatts (MWs) of solar energy generation using photovoltaic (PV) technology and incorporating battery energy storage systems (BESS). The Yahthumb Project would include the solar project and all associated facilities. **Figure 1-1** (in **Appendix A**) shows the proposed general location for the Yahthumb Solar Project approximately 35 miles northeast of Las Vegas and west of Interstate 15 (I-15).

The Moapa Band is federally recognized and has a constitution that was approved by the Secretary of the Interior on April 17, 1942. The current total land base of the Reservation is 71,746 acres that are held in trust by the U.S. Government for the sole benefit of the Moapa Band. The Reservation lands originally set aside in 1874 consisted of 2 million acres, but in 1876, the Reservation was reduced to 1,000 acres. In December 1980, Congress added approximately 70,564 acres to the Tribal land base. The stated purpose of the restoration of these Tribal lands was to provide economic development opportunities. A solar project on the Reservation provides a viable economic development opportunity for the Moapa Band.

1.2 Project Background, Overview, and Location

The proposed Yahthumb solar generating facilities would be constructed entirely within the Reservation within a lease study area of approximately 1,695 acres of tribal trust land. These lands are located at a central corner of the Reservation in an area set aside by the Band exclusively for the Yahthumb Project. The solar fields and associated facilities would be in Sections 29, 30, 31, and 32; Township 16 South, Range 64 East; Mount Diablo Base Meridian. The lease study area is shown on **Figure 1-2**.

The Project would include a new generation interconnection (gen-tie) line up to approximately 10.3 miles long that would interconnect the Project to the regional electrical grid at the existing Reid-Gardner Substation. This gen-tie line would parallel the recently constructed Eagle Shadow Mountain (ESM) gen-tie (NVN 97443) for nearly all its length. It would cross lands managed by the Bureau of Land Management (BLM) – both within a federally designated utility corridor on the Reservation and federal lands near the Reid-Gardner Substation.

Primary access to the Yahthumb site would be provided via an interchange on Interstate-15 to the existing Ute Road on the Reservation. This road would be upgraded as needed. Secondary access would be provided via an existing road within the designated utility corridor that would also be upgraded as needed. **Figure 1-3** shows the locations of the proposed gen-tie lines and access roads.

The water supply required for the Project would be leased from the Moapa Band and drawn from the Moapa Band's existing water rights. The water would be delivered to the site via temporary pipeline or truck.

The Project is described in more detail in **Section 2**.

The Reservation was selected as the proposed location for the Project due to its abundance of solar resources, the availability of suitable land, transmission line accessibility, and absence of land use constraints and restrictive land use designations. The lease study area for the Yahthumb Project on the Reservation was selected by the Moapa Band to minimize environmental impacts and infrastructure needs due to its proximity to existing roads and transmission lines. In addition, the Project would create employment opportunities and generate lease income for the Moapa Band, help the State of Nevada meet its renewable energy goals, contribute to the local economy, and encourage expenditures in local businesses.

The Project would be one of the several utility-scale PV solar projects to undergo evaluation on the Reservation (see **Figure 1-4**). Of the previously evaluated projects, one is in operation, and another is currently under construction. Below are brief summaries of these projects.

K Road Moapa Solar Facility (K Road)/Southern Paiute Solar Project – The K Road Final Environmental Impact Statement (EIS) and Record of Decision (ROD) was published in 2012 and is a 350 MW PV solar project (BIA 2012a). K Road was sold after the completion of the Final EIS and ROD and the site was renamed the Southern Paiute Solar Project. The Southern Paiute Solar Project has been constructed and is currently in operation. The Southern Paiute Solar Project is located about 1.8 miles south of the proposed Yahthumb Solar Project.

Aiya Solar Project (Aiya) – The Aiya Final EIS and ROD was published in 2016 and is a 100 MW PV solar project (BIA 2016). Aiya has no power purchaser and has not been constructed. If constructed, it would be in the northern portion of the Reservation, approximately 7.6 miles northeast of the proposed Yahthumb Project.

Eagle Shadow Mountain Solar Project (ESMSP) – The ESMSP Final EIS was published in December 2019 and the ROD was signed in February 2020 and is a 300 MW PV solar project (BIA 2019a, 2020d). The ESMSP is currently under construction and is located approximately 1.3 miles southwest of the proposed Yahthumb Project.

Moapa Solar Energy Center (MSEC) / Arrow Canyon Solar Project (ACSP) – MSEC Final EIS and ROD was published in 2014 and is a 200 MW PV solar project (BIA 2014). In March 2017, the MSEC Project was purchased by EDFR and renamed the Arrow Canyon Solar Project (ACSP). This project was evaluated in a Supplemental EIS for the expansion of the solar field on Reservation lands and the Final SEIS was issued in December 2020 (BIA 2020c). The ACSP is located approximately 5.0 miles southwest of the proposed Yahthumb Project.

Southern Bighorn Solar Project I (SBSP I) and Southern Bighorn Solar Project II (SBSP II) – The SBSP I and SBSP II Projects were recently evaluated through the National Environmental Policy Act (NEPA) process. The Final EIS was published in June 2021 (BIA 2021). They are located about 0.8 miles south and 0.8 miles east-southeast of the proposed Yahthumb Project.

Chuckwalla Solar Projects – The Chuckwalla Solar Projects are currently being evaluated through the NEPA process. They include up to four PV solar projects totaling 700 MWs and located within a 6,500-acre lease study area in the southeast corner of the Reservation approximately 4.4 miles southeast of the proposed Yahthumb Project.

In addition, the approved Gemini Solar Project is south of the Reservation on BLM land approximately 5.2 miles south of the proposed Yahthumb Project and is not yet constructed.

1.3 Purpose and Need of the Proposed Project

The purpose and need of the proposed Project are to: (1) provide a long-term, viable economic revenue base (lease income) and job opportunities for the Moapa Band; (2) allow the Moapa Band, in partnership with the Applicant, to optimize the use of the lease site while maximizing the potential economic benefit to the Moapa Band; and (3) develop clean renewable electricity generation from the Moapa Band’s solar resources to support the State of Nevada’s 50 percent renewable portfolio standard requirement by 2030 and a goal of 100 percent carbon-free resources by 2050 (State Bill 358). The Project would also help meet the federal government’s goals to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies.

The Moapa Band identified the proposed Project as viable opportunities to meet its economic development goals because the lease would provide much needed revenue to the Moapa Band while occupying a small portion of the Reservation (2.4 percent). The construction, operation and maintenance (O&M), and decommissioning of the Project would afford employment opportunities to Moapa Band members. The Moapa Band has determined that the Project would also be consistent with the Moapa Band’s tradition of respect for the land and would fulfill the purposes for which the 70,564 acres were restored to the Moapa Band by the federal government in 1980 (Moapa Band 1980). The proposed use of the Moapa Band’s water by the Project would help the Moapa Band affirm and sustain its rights to the water.

Because the Project meets the Moapa Band’s objectives, they have forwarded a resolution documenting their intent to enter into the lease agreements for the Project to the BIA to initiate the environmental review process for the proposed 138-MW Project.

1.4 Agency Purpose and Need

This Draft EIS was prepared to thoroughly examine the potential environmental impacts of the proposed action and alternative actions in order to support informed decision-making. This Draft EIS is consistent with the purpose and goals of NEPA; the requirements of the Council on Environmental Quality’s (CEQ) implementing NEPA regulations at 40 CFR Parts 1500-1508; longstanding federal judicial and regulatory interpretations; the Department of the Interior’s NEPA regulations (43 CFR Part 46); and Administration priorities and polices including Secretary’s Order No. 3399 requiring bureaus and offices to use “the same application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect.”

1.4.1 BIA Purpose and Need

The need for the BIA action is established by the BIA’s responsibility to respond to a request for a business lease approval and right-of-way (ROW) application between the Moapa Band and the Applicant over or across lands held in trust for Indian tribes. The BIA must meet its responsibility to review and approve actions on tribal lands held in trust for the benefit of the Moapa Band (42 United States Code [U.S.C.] §§ 4321 et seq).

The BIA purpose, pursuant to 25 U.S.C. § 415, is to deny, grant, or grant with modifications the solar energy ground lease for the solar fields and associated ROW agreements between the Moapa Band and the Applicant.

1.4.2 BLM Purpose and Need

The need for the BLM action is established under Title V of the Federal Land Policy and Management Act ([FLPMA] 43 U.S.C. § 1761), where the BLM must respond to Applicant’s ROW grant application for the gen-tie line, temporary water pipeline, and existing BLM-managed access roads. In accordance with Section 103(c) of FLPMA, public lands are to be managed for multiple uses that consider the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Department of Interior (DOI) is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501[a][4]).

The BLM purpose is to deny, grant, or grant with modifications the ROW request to construct, operate, maintain, and decommission the proposed new gen-tie line located within the designated utility corridor on Reservation land managed by the BLM; the ROW request for use of existing access roads located on BLM land and Reservation land within the BLM-managed designated utility corridor; and the ROW request for temporary water pipeline within the designated corridor. The ROWs would be in compliance with FLPMA, BLM ROW regulations (43 Code of Federal Register [CFR] § 2800), and other applicable federal and Nevada State laws and policies, and would be in compliance with all objectives, directions, and requirements of the BLM Las Vegas Resource Management Plan.

1.5 Decisions To Be Made

Table 1-1 summarizes the agency decisions to be made for the proposed Yahthumb Project. The BIA and the BLM decisions, if approved, would assist in addressing the management objectives in Title II, Section 211 of the Energy Policy Act of 2005 (42 U.S.C. §§ 13201 et seq.) and Secretarial Order 3285A1 (March 11, 2009) that established the development of environmentally responsible renewable energy as a priority for the DOI. Refer to Chapter 2 for descriptions of Project components and the locations where a lease would be required from BIA and where ROW would be required from BLM and BIA.

Table 1-1 Summary of Agency Decisions to be Made	
Agency	Action
BIA	Approval of solar energy ground lease and approval of ROWs for portions of the gen-tie line and access roads located on the Reservation.
BLM	Approval of ROW for portions of the gen-tie line within the BLM-managed designated utility corridor on Reservation land and BLM lands near the Reid-Gardner Substation; and approval of ROW for use of existing access roads and ROW for a temporary water pipeline located on BLM-managed federal land and within the BLM-managed designated utility corridor on Reservation land.

Because the BIA has a jurisdictional trust responsibility over Indian lands and the BLM has land management responsibilities under FLPMA, the Project is a major federal action and must comply with the NEPA of 1969 (42 U.S.C. §§ 4321 et seq.). Because most of the Project and related infrastructure would be located on tribal trust land, the BIA is the lead federal agency for purposes of compliance with NEPA. The Moapa Band, the BLM, Clark County, U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), and Nevada Department of Wildlife (NDOW) are cooperating agencies on the EIS for the Project. The BIA and the BLM will use this EIS to make their respective decisions and the other cooperating agencies will use this information to support their analyses and decisions, as needed.

1.6 Summary of Public Scoping and Issue Identification

1.6.1 Public Scoping Process

Scoping helps determine the significant issues, alternatives, and the appropriate scope of environmental analysis to be addressed in this EIS. Scoping also ensures that the issues and alternatives are within the scope of the decisions to be made by the BIA, the BLM, and other cooperating agencies.

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Project in the Federal Register on June 25, 2021. In addition, notices were placed in local newspapers and two virtual public scoping meetings were held for the Project on July 20 and July 21, 2021. In accordance with interim guidance for NEPA public participation processes during the COVID-19 pandemic, the public scoping meetings were held virtually rather than in person. The PowerPoint presentation was posted to the Project’s website prior to the virtual meetings and participants with access to the internet were able to watch a live presentation of the PowerPoint, ask questions about the Project, and provide comments through a link on the website. A telephone line was set up for participants who did not have access to the internet. Additionally, the live presentation was recorded and made accessible for viewing throughout the scoping period. The scoping report (**Appendix B**) summarizes the comments received and provides a preliminary list of issues and/or concerns identified.

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

Issue Topic	Issue/Comment
Water Resources	Need to comply with relevant floodplain and stormwater requirements to minimize erosion and sediment production
	Avoid development within major washes
	Describe the amount and source of the water to be used during construction and operation
Soils	Should include measures to minimize grading and soil disturbance to the extent possible
Vegetation	Should include measures to minimize vegetation clearing to the extent possible
	Should include measures to control weeds to the extent possible
Cultural Resources	Determine whether the development could have potential effects to significant cultural sites in the lease study area that would need to be mitigated or avoided
	Determine whether the project could impact the Old Spanish National Historic Trail
Socioeconomics	Describe the economic development opportunity for the Band
	Describe the jobs for tribal members and others in the region that would be created
Wildlife	Describe the potential impacts to threatened and endangered species (including the desert tortoise) and other sensitive wildlife species
	Consider measures that minimize impacts to desert tortoise habitat and connectivity such as fencing to allow tortoises to re-enter and utilize the site following construction
	Describe the potential impacts to avian species from construction and operation of the project
Visual Resources	Evaluate the impact the solar fields could have on views of the landscape

Table 1-2 Key Issues Identified During Scoping	
Issue Topic	Issue/Comment
Air Quality/Public Health	Measures should be implemented to control and minimize fugitive dust and to prevent worker exposure to Coccidioides spores, if present
Regional Impacts	Identify impacts from other solar projects and other developments in the area
	Discuss trends of and collective impacts to key resources including desert tortoise

1.7 Policies and Programs

1.7.1 Relationships to Statutes, Regulations, and Other Plans

The Yahthumb Project will conform to the federal, tribal, State, and local laws, regulations, or policies that may apply to the Project. It should be noted that portions of the Project that lie wholly within the Reservation would also be regulated under the Moapa Band’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 gen-tie lines and access roads on BLM-managed land off the Reservation may be regulated under County, State, and federal regulations that apply to the BLM.

1.8 Permits and Approvals Required for the Proposed Project

Table 1-3 lists the anticipated federal, tribal, State, and local permits or approvals that may be required for the proposed Project beyond the BIA, BLM, and Reclamation decisions and NEPA process. This table has been subdivided by the components of the Project and land jurisdiction (the Reservation, and lands managed by the BLM). In addition to the items listed in **Table 1-3**, the access roads will require ROW grants from BIA.

Table 1-3 Anticipated Permits and Approvals for the Project Components		
Land Ownership / Jurisdiction	Solar Fields	Gen-Tie Lines
Moapa River Indian Reservation/BIA	<ul style="list-style-type: none"> • Lease approval, ROW grant (BIA) • Section 7 consultation (USFWS) • Section 106 consultation (SHPO) • Compliance with Tribal Environmental Policy Ordinance • Construction General Permit for Stormwater Discharges (USEPA) 	<ul style="list-style-type: none"> • ROW grant (BIA) • Section 7 consultation (USFWS) • Section 106 consultation (SHPO) • Compliance with Tribal Environmental Policy Ordinance • Construction General Permit for Stormwater Discharges (USEPA)
BLM	Not applicable	<ul style="list-style-type: none"> • ROW grant (BLM) • Interconnection approval (Reclamation) • Section 7 consultation (USFWS) • Section 106 consultation (SHPO) • Special Purpose Permit—Desert Tortoise Relocation (NDOW) • UEPA Permit (PUCN) • Interconnection approval (Reclamation)

Table Abbreviations: BIA = Bureau of Indian Affairs; BLM - Bureau of Land Management; NDOW = Nevada Department of Wildlife; NPDES = National Pollutant Discharge Elimination System; PUCN = Public Utilities Commission of Nevada; ROW = right-of-way; SHPO = State Historic Preservation Office; USEPA = Utilities Environmental Protection Act; USFWS = U.S. Fish and Wildlife Service

CHAPTER 2

Proposed Action and Alternatives

This chapter describes the Proposed Action and identifies 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. Potential alternatives are categorized as those that are carried forward for detailed analysis and those that were considered but not carried forward for detailed analysis.

2.1 Proposed Action Alternative

The Proposed Action would consist of a 138-MW PV solar project incorporating BESS, a gen-tie line that would interconnect the Project to the regional electrical transmission grid, access roads to the solar site from Interstate 15 (I-15), and possibly a temporary water pipeline. The solar field and most of the primary access road would be located on the Reservation. Most of the gen-tie line would be located within the utility corridor on the Reservation managed by the BLM. **Figure 1-2** shows the location of the lease study area for the proposed solar Project.

2.1.1 Proposed Solar Project Components

The Yahthumb Project solar site would be located entirely on the Reservation which would be leased by the Moapa Band to the Applicant for an up to 5-year construction term plus a 30-year operations term with two 10-year extensions and an 18-month post-operations term for a total term up to 56 ½ years.

Figure 2-1 shows the proposed locations on the lease study area where solar fields would be developed for the proposed solar Project. Major on-site facilities would include a 138 MW alternating current (AC) solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, a BESS, and a project substation. The off-site facilities would include a gen-tie and associated facilities, site access roads, and a temporary water pipeline.

The gen-tie line would be a single-circuit 230 kilovolt (kV) line up to approximately 10.3 miles long and located on the Reservation, BLM-administered lands, and private lands. It would generally parallel the ESM gen-tie line (recently constructed) and most of it would be within a federally designated utility corridor on the Reservation managed by BLM. This line would generally require a ROW width of 75 feet. The primary access for the site would be provided by the existing Ute Road from an interchange on I-15, and secondary access would be provided by the existing road network within the utility corridor. Temporary facilities that would be removed/reclaimed at the end of construction include a temporary water pipeline, laydown and construction areas, and temporary construction areas along the gen-tie line. **Table 2-1** summarizes the primary components of the Project and the associated agency actions.

In addition to the federal agency jurisdictions identified in **Table 2-1**, the approximately 5.3-mile portion of the gen-tie crossing BLM lands outside of the Reservation and private lands would be subject to Clark County jurisdiction and would require a Special Use Permit (SUP).

TABLE 2-1 SUMMARY OF AGENCY LANDS/JURISDICTION PROPOSED YAHTHUMB SOLAR PROJECT				
Agency	Project Component	Location	Agency Action	Mileage/Acreage¹
BIA	Solar Field	Reservation	Lease ²	Up to 1,400 acres
	230 kV Gen-Tie Line	Reservation	ROW	Up to 0.1 mile / 0.9 acre
	Primary Site Access Road	Reservation	ROW	3.7 miles / 10.8 acres
	TOTAL BIA			1,411.7 acres
BLM	230 kV Gen-Tie Line	Designated Utility Corridor on Tribal Lands	ROW ³	7.1 miles / 102.0 acres
	230 kV Gen-Tie Line	Federal Lands managed by BLM	ROW ³	4.2 miles / 26.6 acres
	Primary Site Access Road	Designated Utility Corridor on Tribal Lands	ROW	1.7 miles / 5.0 acres
	Secondary Site Access	Designated Utility Corridor on Tribal Lands	ROW	7.8 miles / 22.7 acres
	Secondary Site Access	Federal Lands managed by BLM	ROW	1.1 miles / 3.2 acres
	Temporary Water Pipeline	Designated Utility Corridor on Tribal Lands	ROW	4.7 miles / 10.3 acres
	TOTAL BLM			26.6 miles / 148.0 acres
PRIVATE	230 kV Gen-Tie Line	Private Lands owned by NV Energy	N/A	1.1 miles / 10.0 acres
	TOTAL Private			1.1 miles / 10.0 acres

¹ Acreage and mileage are approximate. Gen-tie acreage is based on a 75-foot ROW and the expected maximum length of the line (10.3 miles) - only a portion of the ROW would be disturbed. Primary access road and most of the secondary access road are existing (except 2.5-mile section of secondary access road where existing road would be upgraded). Only a portion of the 1,400-acre potential solar site and lease area would be disturbed by the final footprint of the solar project.

² Lease term would be 56.5 years

³ BLM ROW term would be 50 years and would need to be extended if Project life extends beyond that period.

The Project would include the following on-site key elements located within the up to 1,400-acre solar lease boundary, which are discussed further below.

- Solar Field
- Battery Energy Storage System
- On-site Electrical Collection System and Substation
- Site Security and Fencing
- Communication Systems Infrastructure
- Internal Project Roads
- Lighting
- Waste and Hazardous Materials Management
- Fire Protection

The Project would include the following off-site permanent elements located outside of the solar lease boundary, which are discussed further below:

- 230-kV Transmission Line (Gen-Tie)
- Access Roads (primary and secondary)

The Project would also include the following temporary key elements associated with construction that would be removed once construction is complete, which are also discussed further below:

- Equipment laydown areas on the solar field
- Construction areas and pulling sites along gen-tie line
- Temporary water pipeline

The total acreage of temporary and permanent disturbance associated with the Yahthumb Project facilities is summarized in **Table 2-2**.

TABLE 2-2 TEMPORARY AND PERMANENT DISTURBANCE			
Project Component	Jurisdiction	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Solar Field and Ancillary Facilities	Reservation	1,129 ¹	297 ²
230 kV Gen-Tie Line	Reservation	0	0
	BLM (corridor)	30.8	5.2
	BLM	10.8	2.1
	Private	2.6	2.1
Site Access Road (Primary)	Reservation	0	0.03
	BLM (corridor)	0	1.74
Site Access Roads (Secondary)	BLM (corridor)	0	0
	BLM	0	0
Temporary Water Pipeline	BLM (corridor)	10.3	0
Total		1,184	308

¹ The solar field includes all facilities within its boundary including solar arrays, internal site roads, substation, and all associated components.

² These acres would be graded and kept free of vegetation for the duration of operations while the remainder would not be graded with vegetation left in place.

Development of the Project would include implementation of best management practices (BMPs) designed to guide project planning, construction activities, and operation of facilities to minimize environmental impacts. The BMPs and other design features incorporated into the Project are summarized in **Appendix C** of this EIS.

Solar Fields

The solar field would be developed to avoid two larger drainages that cross the lease study area as shown on **Figure 2-1**. This would create three primary solar field areas – northern, central, and southern. Components within the solar fields include mounted PV modules, inverters, and transformers that would be combined to form array blocks approximately 3.15 MWac and 3.6 MWac in size (block size may change based on final design). The blocks would be repeated to create up to 138 MW of AC electrical capacity. Inverter stations are generally located centrally within the blocks. Blocks would

produce direct electrical current (DC), which is converted to AC at the inverter stations. **Figure 2-2** shows the conceptual site plan for the Yahthumb Project solar field.

The Project would be constructed using PV panels or modules that convert sunlight directly into electricity. Panels would be installed on single-axis tracker mount systems oriented in north-south rows that would rotate to follow the sun over the course of the day. The foundations for the mounting structures would be embedded driven steel posts or other embedded foundation design based on the structure, soil conditions, and wind loads. Final solar panel layout and spacing would be optimized for site characteristics and the needed energy production.

A typical panel array layout using single-axis trackers is shown on **Figure 2-3**. The highest point for a tracker would be achieved during the morning and evening hours when the trackers are tilted at their maximum angle and would be up to 15 feet above the ground surface depending on the grade where the posts are installed (**Figure 2-4**).

In the tracking system, each tracker panel array would be powered by a low-voltage electric drive motor. The motors would normally be operated for a few seconds every five to 10 minutes during daylight conditions to move the panels in approximately one-degree increments.

Meteorological monitoring stations located at multiple locations (up to five) within the solar array would monitor wind speed and communicate with the tracker units. This would allow for the trackers to rotate to a flat position during high winds. Meteorological stations would be mounted on or around the inverter units and would not exceed 16 feet in height.

A helipad would be developed near the substation and BESS area to provide first-responder access in case of emergency. The dimensions of the helipad would be about 100 feet by 100 feet and the area would be compacted and covered with gravel and would provide sufficient clearance from all structures and any potential obstructions. Helicopters would use this pad infrequently and only in the case of emergencies during construction and operation.

Battery Energy Storage System

The Yahthumb Project may include one or more BESSs, located at or near the Project substation and/or at the inverter stations, but possibly elsewhere on site. The BESSs would consist of modular and scalable battery packs and battery control systems that conform to national safety standards. The BESS modules, which may include commercially available flow batteries, would consist of industry-standard containers (approximately 40 feet x 8 feet x 8 feet) in pad- or post-mounted, stackable metal structures.

The total acreage of the BESS is not expected to exceed 12 acres. The actual dimensions and number of energy storage modules and structures would vary depending on the application, supplier, chosen configuration, and applicable building standards.

Electrical Collection System and Substation

PV modules convert sunlight into DC electricity which would be collected and delivered through underground or aboveground cables to an inverter near the center of the array where it converts the DC electricity to AC electricity and a medium-voltage transformer steps up the voltage to 34.5 kV. This converted AC electricity then would be delivered to the on-site substation via the 34.5 kV AC collection

system. At the substation, the electricity again would be stepped up to 230 kV for delivery to NV Energy's transmission grid at the Reid-Gardner Substation.

The inverter units would have a rated power of up to 3.6 MW each, a unit transformer, and voltage switch gear. The unit transformer and voltage switch gear would be housed in steel enclosures, while the inverter unit(s) would be housed in cabinets. The inverter station could also be within an enclosed or canopied metal structure on a skid or concrete mounted pad.

The 34.5 kV collector system would be installed either as overhead single- or double-circuit lines and fiber optic communication lines on wooden poles with post insulators or underground in trenches depending on soil characteristics. If overhead, pole height would be up to 75 feet above grade with approximately 150-foot spacing between poles. Wood poles typically would be directly embedded to 10 percent of the pole height plus two feet. If the collector system is buried, the trenches would be as deep as four feet and as wide as 10 feet depending on the number of circuits being collected. Collector lines would run through and between the solar fields.

The on-site Project substation would include auxiliary power transformers, distribution cabinets, revenue metering systems, a microwave transmission tower, voltage switch gear, a small control building, and a mechanical electrical equipment room. The substation would occupy an area of up to 10 acres and would be secured separately by an additional chain-link fence. The proposed location of the Project substation would be near the main site entrance.

Site Security and Fencing

Each solar array area would be enclosed within a chain-link fence, potentially with barbed wire on top, measuring up to eight feet in height (from finished grade). The fence would have controlled access points, and possibly security alarms, security camera systems with remote monitoring, and security guard vehicle patrols to deter trespassing and/or unauthorized activities. Additional fencing also would be installed around the on-site substation.

Temporary desert tortoise exclusion fencing would be installed outside of the chain-link perimeter fence during construction. The permanent perimeter fence would be installed to leave a six to eight-inch opening at the bottom of the fence to allow the movement of desert tortoises across and through the site when the temporary tortoise fence is removed following construction. The specifications for the perimeter fencing would be determined through consultation with the USFWS. Substation fencing would include approved desert tortoise exclusion fencing to prevent tortoises from entering the substation.

Communication Systems Infrastructure

Telecommunications systems would be installed at the Project substation consisting of a remote terminal unit (RTU) and equipment necessary for the solar facility. This equipment would include a communications line (i.e., T-1 line), and/or a microwave receiver mounted on the control building or on a lattice tower up to 100 feet tall, and miscellaneous communication cables and link equipment, as required. Fiber optics would be installed in one of the shield wires of the gen-tie line to link the project substation to the Reid Gardner Substation. In addition, an up to 100-foot-tall structure may be erected

near the substation/control building to facilitate wireless communications to provide site telecommunications.

The Project would have a Supervisory Control and Data Acquisition (SCADA) system that would allow for the remote monitoring and control of inverters and other Project components. The SCADA system would be able to monitor Project output and availability and to run diagnostics on the equipment. This equipment would be located in the site substation and would connect to the communications system.

Internal Project Roads

Existing roads / primary access roads would be used to provide access between the three solar field areas. Within the solar fields, access ways would be built to provide vehicle access to the solar equipment (PV modules, inverters, BESS, transformers) for operation and maintenance (O&M) activities. These access ways would be located between the array blocks to facilitate access to array blocks and inverters. Turnarounds would be constructed at the terminus of interior access roads to facilitate vehicle and equipment turn-arounds. The existing soil surface of all interior access ways would be bladed. In addition to grading, interior access ways that lead to inverter stations would be compacted using on-site materials.

Lighting

Minimal lighting would be used on-site and would be directed inward and downward. Site lighting could include motion sensor lights for security purposes. Lighting used on-site would be of the lowest intensity foot candle level and in compliance with any applicable requirements from the Moapa Band as measured at the property line after dark.

Water Supply

The Project's construction water requirements would be met from existing water rights owned by the Moapa Band. The Applicant would have access to this water supply through an agreement with the Moapa Band. This water would be provided either from an existing tribal well located off-site approximately 4.7 miles south of the solar project or a new well drilled on site. If the selected water supply is the off-site well, water would be delivered to the site during construction by a temporary water pipeline or trucks.

Up to 500 acre-feet (AF) of water would be required over approximately 12 to 14 months for construction-related activities, including dust control. During operations, water demand for panel washing and O&M domestic use is not expected to exceed 10 acre-feet per year. A small water treatment system could be installed to provide deionized water for panel washing. One or more aboveground water storage tanks could be located on-site near the site entrance.

Wastewater Treatment

Wastewater generated during construction and operation would include sanitary waste. Portable toilets would be used during construction and operation.

Waste and Hazardous Materials Management

The primary wastes generated at the Project during construction and O&M would be nonhazardous solid and liquid wastes. Limited quantities of hazardous materials would be used and stored on the solar site. The BESS would contain lithium-ion batteries that would need replacement periodically, and the used batteries would need to be disposed of according to appropriate protocols. The primary hazardous materials on site during construction would be the fuels, lubricating oils and solvents associated with construction equipment. The nonhazardous wastes produced by construction and O&M activities would include defective or broken electrical materials and batteries, empty containers, the typical refuse generated by workers, and other miscellaneous solid wastes.

The Applicant would prepare an Emergency Response Plan and a Spill Response Plan to address waste and hazardous materials management including BMPs related to storage, spill response, transportation, and handling of materials and wastes. Waste management would emphasize the recycling of wastes where possible and would identify the specific landfills that would receive wastes that cannot be recycled.

Fire Protection

The Project's fire protection water system may be supplied from the water storage tank(s) which would have the appropriate fire department connections to facilitate use for fire suppression purposes and be consistent with Clark County requirements. During construction, one temporary firewater pump would deliver water to the fire protection water-piping network. Fire protection pump flow rates would be in accordance with applicable fire safety standards.

The electrical equipment enclosures that house the inverters, transformers, and BESS would be metal structures. Any fire that could occur would be contained within the structures which would be designed to meet National Electric Manufacturers Association (NEMA) 1 or NEMA 3R IP44 standards for electrical enclosures (heavy duty sealed design to withstand harsh outdoor environmental conditions).

The construction contractor would develop and implement a Fire Management Plan for construction and the Applicant would prepare and implement a Fire Management Plan for operations.

2.1.2 Off-Site ROWs

As discussed previously, the primary off-site ancillary facilities needed to support the Project includes a gen-tie line, access roads, and a temporary water pipeline. The approximate length and acreage of each of these ROWs broken down by land jurisdiction is provided in **Table 2-1** and a description of each of these facilities follows.

Gen-Tie Transmission Line

The Project would require the construction of an up to approximately 10.3-mile single-circuit 230 kV gen-tie for interconnection to the regional transmission grid system. The proposed gen-tie route would originate from the Project substation on tribal land and would be located within the designated BLM utility corridor where it would parallel the newly constructed ESM gen-tie line for approximately 7.1 miles. It would then enter BLM-administered lands for approximately 0.8 mile, then cross private lands owned by NVE for approximately 1.1 miles, and then cross BLM-administered lands for another approximately 1.2 miles terminating at a Point of Change of Ownership (POCO) structure near NVE’s Reid Gardner Substation. The gen-tie would be designed to accommodate transmission of energy generated by the Project and an approximate 75-foot-wide ROW would be required from BLM for the gen-tie line. **Figure 2-5** shows the location of the proposed gen-tie route and **Table 2-3** below provides the Township, Range, and Section(s) that would be crossed by the proposed gen-tie line broken down by land managing agency with jurisdiction.

Table 2-3 General Legal Description of Proposed Gen-Tie Line by Jurisdiction		
Reservation		
Township 15 South	Range 65 East	
BLM (within designated utility corridor)		
Township 15 South	Range 65 East	Sections 12, 13, 14, 22, 23, 27, 28, 32, and 33
BLM (on federal land)		
Township 16 South	Range 66 East	Sections 5, 6, and 7
Private		
Township 16 South	Range 66 East	Sections 5 and 6

Information based on the Mount Diablo Base Meridian

It is possible that the POCO location could change from its originally proposed location as shown on **Figure 2-5**. In either case, the Applicant would construct the gen-tie from the Project substation to the POCO structure and the remaining portion of the gen-tie would be constructed by NV Energy to the Reid Gardner Substation.

The portion of the overhead 230 kV line on federally administered lands would be installed on structures spaced approximately 700 to 900 feet apart depending on the topographic, hydrologic, and geologic conditions of the underlying lands. The structures would be up to approximately 150 feet tall (above grade) with minimum ground clearance of 25 feet per local and national electrical code requirements. In addition, one of the shield wires on the gen-tie line would include a fiber optic communications cable providing a communications link between the Project substation and the Reid Gardner Substation. **Figure 2-6** shows the dimensions of the typical steel pole transmission structure proposed for this Project.

Access along the entire length of gen-tie ROW would be provided via the existing roads associated with the recently constructed ESM gen-tie line. Short spur roads would be built from this existing road where needed to access each new structure location along the proposed gen-tie. **Figure 2-7** shows an illustration of how the existing ESM gen-tie road would be utilized to provide the needed access for the proposed gen-tie.

All overhead electrical lines would be designed and installed in accordance with the Avian Power Line Interaction Committee’s (APLIC) Suggested Practices for Avian Protection on Power Lines (APLIC 2006).

The Applicant would also prepare a Bird and Bat Conservation Strategy (BBCS) to address potential impacts to birds and bats during the construction, operations, and maintenance phases of the Project.

Site Access Roads

Primary access to the Yahthumb Project site for construction and through operations and decommissioning would be provided via the existing Ute Road which is located on the Reservation and is accessed via an existing interchange on I-15. The existing Ute Road would provide access to central and southern portions of the solar site. An existing road within the corridor would be upgraded from Ute Road for about 1.1 miles with a new spur road built for about 0.5 mile to provide access to the northern portion of the solar site.

Secondary access would be provided via existing roads within the designated utility corridor. Access to these roads would be via I-15, US Highway 93, and North Las Vegas Boulevard to existing improved roads on the Reservation. These existing roads on the Reservation to be used for secondary site access include the road built to provide access to the nearby existing K Road Solar Facility and ESM Project. From the K Road/ESM access points, the existing road within the utility corridor would be upgraded for about 2.5 miles to provide access to the YTP Project.

Figure 2-1 shows the location of the existing Ute Road and the secondary roads that would be used. All site access road ROWs (existing and proposed) would be 24 feet wide.

Temporary Water Pipeline

If the water needed for construction is provided from the Moapa Band's existing well located south of the solar project site, a temporary water pipeline could be installed to transport that water to the site. This pipeline would be approximately 4.7 miles long, eight to 12 inches in diameter, and installed on the ground surface adjacent to the existing gen-tie service road for the ESM gen-tie. The temporary ROW for this pipeline would be 20 feet wide. Following the completion of construction, the pipeline would be removed.

2.1.3 Proposed Project Construction

Prior to any activity on the site, required resource protection plans would be developed and regulatory and permit conditions would be integrated into the final construction compliance documents. Project construction would begin once all applicable approvals and permits have been obtained. Construction is expected to take approximately 12 to 14 months and would include mobilization, grading and site preparation, installation of drainage and erosion control measures, PV panel/tracker assembly, and solar field, BESS, substation, and gen-tie construction.

Solar Field Construction

Construction of the solar project would incorporate the following steps:

Surveying/Staking - Prior to construction, the limits of construction disturbance areas would be determined by surveying and staking. Where necessary, the construction areas and sensitive areas to be

avoided would be flagged with appropriate buffers so all construction activities would be limited to prevent unnecessary impacts to the sensitive areas.

Clearance Surveys/Temporary Fencing - During the site clearance phase, the boundaries of the construction areas would be surveyed for sensitive species during appropriate timeframes. Approved temporary tortoise fencing would be installed around the perimeter of the construction areas to prevent tortoise from moving onto the site from adjacent areas. Authorized biologists would be retained to survey for and relocate desert tortoise and perform other sensitive species surveys, removal, and mitigation.

Vegetation Removal - Vegetation would be permanently cleared from internal project roadways and at inverter equipment, the BESSs, and the substation. Within the solar field, native vegetation would be left in place to the extent possible with some mowing and selective trimming as needed to create a safe work environment and avoid interference with the movement of the solar panels. Prior to construction, vegetation within the solar arrays would be mowed to a height of 18 inches leaving the roots intact to facilitate regrowth during operations. Construction equipment would drive over and crush the vegetation during installation of the arrays.

Site Clearing/Grading/Excavation - The cuts and fills associated with all earthworks required on the site are planned to be balanced on-site. Within the solar field, grading would be limited but some grading would be required for the project substation, O&M area, battery storage area, perimeter roads around the solar arrays, and electrical equipment pads. A small pad could also be graded within each solar array to accommodate the inverter and transformer, or they could be installed on driven piers.

Gravel/Aggregate/Concrete - Concrete would be trucked in and poured in place for equipment, gen-tie structures, and foundations (BESS, inverters). Aggregate material would be used for parking areas, substation area, and where needed for the perimeter road and access roads. Riprap material could be required for erosion control. This material would be sourced from the Moapa Band, as available.

PV Solar Array Assembly and Construction - The construction sequence for the solar field equipment would follow a generally specified order for each array. Construction work within each array would generally proceed as follows:

- Install foundations for inverter units
- Prepare trenches for underground cable within each array
- Install underground cable as required
- Backfill trenches
- Install inverter and transformer equipment
- Install steel posts and tracker assemblies
- Install PV modules
- Install concrete footings for transformers, and substation equipment
- Install foundations for batteries
- Install battery containers and supporting equipment
- Perform electrical terminations
- Inspect, test, and commission equipment

Cable trenches within the arrays would contain electrical conductors for low-voltage power collection and fiber optic cables for equipment communication. Trenches would vary between three to 10 feet wide and three to four feet deep. Trench excavation would be performed with conventional trenching equipment, and excavated soil would be placed adjacent to the trench and used as backfill once installation is complete.

The assembled solar equipment would be installed on steel posts to which steel tracker assemblies would be attached. The structural steel posts may be galvanized to mitigate corrosive soils, as needed. Trucks would be used to transport the PV modules to the solar field. Final solar field assembly would require small cranes, tractors, and forklifts.

Standard transmission line construction techniques would be used to construct the 34.5 kV collector lines where constructed overhead - foundation installation, tower installation, and conductor stringing. Wooden poles used for the overhead 34.5 kV collector line would be directly embedded into the ground and would be installed by auguring holes and placing the poles into the holes using backhoes or heavy lifter vehicles.

Substation Construction - The Project substation would be constructed on the solar site in compliance with applicable electrical safety codes. The on-site substation would require a graded site to create a relatively flat surface with approximately one percent maximum slope in any direction. The substation area would be excavated to a depth of approximately 10 feet, a copper grounding grid designed to meet the applicable electrical requirements would be installed, and the foundations for transformers and metal structures would be prepared. Final ground grid design would be based on site-specific information such as available fault current and local soil resistivity. Typical ground grids consist of direct buried copper conductors with copper-clad ground rods arranged in a grid pattern covering the substation area plus a small buffer outside the fence. After installation of the grounding grid, the area would be backfilled, compacted, and leveled followed by the application of aggregate rock base. Installation of the transformers, breakers, buswork, and metal dead-end structures would follow. A containment area around the transformers would be sized to hold the full volume of oil within the transformers and lined with an impermeable membrane covered with gravel to capture any expected leaks. A prefabricated control house would be installed to house the electronic components required for the substation equipment.

Gen-Tie Construction

Prior to construction, geotechnical surveys involving drilling boreholes could be conducted along the line to provide information for the foundation design of the structures and access roads. Construction equipment access would be required at each transmission structure. The Project would use the existing access roads associated with the adjacent ESM gen-tie with spur roads developed to get drilling and construction equipment to each structure location for the Yahthumb Project gen-tie line. The Plan of Development (POD) for the gen-tie lines included as **Appendix D** in this EIS.

Construction of the gen-tie would begin with development of spur roads where they are needed to each structure location. Spur roads would typically be 12 feet wide. Vegetation would be removed, the surface would be bladed, and compacted only where necessary to ensure work safety and stability if needed. Roads would be left in place for use during O&M but would not be maintained following construction.

To access the gen-tie service roads, construction vehicles would use the existing Hidden Valley Road near the Reid Gardner Substation on the northern end of the gen-tie route and the upgraded solar site access road for the southern end of the gen-tie route.

Structure Sites - An approximately 125-foot by 50-foot (6,250 square-foot or 0.15 acres) area would be needed around each of the structure sites for construction. These areas would be temporarily disturbed during the construction period and would be cleared of vegetation only as required for safety and efficiency. Holes would be developed for each transmission structure using a truck-mounted drill rig or a standalone auger rig if required. The poles would be set within an augured hole (for tangent structures) or on a concrete pier foundation (dead-end structures).

Foundation Installation - The steel poles used for the gen-tie would be supported by steel-reinforced poured pier concrete foundations where needed for the conditions at each structure site. The primary equipment used in setting foundations would be concrete trucks, auger rigs, pickup trucks, crane, and front-end loaders. These foundations would be constructed by auguring a cylindrical hole using a truck-mounted drilling rig. Reinforcing steel and anchor bolt cages would be installed in the hole and then the hole would be backfilled with concrete. Foundations could range in size from approximately four to seven feet in diameter and from 12 to 30 feet in depth. Larger diameter and deeper foundations would be needed where the transmission line turns at an angle of 30 degrees or greater. Excavated spoil material would be spread around the temporary work areas.

Structure Installation - Structures would be staged in designated laydown/stringing areas or delivered and unloaded adjacent to their respective final locations. Poles would be delivered on a flat-bed trailer and lifted into place using a crane. For direct-imbedded (tangent) poles, the open space between the poles and walls of the auger holes would be backfilled with concrete or soil. The poles would be supported, as necessary, during installation to ensure correct pole seating in the hole or on the foundation.

Conductor Stringing - After the structures are erected, the conductors and static wires would be strung between them and attached. Pull and tensioning sites are the locations where equipment would be located to pull the conductors and wires into place. Multiple pulling and tensions sites would be required for installing the conductors on the transmission structures, and these sites would be approximately 75 feet wide by 400 feet long and located within the ROW except at angle structures where they would be at least partially outside the ROW. Stringing would likely be conducted one conductor at a time, with all equipment in the same location until all lines are in place.

Conductor stringing is typically accomplished with heavy-duty trucks and telescoping boom lift. If necessary, some sections of line could be strung either by helicopter or by walking a light pulling rope between structures that is used to pull in the heavier conductor. If helicopters are used to support the conductor stringing operations, in addition to installing the ropes and cables between stringing sites, they could also be used to transport line workers, clip ladders, and other tools between pole locations. It is anticipated that one of the lay-down yards on the solar site would be used for helicopter staging. Where used, helicopter duration for construction at any one structure location would be about 20 to 30 minutes per structure. More details regarding helicopter use would be included in a detailed project-specific Helicopter Flight and Safety Plan developed prior to construction.

Truck-mounted cable-pulling equipment would be placed at the first and last towers or poles in a segment - pulling equipment at the front end and braking or tensioning equipment at the back end. After the conductors are pulled through the segment, they would be attached to the insulators, and the conductor tension would be increased to achieve a ground clearance of at least 25 feet prior to moving to the next section.

Equipment/Personnel - Typical equipment expected to be used for transmission line construction include bulldozers, graders, compactors, drilling rigs, cranes, boom trucks, flat-bed trucks, crew trucks, concrete trucks, bucket lift trucks, and heavy-duty trucks (puller and tensioner).

Solar Site Access Road Construction

The existing Ute Road on the Reservation would provide primary access to the Yahthumb Project site. It is expected that minimal improvement would be needed for this road but some improvements to the low water crossings are expected to be needed.

Site Stabilization, Protection, and Reclamation

During and following construction of both on-site and off-site facilities, appropriate water erosion and dust-control measures would be implemented to prevent increased dust and erosion around the site. Dust generated by construction would be controlled and minimized by applying water (obtained from the Moapa Band). If needed to control dust during construction, agency-approved palliatives could be applied to newly constructed interior access roads after they are constructed at the beginning of the construction period.

Soil stabilization measures would be used to prevent soil being eroded by storm water runoff. The Applicant would employ BMPs to protect the soil surface from erosion. The construction contractor would develop and implement an erosion-control plan for the Project. Temporary laydown areas would be established in flat areas of the site and would not be bladed. The Applicant would prepare a final Site Restoration Plan that would outline all measures to be implemented immediately after construction.

Construction Workforce Schedule, Equipment, and Materials

The construction workforce for the solar facility and gen-tie would consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. The construction workforce is anticipated to be an average of 200 construction workers with a peak not expected to exceed 400 workers at any given time. Most construction staff and workers would commute daily to the jobsite from within Clark County, primarily from the Reservation and the Las Vegas area. The Applicant would prepare a Worker Environmental Awareness Plan (WEAP) for the Project that would address Project-specific safety, health, and environmental concerns, and all construction workers would be required to complete WEAP training.

Construction generally would occur between 5:00 a.m. and 7:00 p.m. and could occur seven days a week. Additional hours could 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 (e.g., at 3:00 a.m.) to avoid work during high ambient temperatures. Further, construction requirements would require some

nighttime activity for installation, service or electrical connection, inspection, and testing activities. Nighttime activities would be performed with temporary lighting.

Initial grading work would include the use of primarily rubber-tired tractors, track-driven excavators, graders, dump trucks, and end loaders, in addition to the support pickups, water trucks, and cranes. Throughout the construction process, temporary aboveground fuel storage tanks would be located at the site for construction equipment fueling. For civil work, equipment would include road graders, trenching machines, pumps, excavators for foundations, tractors, and additional support vehicles. Construction materials such as concrete, pipe, PV modules, wire and cable, fuels, reinforcing steel, and small tools and consumables would be delivered to the site by truck.

Construction Traffic

Typical construction traffic would consist of trucks transporting construction equipment and materials to and from the site and vehicles of management and construction employees during the construction period. Most construction staff and workers would commute daily to the jobsite from within Clark County, primarily from the Reservation and Las Vegas area. Most construction traffic would use the site's primary access - I-15 to the existing Ute Road across the Reservation to the site. Some construction traffic would also occur on the secondary access road (water pipeline/delivery). The construction contractor would prepare a Transportation Management Plan to address Project-related traffic.

Health and Safety Program

The Applicant would require that all employees and contractors adhere to appropriate health and safety plans and emergency response plans. All construction and operations contractors would be required to operate under a Health and Safety Program (HASP) that meets industry standards. All site personnel would be required to go through a new hire orientation and follow the worker's environmental awareness program (WEAP) outlining safety, health, and environmental requirements.

2.1.4 Temporary Construction Facilities (to be removed following construction)

On-site Temporary Project Construction Facilities

The Project construction contractor would establish a total of approximately 20-acres of temporary construction laydown areas near the main entrance to the solar field lease area and in various other locations within each individually fenced portion of the solar field. The selected areas would be cleared of vegetation but would not need to be bladed or compacted. Where practical, laydown areas used to facilitate construction of one portion of the solar facility would be developed with the solar arrays. Following construction, equipment would be removed from laydown areas not developed with solar arrays and allowed to revegetate using the guidance provided in the Project restoration and weed management plans.

An approximately 20-acre portion of the solar facility near the site entrance would be permanently used for development of the project substation and BESS. Although this entire area is included in the

permanent disturbance acreage estimate, during construction, portions of this area would also be used for temporary construction trailers with administrative offices, temporary generators to provide power for the trailers and administrative offices during construction, construction vehicle parking, tool sheds, and equipment and construction materials delivery and storage. Following construction, these facilities would be removed from the site.

The portions of the site disturbed by construction and not covered by roads, BESS facilities, and the site substation would be allowed to revegetate following construction. Vegetation would be maintained to a height as needed for movement of the solar panels, site maintenance, and fire-risk management using mechanical and chemical controls.

Off-site Temporary Project Construction Facilities

Temporary construction areas located off-site would be located at each gen-tie line structure location and at locations required for conductor stringing, splicing, and pulling operations to accommodate construction of the gen-tie. These areas would be required for staging equipment and materials for foundation construction and tower/conductor installation. In addition, a temporary water pipeline as described above could be located off-site to facilitate water delivery during construction. The acreages of these temporary disturbances are identified in **Table 2-2**.

2.1.5 Proposed Operation and Maintenance

On-site Project Facilities

The O&M requirements for a PV solar generation facility includes regular monitoring, periodic inspections, and conducting any needed maintenance. Operation of the Project is expected to require a workforce of up to four full-time-equivalent (FTE) positions. This workforce would include administrative and management personnel, operators, and security and maintenance personnel.

Routine maintenance would include periodic inspections and service. Panel washing could be conducted as needed to improve power generation efficiency. O&M would require the use of vehicles and equipment including crane trucks for minor equipment maintenance. Additional maintenance equipment would include forklifts, manlifts, and potential chemical application equipment for weed abatement. Pick-up trucks would be in daily use on the site. No heavy equipment would be used during normal plant operation.

Dust during O&M would be controlled and minimized by applying water and palliatives. Palliatives could be applied on areas that would not be disturbed during operation using a one-time application.

Safety precautions and emergency systems would be implemented as part of the design and construction of the Project to ensure safe and reliable operation. The Project would have an Emergency Response Plan (ERP) that would address potential emergencies including chemical releases, fires, and injuries. All employees would be provided with communication devices for an emergency.

The Applicant would prepare a weed management plan for the Project that follows an integrated approach as required by BIA and BLM. The weed plan would be implemented as needed during

operations. Herbicides would be used to control noxious weeds, if required. Pest control may also be required on the solar site on tribal land, including control of rodents and insects inside of the buildings and electrical equipment enclosures.

Off-site Project Facilities

The gen-tie line would operate continuously throughout the life of the Project. Following construction, operational activities associated with the gen-tie would involve periodic inspection and occasional maintenance and repair. Bi-annual visual inspections would be conducted by ground crews to inspect insulators, overhead grounds, and transmission structure hardware. O&M activities could include insulator washing (as needed), repair or replacement of conductor (as needed), replacement of insulators (as needed), and response to emergency situations (outages) to restore power. Gen-tie access roads are not expected to require much regular maintenance but could be graded as needed to provide access to transmission structures for maintenance activities.

2.1.6 Proposed Project Decommissioning

The anticipated operational life of the Yahthumb Project would be up to 50 years after which, the Project would be decommissioned, and existing facilities and equipment would be removed. Some buried components (such as cabling) could potentially remain in place. Following decommissioning, the solar site would be reclaimed and restored according to applicable regulations at the time of decommissioning.

A draft Decommissioning Plan that provides its overall framework has been developed and is included as an appendix to the EIS. The final Decommissioning Plan would be developed near the time of decommissioning in coordination with the Moapa Band and BIA and with input from other agencies as appropriate. The final plan would address future land use plans, removal of hazardous materials, impacts and mitigation associated with closure activities, schedule of closure activities, equipment to remain on the site, and conformance with the applicable regulatory requirements in force at that time.

Gen-tie components would also be decommissioned and removed from the ROW in accordance with local, state, and federal laws. Prior to dismantling or removal of equipment, staging areas would be delineated along the gen-tie as appropriate. All decommissioning activities would be conducted within designated areas anticipated to be within the boundaries of existing easements and ROWs.

Following decommissioning, the disturbed areas would be stabilized and revegetated according to BLM and BIA standards.

2.1.7 Management Plans, Best Management Practices, and Mitigation Measures

The following Management Plans would be prepared by the Applicant and would be submitted to the Moapa Band, BIA, BLM, and USFWS (as appropriate) for approval. Management plans not included as an appendix to this EIS would be prepared and approved prior to implementation of the Project.

In addition, the Proposed Action includes BMPs intended to avoid or reduce environmental impacts associated with the Project. These can be found in **Appendix C**. Additional resource-specific plans would also be developed and are listed below:

- Site Restoration Plan (**Appendix E**)
- Integrated Weed Management Plan (**Appendix F**)
- Decommissioning Plan (**Appendix G**)
- Bird and Bat Conservation Strategy (**Appendix H**)
- Raven Control Plan (**Appendix I**)
- Gila Monster Reporting Protocol (**Appendix J**)
- Spill Prevention, Control, and Countermeasure (SPCC) Plan
- Emergency Response Plan
- Fire Management Plan
- Dust Abatement Plan
- Traffic Management Plan
- Health and Safety Program
- Hazardous Materials and Waste Management Plan
- Stormwater Pollution Prevention Plan
- Site Drainage Plan
- Worker Environmental Awareness Program
- Unanticipated Discoveries Plan
- Blasting Plan (if needed)

2.2 Alternative 2 – No Action Alternative

Under NEPA, the BIA and cooperating agencies must consider an alternative that assesses the impacts that would occur if the Project was not constructed. The No Action Alternative assumes that the lease agreement would be denied, the BLM ROWs would not be issued, and the Project would not be built. Under the No Action Alternative, the purpose and need of the Project would not be met. The Moapa Band would not benefit economically from the energy production that would be obtained from the solar Project. The development of sustainable renewable resources would not occur, and the State of Nevada would not be assisted in efforts to meet its renewable energy goals.

2.3 Alternatives Considered but Eliminated from Detailed Analysis in the EIS

Federal agencies are required under NEPA to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternative not developed in detail (40 CFR § 1502.14). Several alternatives were considered during the development and scoping phases of the Project. The alternatives below were not carried forward for detailed analysis because they would be ineffective (it would not respond to or meet the purpose and need), were determined to not be technically or economically practical or feasible or would cause greater environmental effects than the alternatives analyzed in detail. The justifications for eliminating these alternatives are described briefly below.

2.3.1 Alternative Reservation Locations

The Applicant and the Moapa Band considered other areas on the Reservation for potential solar development. This evaluation considered a variety of factors, including the need for up to 1,695 contiguous developable acres, topography, drainage, potential impacts to sensitive resources (including special status species and cultural resources), and proximity to existing infrastructure, transmission interconnection points, and access. The Moapa Band dismissed some areas on the Reservation due to resource constraints. Other suitable development sites on the Reservation either have been already developed, approved for other solar projects, are under consideration for other solar projects, or would have similar or greater consequences.

This process was designed to identify areas with the greatest potential for development while minimizing potential adverse impacts and 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 proposed Chuckwalla sites, the approved SBS sites, the approved ACSP site, the approved Aiya Solar site, the constructed ESMSP site, and other sites on the Reservation previously studied and eliminated by the K Road (now called Southern Paiute Solar Project) EIS (BIA 2012a) were not considered. In addition, the 6,000 acres of desert tortoise relocation areas associated with the Southern Paiute Solar Project was not available for development.

Also, the Moapa Band has been working very closely with several other solar power developers on current partnerships for additional solar projects, and they intend to propose construction of additional solar facilities on the Reservation over the next ten years. Therefore, many potentially suitable areas outside the designated area for the Yahthumb Project are precluded from consideration because they are committed for other energy projects (primarily solar) or have other constraints, including potential impacts on desert tortoise and other wildlife.

Considering all these factors, the Moapa Band has designated the boundary of the lease study area for consideration for the Yahthumb Project. Areas outside the designated lease study area have been determined by the Moapa Band to be not available for consideration for the Project.

2.3.2 Alternative Off-Reservation Locations

The Project is, by the terms of their purpose, limited to locations on the Reservation on land held in trust by the federal government for the Moapa Band. Accordingly, BIA did not consider off-Reservation alternatives as these locations would not meet the purpose and need of providing a long-term, viable economic revenue base (lease income) and job opportunities for the Moapa Band.

2.3.3 Alternative Gen-Tie Line Alignments

The gen-tie lines are necessary to connect the solar Project to the Reid-Gardner Substation. The proposed gen-tie line was routed to utilize the BLM-managed designated utility corridor and utilize existing access associated with recently constructed ESM gen-tie line. Therefore, other route alignments were eliminated from further consideration and additional evaluation.

2.3.4 Concentrated Photovoltaic (CPV) Technology

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

2.3.5 Distributed Solar Generation

The concept of distributed solar generation locates smaller projects near the demand for electricity. Generally, these projects would generate power using PV solar panels (like all PV technologies). The PV solar panels could be installed on private or publicly owned residential, commercial, or industrial building rooftops, or in other disturbed areas such as parking lots or adjacent to existing structures such as substations. To be a viable alternative to the proposed Project, there would need to be enough locations where new distributed solar generation could be installed to cumulatively generate up to 138 MW of capacity and enough local demand for this electricity.

To meet the purpose and need, generation would need to be located on the Reservation and there are insufficient rooftops or other disturbed areas on the Reservation to make this option viable. Also, a true distributed generation project typically generates less than 10 MW and could not meet one of the fundamental objectives of the proposed utility-scale solar project: to provide renewable energy to a utility provider. Rooftop systems that lack transmission only generate power for on-site consumption, and the limited on-Reservation uses create only a fraction of the demand that these Projects seek to serve. Distributed generation projects cannot fill the same energy needs as utility-scale projects, and one is not a feasible alternative for the other.

2.3.6 Wind Energy

Wind carries kinetic energy that can be utilized to spin the blades of wind turbine rotors and electrical generators, which then feed AC electricity into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind 's kinetic energy into electricity. A single 1.5 MW turbine operating at a 40 percent capacity factor generates 2,100 MW hours annually. In 2012, the average size of wind turbines was 2.5 MW with 7.5 MW turbines the largest in use today (American Wind Energy Association 2018).

The technology is well developed and can be used to generate significant amounts of power. The use of wind energy on the Reservation could potentially be feasible at the scale/size of the Proposed Action if enough wind resources were available, but it would not eliminate impacts caused by the Proposed Action. The acreage of the impacted area would be dependent on the size of the turbines selected. A wind project could result in impacts on biological and cultural resources and visual effects greater than with the Proposed Action.

Wind energy was eliminated from detailed discussion because this area has not been identified to have a sufficient wind resource, and this alternative would not be technically or economically feasible to

implement. Additionally, wind energy would not meet the BIA’s purpose and need to respond to the Applicant’s application.

CHAPTER 3

Affected Environment and Environmental Consequences

This chapter describes the physical, biological, social and economic characteristics of the area that would be affected (Affected Environment) and the environmental impacts that would result (Environmental Consequences) from implementation of the Yahthumb Solar Project and alternatives.

The terms “effect” and “impact” are used synonymously in this document. Potential impacts are described in terms of duration, intensity, type, and context. Definitions of impact terms are provided below.

Impacts fall into three categories:

- **Direct:** caused by the action, same time and place.
- **Indirect:** caused by the action, but later in time or further in distance, but are still reasonably foreseeable.
- **Cumulative:** caused by the incremental impact of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions.

For the purposes of this analysis, duration of the impact is defined as follows:

- **Short-term:** impacts that would be less than five years in duration.
- **Long-term:** impacts that would be five years or greater in duration.

For the purposes of this analysis, intensity or severity of the impact is defined as follows:

- **Negligible:** changes would not be detectable and/or measurable. The resource would be essentially unchanged or unaltered.
- **Minor:** changes would be detectable, localized, and/or measurable. The resource would be slightly changed or altered.
- **Moderate:** changes would be clearly detectable, measurable, and/or have an appreciable effect on the resource. The resource would be notably changed or altered.
- **Major:** changes would be readily detectable, and/or have a severe effect on the resource. The resource would be substantially changed or altered.

For the purposes of this analysis, the type of impact is defined as follows:

- **Adverse:** impacts that would have a detrimental effect to a resource.
- **Beneficial:** impacts that would have a positive effect to a resource.

The proposed Yahthumb Project would be one of the several utility-scale PV solar projects on the Reservation to be recently evaluated in an EIS. The previously evaluated solar projects on the Reservation are:

- **K Road Moapa Solar Facility (K Road)/Southern Paiute Solar Project** – The K Road Solar Project is a 350 MW PV solar project and the Final Environmental Impact Statement (EIS) and Record of

Decision (ROD) were published in 2012 (BIA 2012). K Road was sold and renamed the Southern Paiute Solar Project. It is located about 2.0 miles south of the proposed Yahthumb Solar Project.

- **Aiya Solar Project (Aiya)** – The Aiya Solar Project is a 100 MW PV solar project and the Final EIS and ROD were published in 2016 and (BIA 2016). It is approximately 7.5 miles northeast of the proposed Yahthumb Project.
- **Eagle Shadow Mountain Solar Project (ESMSP)** – The ESMSP is a 300 MW PV solar project and the Final EIS was published in December 2019 and the ROD was signed in February 2020 (BIA 2019a, 2020d). The ESMSP is located approximately 1.0 mile southwest of the proposed Yahthumb Project.
- **Moapa Solar Energy Center (MSEC) / Arrow Canyon Solar Project (ACSP)** – The MSEC is a 200 MW PV solar project and the Final EIS and ROD was published in 2014 (BIA 2014). The MSEC Project was purchased and renamed the Arrow Canyon Solar Project (ACSP). A Final Supplemental EIS for the expansion of the solar field on Reservation lands was issued in December 2020 (BIA 2020c). The ACSP is located approximately 4.5 miles southwest of the proposed Yahthumb Project.
- **Southern Bighorn Solar Project I (SBSP I) and Southern Bighorn Solar Project II (SBSP II)** – The SBSP I and SBSP II Projects were recently evaluated through the NEPA process. The Final EIS was published in June 2021 (BIA 2021b) and the ROD was published in July 2021. They are located about 4.0 miles west and about 1.0 mile southeast of the proposed Yahthumb Project.
- **Chuckwalla Solar Projects** – The Chuckwalla Solar Projects are currently being evaluated through the NEPA process. The Draft EIS was published in March 2022 (BIA 2022). These projects are located approximately 4.5 miles southeast of the proposed Yahthumb Project.

Figure 1-4 shows the relative location of these projects. While the solar site and gen-tie lines associated with the proposed Yahthumb Project would occupy a different footprint than the previously evaluated PV solar projects on the Reservation, the size of the previously analyzed facilities, location, and many of the resources/uses evaluated would be similar to if not the same as the Yahthumb Project. Analyses from the previous resource investigations are incorporated by reference in this EIS, where applicable. The EISs for these previous projects can be found at the following link:

<https://www.yahthumbsolarprojecteis.com/previous-eiss.html> .

Referencing allows BIA to prepare environmental documents without duplicating relevant portions of the previous EISs and RODs. Since potential impacts to resources/uses from construction, operation, maintenance, and decommissioning of these previous solar energy generating facilities have been analyzed in the previous NEPA documents, the analysis of the relevant resources/uses will not be repeated in this EIS.

Table 3-1 outlines all the resources/uses considered by the BIA and cooperating agencies (including the issues identified during scoping) for evaluation in this EIS. Each resource/use was evaluated for its potential to be affected by the Proposed Action and whether implementation of the proposed Yahthumb Project could result in a change to existing conditions. The table also identifies those resources evaluated in detail in subsequent sections of this chapter of the EIS and provides the rationale for eliminating some resources/uses for further analysis.

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
Air Quality	<p>The proposed Yahthumb Project lease area lies within the same airshed (HA 218 – California Wash) as the six previous EISs for solar projects on the Reservation - K Road (BIA 2012), MSEC (BIA 2014a), Aiya (BIA 2016), ESMSP (BIA 2019), SBS (BIA (2021), and Chuckwalla (BIA 2022). These analyses determined that potential impacts from development, O&M, and decommissioning of a solar facility and gen-tie line on local and regional air quality would result from fugitive dust emissions and vehicle exhaust emissions primarily during construction. Further, they determined that the impacts would be minor because of implementation of Best Management Practices (BMPs) for dust control and would not require additional measures to minimize or avoid adverse impacts. Following construction, operation of the solar projects was not expected to contribute to measurable or detectable impacts to air quality (BIA 2012: pages 4-26 through 4-31, BIA 2014a: Pages 4-22 through 4-32; BIA 2016: Pages 4-20 through 4-30, BIA 2019a: page 3-3, BIA 2021: Page 3-2); BIA 2022: page 3-3.</p> <p>The types of construction and operational/maintenance activities that would be undertaken for the Yahthumb Project would be the same as those analyzed for the six previous solar projects and all the same BMPs are included as part of the Project design features (Appendix C). Exhaust and fugitive dust emissions generated from construction equipment and mobile sources would increase ambient concentration of regulated air pollutants. Wind-driven emissions of fugitive dust would be generated following disturbances by construction activities, including mobile sources traveling on paved and unpaved roadway surfaces. Operation of the Yahthumb Project would include combustion emissions from worker commutes, delivery trips, and construction equipment used for maintenance. However, these impacts are anticipated to be well below thresholds that define any noticeable change to local/regional air quality.</p> <p>The Proposed Action would have short-term and long-term, negligible adverse air quality impacts resulting from the construction and decommissioning of the Project and long-term, negligible adverse impacts resulting from operations.</p> <p>There is no potential for new or modified impacts that have not been disclosed in prior environmental documentation. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS	
Resource/Use	Rationale for Not Analyzing in Detail
Areas of Critical Environmental Concern (ACECs)	There are no ACECs in the vicinity of the Project area so no impact to this resource would result from the Project. The nearest ACEC is the Hidden Valley ACEC approximately 11 miles south of the Project. Therefore, this resource topic has been eliminated from analysis in this EIS.
BLM Sensitive Species and Nevada State Listed Species	<p>The Yahthumb Project occurs primarily on the Reservation with only a portion of the gen-tie line and secondary access (30 acres) occurring outside the Reservation on BLM lands. This is the only portion of the Project where protection of BLM-Sensitive Species and Nevada State Listed Species is applicable. An evaluation of the potential for BLM-Sensitive and Nevada State Listed Species to occur within the Project area on BLM-managed lands is provided in Appendix K. The previous EISs for solar projects on the Reservation analyzed impacts on these species (BIA 2012: pages 4-50 through 5-60; BIA 2014: pages 4-52 through 4-53; BIA 2016: pages 4-42 through 4-48; BIA 2019a: pages 4-44 through 4-48, BIA 2021: page 3-3; and BIA 2022: page 3-4). Like the previous projects, this project would involve limited impacts on BLM land.</p> <p>Construction of the short segment of gen-tie on BLM land would not be likely to impact any BLM-Sensitive or Nevada State Listed Species. Implementation of reduced speed limits and other design features and BMPs (Appendix C) and management plans (see Appendices D through K) during construction, O&M, and decommissioning would minimize the potential for impacts to sensitive wildlife species.</p> <p>The Proposed Action would have negligible, localized, short- and long-term, adverse impacts on BLM-Sensitive and Nevada State Listed plant and wildlife species. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>
Climate Change	See analysis in Section 3.1.
Cultural Resources	See analysis in Section 3.2.
Environmental Justice	The tribal members on the Reservation meet the criteria of a minority population and are subject to environmental justice consideration under Executive Order 12898. The proposed Project is being developed by and to benefit the Moapa Band by creating temporary and long-term jobs and would not disproportionately negatively affect the Moapa Band. The Yahthumb Project would provide beneficial impacts of creating both jobs and revenue for the Band and tribal members. These impacts would be short-term during construction and decommissioning and long-term during operations. No displacements or permanent changes in populations would occur. There would be no potential for disproportionately high and adverse human health or environmental effects to tribal populations. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Farm Lands (prime or unique)	There are no U.S. Department of Agriculture-designated prime or unique farmlands within the analysis area so no impact to this resource would result from the Yahthumb Project. Therefore, this resource topic has been eliminated from analysis in this EIS.

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
Fire Management	<p>Development of the Yahthumb Project would have a minor long-term beneficial effect by reducing the potential for wildland fires in the area by eliminating some of the fuel source on up to 1,400 acres where a portion of the vegetation could be mowed to a height of 18 inches. At the same time, the Project would introduce a minor short-term increase in the likelihood for ignitions from activities during construction and decommissioning. The proposed Project is in a remote area, located approximately 10 miles from the nearest residential/urban area. Fire management would be similar for the Yahthumb Project as the other solar projects on the Reservation. The BLM responds to all wildland fires on both BLM and the Reservation and structure fire response would be covered by Clark County Rural Fire and/or Moapa Fire Protection District. BIA is drafting a fire management plan that includes the project area to improve direction in the future.</p> <p>The previous EISs provide analysis of potential impacts from fire associated with the construction, operation, maintenance, and decommissioning of a PV solar facility (BIA 2012: pages 4-100 through 4-102; BIA 2014: pages 4-111 through 4-112; BIA 2016: page 4-96; BIA 2019a: page 3-5; BIA 2021: pages 3-4 and 3-5; BIA 2022: page 3-5). The Yahthumb Project would be located on the same sparse vegetation types as those the previous projects. These analyses concluded that the threat of harm or loss to structures from wildfires would be negligible. Like for the previous projects, all applicable BMPs to minimize and control fire risk would be incorporated into a fire management plan for the Yahthumb Project that would be submitted to BIA and BLM for approval and implemented during construction, operation, maintenance, and decommissioning. Therefore, impacts would be negligible so this resource topic has been eliminated from further analysis in this EIS.</p>
Floodplains/Flood Hazards	<p>There are mapped Federal Emergency Management Agency (FEMA)-designated 100-year floodplains within the lease option area associated with California Wash tributaries (FEMA Flood Insurance Rate Maps [FIRM] 32003C1050E and 32003C1075E). However, the Project would be designed to avoid the 100-year floodplain and other major ephemeral drainages within the lease option area.</p> <p>No onsite or offsite facilities would be constructed within the 100-year floodplain. All large ancillary facilities (e.g., shared facilities area) will be located outside of the ordinary high-water mark of any drainages. Some PV supports could be placed within ungraded drainages where technically feasible. Road crossings would be designed to meet standards for low-water crossings within floodplains. Temporary disturbance in drainages would also occur from trenching across drainages for underground collector line installation. The low-water crossings and trenches would not affect the grade or flow within the floodplain.</p> <p>A hydrology report would be prepared to model flood depths in the Project area and Project infrastructure would be designed in consultation with hydrology experts to protect infrastructure for the life of the Project and in accordance with local, State, and federal standards. A number design features and BMPs (Appendix C) would be implemented to manage stormwater runoff and erosion in the Project area, which could otherwise have downstream effects on floodplains. With the implementation of these design features and BMPs, the Proposed Action would not lead to the modification of any floodplains or increased flood hazards. Therefore, the Proposed Action would have negligible, short- and long-term, adverse impacts on floodplains and flood hazards, and this resource topic has been eliminated from further analysis in this EIS.</p>
Forest Resources	<p>The BIA and Moapa Band do not consider yucca and cacti to be forest resources so this topic would not apply to tribal lands. The project area on BLM lands does not contain forests or woodlands so no impact to this resource would result from the Project. Therefore, this resource topic has been eliminated from analysis in this EIS.</p>

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
General Wildlife	<p>The previous EISs for solar projects on the Reservation provide analysis of potential impacts to general wildlife species from construction, O&M, and decommissioning of solar facilities on the Reservation (BIA 2012: pages 4-46 through 4-49; BIA 2014: pages 4-48 through 4-52); BIA 2016: pages 4-44 through 4-48; and BIA 2019a: pages 3-38 through 3-40).</p> <p>Ground-disturbing activities during construction, O&M, and decommissioning of the Yahthumb Project would result in direct mortality, altered foraging and breeding behavior, abandonment of habitat, and avoidance behaviors. Increased noise and human presence could result in short-term, impacts to wildlife by causing wildlife to alter foraging and breeding behavior. Loss of burrows due to construction, ground vibration, or avoidance behavior would cause wildlife to search for and/or dig new burrows. These impacts would be minimized by implementation of design features and BMPs (Appendix C) and management plans (see Appendices D through K). Therefore, effects to general wildlife would be negligible.</p> <p>Removal and modification of vegetation within the solar fields, new access roads, and gen-tie line ROWs would reduce forage, shelter, and nesting opportunities. The permanent disturbance of 309 acres of habitat by the Project could cause wildlife to rely more heavily on habitat in the surrounding areas. The area of permanent impact for the Project is relatively small and is not expected to result in any change in habitat availability or cause habitat fragmentation in comparison to existing conditions. Permanent disturbance to habitat would result in a negligible, long-term, adverse impact on general wildlife. Following decommissioning, these disturbed areas would be revegetated, which would minimize the long-term impacts to general wildlife species and their habitats.</p> <p>Following construction, the regrowth of 1,184 acres of temporarily impacted vegetation would allow for many species to utilize the solar fields during O&M, resulting in a negligible, long-term, beneficial impact on general wildlife. The increase in perches for avian predators such as ravens and raptor species could increase the risk of predation to prey species, but the use of perch deterrents would minimize this impact.</p> <p>With the implementation of design features and BMPs (Appendix C), the Proposed Action would result in negligible, localized, short- and long-term, adverse impacts on general wildlife. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>
Hunting, Fishing, and Gathering	<p>No hunting, fishing, or gathering has been reported or documented by the Moapa Band in the vicinity so no impact to these activities would result from the Yahthumb Project. Therefore, this resource topic has been eliminated from analysis in this EIS.</p>
Indian Trust Assets	<p>Like the previous solar projects, the proposed Yahthumb Project would impact Reservation lands and vegetation and wildlife resources where the Project and associated ROWs are constructed. Indian Trust Assets, such as fishing rights and minerals would not be impacted by implementation of the Yahthumb Project the same as described in the previous EISs (BIA 2012: Page 4-78; BIA 2014a: Page 4-94; BIA 2016: Page 4-79; BIA 2019a: page 3-6; and BIA 2021: page 3-7; BIA 2022: page 3-6). The Yahthumb Project’s proposed use of tribal water would exercise the Moapa Band’s water rights which would demonstrate the Band’s legitimate need for these water rights. This would support the Band against any adverse claims by others in the future. Since this Project would not negatively impact Indian Trust Assets, this resource topic has been eliminated from further analysis in this EIS.</p>

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
<p>Invasive Plant Species and Noxious Weeds</p>	<p>The previous solar EISs - K Road (BIA 2012: pages 4-41 through 4-45), MSEC (BIA 2014: pages 4-41 through 4-45), Aiya (BIA 2016: pages 3-37 through 3-42), ESMSP (BIA 2019a: page 3-7; SBSP (BIA 2021, page 3-7; BIA 2022: page 3-7) - provide a detailed analysis of potential impacts and mitigation for noxious weeds and invasive plants during the construction, operation, maintenance, and decommissioning of a PV solar facility and gen-tie. Each EIS contains a Weed Management Plan in the appendices for each project.</p> <p>Weed sources could include construction vehicles if not properly cleaned, imported fill, hay bales, and invasion from adjacent lands via natural movement such as wind. Invasive weed species could out-compete native plants for resources such as water and space. The proposed location for the Yahthumb Project is within the same vegetation types and has the potential to encounter the same weed species (including Sahara mustard) as the previous projects and the Project has the same potential to generate short and long-term, adverse effects from weed species. A site reconnaissance was conducted for the Yahthumb lease area and about 26 acres of Sahara mustard was found along the gen-tie routes. All applicable BMPs associated with weed management specified by BIA and BLM policies were incorporated into the management plans for the previous projects and would likewise be implemented as design features for the Yahthumb Project. The Integrated Weed Management Plan (Appendix F) would be reviewed and approved by BIA and BLM prior to implementation. With the implementation of design features and BMPs (Appendix C) and the Integrated Weed Management Plan (Appendix f), the Proposed Action would result in minor, short-term, adverse impacts associated with introduction and spread of invasive plant species and noxious weeds during construction, and negligible long-term, adverse impacts during O&M and decommissioning. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>
<p>Lands and Realty</p>	<p>The Yahthumb Project solar fields and access ROWs would be constructed on Reservation land. A portion of the ROWs for the gen-tie lines would be on Reservation land within the BLM-managed designated utility corridor and a very small portion of the ROWs for the gen-tie lines would be federal land managed by the BLM. T Collectively, this would affect 1,412 acres of tribal lands under BIA jurisdiction and 148 acres under BLM jurisdiction.</p> <p>The solar site lands and surrounding lands on the Reservation are currently vacant. The Yahthumb Project is in an area designated by the Moapa Band for economic development and most of the gen-tie route is located within the BLM-managed designated utility corridor set aside for this specific purpose.</p> <p>Additional discussion regarding adjacent land uses and existing leases and ROWs, as well as potential impacts, are discussed in the previous solar EISs (BIA 2012: pages 3-66 through 3-70 and pages 4-79 through 4-81); BIA 2014: pages 3-58 through 3-59 and pages 4-92 through 4-95; 2019a: pages 3-58 through 3-60; BIA 2019b: page 3-8; BIA 2021: page 3-7 and 3-8; BIA 2022: page 3-7).</p> <p>The Yahthumb Project would be consistent with federal, State, and local land-use plans and policies, existing BLM land-use authorizations, and public land disposition, and would not require any land tenure adjustments. The Project would also meet the desired purpose indicated by the Moapa Band for the use of these lands which were specifically set aside for this Project. There is no potential for new or modified impacts that have not been disclosed in prior environmental documentation. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>
<p>Lands with Wilderness Characteristics</p>	<p>There are no lands with wilderness characteristics within or near the Project area so no impact would result from the Yahthumb Project. Therefore, this resource topic has been eliminated from analysis in this EIS.</p>

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
Lifestyle and Cultural Values	New solar projects (two constructed, three approved awaiting construction, one under analysis, and the proposed Yahthumb Project) have been determined by the Moapa Band to offer an opportunity to expand economic development on the Reservation while holding fast to tribal values for respect and care for tribal land (Moapa Paiutes, n.d.). The Project would not preclude tribal members from accessing any on- or off-Reservation residences, amenities, or places of work. Therefore, the Yahthumb Project would not impact this resource topic and it has been eliminated from further analysis in this EIS.
Livestock Grazing	There are no grazing allotments on this part of the Reservation and no grazing is conducted in the Project area. Therefore, no impact to this resource would result from the Yahthumb Project. Therefore, this resource topic has been eliminated from analysis in this EIS.
Migratory Birds	See detailed analysis in Section 3.3.
Minerals	On tribal lands, the Yahthumb Project would not be located in an area identified by the Moapa Band for mineral development so would have no effect on mineral exploration and mining, leasing or mineral material sales on the Reservation or affected BLM lands. Therefore, the Yahthumb Project would not impact this resource topic and it has been eliminated from analysis in this EIS.
Native American Religious Concerns	<p>The BIA coordinated with the Moapa Band to arrange appropriate cultural resources survey methods and to provide for tribal members to accompany the archaeologists during the survey efforts that were conducted for the Project. In addition, the BIA sent letters to eight tribes in the region with traditional interests in the area 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.</p> <p>The analysis in the six previous solar EISs concluded that there are no identified Native American religious concerns in or near the Project area that would be impacted by the construction, O&M, and decommissioning of a solar facility. Since no sensitive Native American religious concerns would be adversely impacted, no measures to minimize or avoid adverse impacts were required (BIA 2012: pages 3-53 through 3-54 and pages 4-61 through 4-64; BIA 2014: pages 3-46 through 3-47 and pages 4-76 through 4-79; BIA 2016: pages 3-46 through 3-51 and pages 4-65 through 4-68; BIA 2019a: page 3-51; BIA 2021: pages 3-8 and 3-9; BIA 2022: page 3-8).</p> <p>Similarly, the Project area contains numerous cultural features that contribute to the history and the long-term use of this region by the Southern Paiutes and, specifically, the Moapa Band. They have a deeply rooted spiritual connection to the land that weaves stories and songs into the landscape, connecting all elements of the universe. These connections involve water, trails, flora, fauna, geographic structures, and spiritual, historical, and ceremonial events. Through coordination and consultation, no specific concerns have been raised by the Moapa Band or other tribes regarding traditional cultural properties (TCPs) or other religious issues. Therefore, the Project would have no impact on Native American Religious Concerns and this resource topic has been eliminated from further analysis in this EIS.</p>

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
Noise	<p>The six previous solar EISs provide a detailed analysis of potential noise impacts associated with the construction, operation, maintenance, and decommissioning of a PV solar facility and gen-tie on this area of the Reservation. These analyses indicated that there are no sensitive human receptors anywhere near the area that would be adversely impacted by noise from short-term construction or long-term operation of the projects and no measures to minimize or avoid adverse impacts were required (BIA 2012: pages 4-32 through 4-39; BIA 2014a: pages 4-33 through 4-38; BIA 2016: pages 4-30 through 4-35; BIA 2019a: page 3-51; BIA 2021: page 3-9; BIA 2022: page 3-9).</p> <p>The currently proposed Yahthumb Project would be located in undeveloped terrain in a relatively remote area east of I-15 and north of the Valley of Fire Highway. There are no nearby identified noise receptors. Noise impacts from the Yahthumb Project would be generated primarily by equipment and vehicles during construction and decommissioning but these impacts would be short-term and negligible. Noise impacts from the Yahthumb Project during operations would be long-term but negligible. There is no potential for new or modified impacts that have not been disclosed in the prior environmental documents. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>
Paleontological	<p>The six previous solar EISs determined that paleontological materials are unlikely to exist in the Project area, which is categorized as having a low potential for paleontological resources (BIA 2012: page 3-9; BIA 2014: page 3-5; BIA 2016: page 3-6; BIA 2019a: page 3-8; BIA 2021: page 3-9; BIA 2022: page 3-9). The previous projects, like the proposed Yahthumb Project, are located in Quaternary alluvium deposited by flowing water (Stewart and Carlson 1978). These analyses indicated that potential paleontological materials are unlikely to exist in the alluvial deposits and the project area is categorized as low potential for paleontological resources. Therefore, no impact to this resource would result from the Proposed Action and this resource topic has been eliminated from analysis in this EIS.</p>
Public Health and Safety	<p>Potential impacts to public health and safety from development of solar projects on the Reservation have been analyzed in the K Road (BIA 2012: pages 4-95 through 4-102), MSEC (BIA 2014: pages 4-107 through 4-112), and Aiya (BIA 2016: pages 4-92 through 4-96) EISs. Potential health and safety impacts could result from spills of hazardous materials, electrical hazards, or fire hazards but the potential risk to public health was concluded to be minor.</p> <p>The Yahthumb Project, like the previous projects, would be required to comply with all applicable design codes and develop and finalize a variety of plans prior to the start of construction to minimize these risks during the Project such as spill control plans, hazardous materials management plans, emergency response plans, fire management plans, and health and safety programs. Therefore, the potential risk to public health during construction, operations, and decommissioning the proposed Yahthumb Project would be minor and this resource topic has been eliminated from further analysis in this EIS.</p> <p>In addition, the project area is suspected endemic for <i>Coccidioides immitis</i>, a fungus causing Valley fever and construction workers could potentially be exposed. Additional measures to reduce potential worker exposure have been added to Appendix C of this EIS.</p>
Recreation	<p>Public recreation does not occur on the Reservation within or near the project area. Therefore, the Proposed Action would have a negligible effect on recreation, and this resource topic has been eliminated from further analysis in this EIS.</p>
Socioeconomics	<p>See detailed analysis in Section 3.4</p>

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
Soils	<p>Soils in the Yahthumb Project fall within four soil series classification as defined by the USDA NRCS, with three soil classifications (Bard gravelly fine sandy loam, Tonopah gravelly sandy loam, and Badland) making up 100 percent of the Project area (USDA NRCS 2022). The previous EISs evaluated the potential impacts to these soils from the construction, O&M, and eventual decommissioning of the solar facilities (BIA 2012: pages 4-11 through 4-13; BIA 2014: pages 4-9 through 4-12). The previous evaluations looked at the soil characteristics and evaluated the soil erosion rates from wind and water, soil productivity, and potential for contamination.</p> <p>Approximately 309 of the 1,695 acres within the four lease option areas and shared facilities areas would be permanently cleared, graded, and/or disturbed. Vegetation on the remainder of the solar fields (1,129 acres) would be driven over and crushed or trimmed, thereby leaving soil intact, whereas grading would result in loosening and exposure of bare soil. In addition to impacts to soils, the Yahthumb Project would have long-term impacts on areas where biocrust and desert pavement are present, which would affect the soil stabilization benefits they provide. The potential for wind and water erosion would be increased by soil disturbance during construction and decommissioning, resulting in potential adverse impacts. Rather than graded, vegetation in the solar fields would be mowed and crushed, leaving roots intact, which would minimize the potential for erosion. To reduce the potential for water erosion, the Project would develop a Stormwater Pollution Prevention Plan (SWPPP) as part of the final Project design. The drainage plan would incorporate existing, natural offsite washes to allow the stormwater flow to pass through the site naturally. Any onsite drainage control features would be implemented to dissipate flow and minimize scouring and erosion. These features would be designed to protect the integrity of existing drainages and not channelize flows within the site.</p> <p>With the implementation of design features and BMPs (Appendix C) to prevent potential increases in soil erosion and sedimentation, including physical soil stabilization and revegetation as outlined in applicable plans (e.g., Site Restoration Plan, SWPPP, and drainage plan), impacts to soils would be minimized. Therefore, the Proposed Action would have minor, localized, short- and long-term, adverse effects on soils, and this resource topic has been eliminated from further analysis in this EIS</p>
Threatened or Endangered Species	See analysis in Section 3.5.
Timber Harvesting	The project area does not contain forests or woodlands that could be harvested for timber. Therefore, no impact to this resource would result from the Yahthumb Project and this resource topic has been eliminated from further analysis in this EIS.
Topography/Geology	<p>The proposed Yahthumb Project site would avoid major drainages and would be graded only where necessary, so contour changes would be minor and would not create a long-term effect to local topography or drainage. Construction, O&M, or decommissioning of the proposed Project would not alter the soil stability of the solar site or along the gen-tie corridor.</p> <p>The Project area has moderate to high potential for strong earthquake shaking but all proposed Yahthumb Project structures would be required to comply with applicable seismic building codes reducing the potential for earthquake-related structural damage to the Project.</p> <p>Therefore, no impact would result from the Yahthumb Project and this resource topic has been eliminated from further analysis in this EIS.</p>

**TABLE 3-1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS**

Resource/Use	Rationale for Not Analyzing in Detail
Traffic / Transportation	<p>Main access to the Yahthumb Project would be via the existing Ute Road which is located on the Reservation and is accessed via an existing interchange on I-15. Secondary access to the site would be provided via the same roads/routes evaluated for previous solar EISs including the Southern Paiute Solar Project (BIA 2012a), MSEC (BIA 2014) and ESMSP (BIA 2019a). The previous solar EISs provide an analysis of the types and timing of traffic expected and the potential impacts of this traffic on the local roads that would provide primary access (I-15). In addition, the other roads providing secondary access (US 93 and North Las Vegas Boulevard) were evaluated as well. It was determined that traffic impacts would occur primarily during construction and would result in short-term adverse effects on traffic volume but would not adversely affect traffic flow on local roadways.</p> <p>During construction of the Project, the anticipated traffic volumes and movement of equipment are expected to be the same or similar to what was evaluated in the previous EISs for the Southern Paiute Solar Project (BIA 2012a: pages 4-95 through 4-102), MSEC (BIA 2014: pages 4-107 through 4-112), and ESMSP (BIA 2019a: pages 3-10 and 3-11). Construction workers and the construction equipment are not anticipated to exceed what was necessary for the previous projects and therefore the Project is expected to result in minor, short-term effects on the volume of traffic on access routes. The implementation of the Yahthumb Project would not result in road closures or detours. With the implementation of design features and BMPs (Appendix C), the construction of the Project is not expected to adversely affect traffic flow on local roadways or at intersections even during peak construction. During O&M, only five full-time equivalent workers would be employed so there would be negligible impacts on traffic volumes. Impacts during decommissioning would be similar to, but less than, those from construction.</p> <p>A Traffic Management Plan for the Project outlining methods to reduce traffic impacts would be developed prior to and implemented during construction. The implementation of the Yahthumb Project is anticipated to result in minor, short-term, adverse impacts, and negligible, localized, long-term, adverse impacts on traffic/transportation resources. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>
Vegetation	See analysis in Section 3.6.
Visual Resources	See analysis in Section 3.7.
Wastes, Hazardous or Solid	<p>The K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) EISs provide a detailed analysis of potential impacts from hazardous materials associated with the construction, operation, maintenance, and decommissioning of a PV solar facility on the Reservation and gen-tie on or near the Reservation as part of the analysis of public health and safety. Potential risks could result from spills of hazardous materials but the potential risk to public health was concluded to be minor.</p> <p>All potential applicable BMPs associated with hazardous materials and wastes to reduce or prevent environmental impacts will be outlined in plans developed prior to construction of the Yahthumb Project. Therefore, this resource topic has been eliminated from further analysis in this EIS.</p>
Water Resources (Surface/Ground)	See analysis in Section 3.8.
Wetlands/Riparian Zones	See analysis in Sections 3.8

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS	
Resource/Use	Rationale for Not Analyzing in Detail
Wild and Scenic Rivers	There are no Congressionally designated Wild and Scenic Rivers within or immediately adjacent to the project area so no impact to this resource would result from the Yahthumb Project. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Wilderness/Wilderness Study Areas	There are no wilderness or wilderness study areas near the Project area so no impact to this resource would result from the Yahthumb Project. The nearest wilderness area is the Muddy Mountains wilderness approximately 14 miles south of the Project. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Wild Horses and Burros	Wild horses and burros are not found in the Project area. The nearest Herd Management Area (HMA) (Muddy Mountain HMA) is approximately nine miles southeast of the Yahthumb Project. The Red Rock HMA is located in southern Nevada approximately 36 miles southwest of the project area. Therefore, this resource topic has been eliminated from further analysis in this EIS.

¹ Highlighted resource topics are analyzed in detail in this chapter.

3.1 Climate Change

3.1.1 Background

Climate change typically refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended time. Climate change could 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 science continues to expand and refine our understanding of the impacts of anthropogenic activities. Electricity generation and transportation were the two sectors responsible for the majority of greenhouse gas (GHG) emissions during the last few decades both in Nevada and nationally. The next largest contributors to emissions are the residential, commercial, and industrial fuel use sectors (NDEP 2020).

The current guidance for considering GHG emissions and climate change effects in NEPA analysis can be found in Section 5 of Secretary Order (SO) 3399 issued in April 2021 and a February 19, 2021 Federal Register Notice by the CEQ. That Federal Register Notice indicates that "In the interim, agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 GHG Guidance - Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews. In essence, this guidance suggests using the projected GHG emissions associated with proposed actions as a proxy for assessing proposed actions' potential effects on climate change in NEPA analyses.

Currently, there are no emission limits for suspected GHG emissions, for this project, and no technically defensible method for predicting potential climate change contributions from GHG emissions during construction of the proposed action. However, there are, and would continue to be, several efforts to address GHG emissions from federal activities, including federally authorized uses in future planning documents.

3.1.2 Environmental Consequences

3.1.2.1 Proposed Action

Renewable energy projects like the Yahthumb Solar Project generally have an overall net long-term beneficial effect on climate change by their operations offsetting fossil-fuel generation. The previous EISs for solar projects on the Reservation provide an analysis of potential impacts to climate change associated with the construction, operation, maintenance, and decommissioning of PV solar facilities. These analyses concluded that there would be short-term minor increases in GHGs from construction and decommissioning associated with exhaust from construction equipment and vehicles and long-term benefits from operations (BIA 2012: pages 4-4 through 4-7; BIA 2014a: pages 4-4 through 4-5; BIA 2016: pages 4-3 through 4-4; BIA 2022: pages 3-14 through 3-16).

Construction

The GHG emissions from construction of the Yahthumb Project were estimated as described below. The construction of the Proposed Project is estimated to last up to 14 months and would consist of nine construction activities that would overlap. **Table 3-2** identifies these activities and the estimated duration of each.

Table 3-2 Proposed Project Construction Schedule for Each Phase		
Construction Activity ID	Construction Activity	Duration (months)
1	Move on (mobilization)	1
2	Site Preparation & Grading	3
3	Access Road Construction	1
4	Gen-Tie Line Construction	2
5	Internal Roads Construction	2
6	Shared Use Facility Construction	2
7	Electrical Substation	3
8	Batch Plant Operations	2
9	Solar Array Structural, Underground and Panel, and Battery Installation	7

Each activity has a unique fleet of equipment and vehicles. Therefore, the emissions for each were calculated separately. Then all the activities were combined for duration of project construction.

Construction equipment emission factors were developed using EPA MOVES2014a-20151201 (MOVES) model for nonroad sources and the emission factors were reported in units of grams per horsepower-hour (g/hp-hr). These factors were based on the year of construction start (2022), a Clark County Nevada location, and a default fleet of diesel-powered construction vehicles. If a vehicle type was not included in the MOVES default fleet, these were categorized as “Other Construction Equipment” (see **Appendix L**).

CO₂ equivalent (CO₂e) emissions were based on CO₂ and CH₄ emissions from the construction fleet. Any other potential GHGs were assumed to be negligible. **Table 3-3** presents the estimated GHG emissions for each year of construction and compares these to statewide emissions for 2017. Gross statewide GHG emissions exclude carbon sinks that reduce generated emissions. Therefore, net GHG emissions were used for this comparison.

These results show that the 14 months of construction would contribute negligible amounts of GHG emissions relative to the statewide GHG emissions. Although construction emissions are not applicable to stationary source air permitting rules, GHG emissions during the construction phase would be well below the Clark County and federal air permitting threshold for stationary sources (75,000 tons per year). Details for the construction GHG calculations are presented in **Appendix L**.

Table 3-3 GHG Emissions from Proposed Project vs Statewide GHG Emissions	
	GHG Emissions (MMCO₂e¹)
Proposed Project Year 1	0.009
Proposed Project Year 2	0.002
Nevada 2017 Gross	43.813
Nevada 2017 Net	38.066
	Percent
Project Year 1 Percent of Nevada 2017 Net Emissions	0.023 %
Project Year 2 Percent of Nevada 2017 Net Emissions	0.005 %
¹ Million Metric Tons of CO ₂ Equivalent	

Operations

Long-term, operation of the Project would generate renewable electricity through solar power and would have long-term air quality benefits. In 2017, electrical generation (86 percent) was the primary contributor to gross GHG emission sources in Nevada (NDEP 2020). The Proposed Project could reduce these contributions and would support regional and national goals to replace other forms of electricity production that have much higher levels of air pollutant and GHG emissions. The Proposed Project would therefore be consistent with federal and state goals for reducing GHG emissions and supporting the development of renewable energy.

Climate change that could occur in the future has the potential to affect the Project area. This could include the potential for increased storm flows through the site and to the Muddy River, the potential success of reclamation and restoration efforts after construction and decommissioning, and potential impacts on sensitive species and their habitats. The potential magnitude of these effects cannot be predicted but the Project would employ adaptive management to respond to any changes requiring mitigation.

In addition, the management of desert vegetation and soil disruption associated with the proposed construction methods to be used for the Yahthumb Project (mowing vs grading) could have a small reduction in the effect on the ability of the local ecosystem to cycle or sequester carbon and modulate atmospheric CO₂ levels during the operational life of the Project when compared to projects where significant grading would occur. Grading would be minimized on the Project to only those areas where necessary and existing vegetation would be mowed to 18 inches over most of the solar field. This would allow on-site vegetation to re-establish more quickly following construction, reducing the impact on the local ecosystem’s ability to continue to cycle or sequester carbon.

The Yahthumb Project would have short-term, negligible adverse direct impacts from the construction and decommissioning of the solar facilities and long-term, negligible indirect beneficial impacts on climate change from the reduction of primary contributors to GHG emissions offset by the generation of renewable electricity. In addition, the Project would promote federal or state goals to reduce GHG emissions levels.

3.1.2.2 No Action

Under the No Action Alternative, the Proposed Action would not be constructed so there would be no effects to GHG emissions and climate change.

3.2 Cultural Resources

3.2.1 Affected Environment

The proposed Yahthumb Project is primarily located on the Moapa River Indian Reservation which was established in the early 1870s. The area of potential effect (APE) for cultural resources is defined as the area within which resources could be affected by the proposed Yahthumb Project. The APE for direct effects includes all project components (solar field area and ROWs in **Figure 2-1**). The BIA, in consultation with the Moapa Tribal Historic Preservation Office (THPO) and Nevada State Historic Preservation Office (SHPO), defined the APE for indirect effects as a radius of up to five miles from the proposed solar field or the visual horizon, whichever is closer, and a one-mile radius around the gen-tie line where it extends outside the five-mile radius. The area encompassed by the indirect APE includes approximately 129.18 square miles. Most of the APE is located on BIA trust land, held for the Moapa Band, with the indirect APE reaching into BLM and Reclamation managed land, as well as some private land parcels. The cultural resource study consisted of a literature review for both the direct and indirect APEs while the field inventory only included the direct APE (Owen et al. 2022). An indirect effects analysis was performed to determine any indirect visual, auditory, olfactory, and/or atmospheric effects on listed, recommended, or potentially eligible cultural resource sites (Owen et al. 2022, Appendix E).

The pedestrian field inventory consisted of surveying 1,695 acres for the solar field, 121 acres for the gen-tie route, and 193 acres for access roads, for a total direct APE of 2,009 acres. Analyses for the indirect APE included visual, auditory, olfactory, and/or atmospheric effects on cultural resource sites. Eighty-eight sites underwent in-depth review for visual analysis needs. Sixty-seven of these sites were determined as not requiring further analysis. Twenty-one sites proceeded to full analysis. Through site visits to these 21 cultural resources, multiple sites were combined under a single site number, while others were not relocated, resulting in full analysis of visual effects on 10 sites (see below).

3.2.1.1 Cultural History

Prehistoric sites across the Great Basin and the greater American southwest exhibit the presence of humans during the late Pleistocene about 14,000 years ago. Around 9,000 years ago drastic climatic and environmental changes tested the resiliency of the human population, requiring substantial adaptation leading to smaller territorial seasonal ranges, a highly diverse diet, larger group sizes, and annual aggregation that proceeded for millennia. Around 1,500 years ago, Ancestral Puebloan inhabitants of the greater southwest migrated into the vicinity and bringing with them an agricultural way of life. By at least 850 years ago there is clear evidence of Southern Paiute people living in the vicinity of the proposed Yahthumb Project area. Roughly a thousand years later, in the 1800s, the area was settled by Mormon farmers and ranchers.

3.2.1.2 Results of the Literature Review and Field Inventory

The literature review identified 253 previously recorded cultural resource sites in both the direct and indirect APEs. Most of these sites are lithic scatters, rock rings, railroad sites, roads, and trash scatters within the indirect APE. Many remain unevaluated for National Register of Historic Places (NRHP) eligibility. The direct APE has 16 previously recorded archaeological sites within it – none within the solar field (Owen et al. 2022).

Background research identified a total of 16 archaeological sites recorded within the direct APE. The Class III pedestrian survey recorded 12 sites, one of which was a newly identified site. Eleven were previously recorded and updated during the current field inventory. Four previously recorded sites identified during background research were not relocated and are believed to have been destroyed by flooding events and/or misplotted during earlier surveys. All of the recorded sites are located within the gen-tie corridor. The 12 sites recorded in the direct APE and their recommended eligibility are listed in **Table 3-4**.

Site No.	Site Type	Project Location	Previously Recorded	Current NRHP Recommendation
26CK11220	Historic Trash Scatter	Gen-Tie	No	Not Eligible
26CK10089	Prehistoric Lithic Scatter	Gen-Tie	Yes	Not Eligible
26CK10092	Historic Trash Scatter	Gen-Tie	Yes	Not Eligible
26CK3536/26CK3848	Historic Wagon Road/Old Spanish Trail	Gen-Tie	Yes	Non-Contributing
26CK3658	Historic Settlement and Prehistoric Rock Rings	Gen-Tie	Yes	Eligible
26CK4429	Historic Railroad	Gen-Tie	Yes	Non-Contributing
26CK4431	Historic Road	Gen-Tie	Yes	Not Eligible
26CK9557	Historic Trash Scatter	Gen-Tie	Yes	Not Eligible
26CK9558	Prehistoric Lithic Scatter and Historic Trash Scatter	Gen-Tie	Yes	Not Eligible
26CK9560	Historic Trash Scatter	Gen-Tie	Yes	Not Eligible
26CK9561/26CK9568	Historic Trash Scatter	Gen-Tie	Yes	Not Eligible
26CK9978	Historic Road	Gen-Tie	Yes	Not Eligible

The historic wagon road (26CK3536/26CK3848-Mormon Wagon Road/Old Spanish Trail) is listed on the NRHP, being determined eligible under criteria A and D. The wagon road segment within the direct APE has lost integrity from modern construction and maintenance of large utilities along the corridor, as well as heavy off-road use. As such, this segment is recommended non-contributing to the site’s status as a NRHP-listed site. The railroad (26CK4429-Union Pacific) has been recommended eligible for inclusion to the NRHP under criteria A, C, and D. Within the direct APE the railroad has been upgraded and maintained as part of its continued use, leading to this segment being recommended as non-contributing to the site’s overall recommended eligibility on the NRHP.

The lithic scatter sites and trash scatter sites that are recommended not eligible to the NRHP These sites do not meet the necessary criteria under A, B, or C. These sites have been completely recorded and are located on eroded surfaces with bedrock exposures, indicating that they do not contain a potential for depth and thus, no potential for intact buried deposits. As such, site recording during pedestrian inventory exhausted their information potential (criterion D) leading these sites to be recommended not eligible for the NRHP. One site, 26CK3658, is recommended eligible because this historic settlement encompasses prehistoric rock rings and contains the information potential to answer future research questions important to prehistory and history. This recommended eligible historic settlement (26CK3658) is located within the direct APE and extends into the indirect APE.

Two-hundred-fifty-three sites were identified in the direct or indirect APE during the background research for the Yahthumb Solar project. Of those, 165 were not considered for visual analysis. The remaining 88 were reviewed, in depth, for visual analysis needs. Of the 88 sites, 67 did not require further analysis. Twenty-one cultural resource sites proceeded to full analysis. Three of the 21 sites were combined into a single site (26CK1147 includes S1459 and S1460), resulting in a total of 19 sites proceeding to full analysis. During site visits to the 19 sites for inspection of condition and photo-documentation, including visual simulations, four of the sites were not relocated, one additional site was not relocated and likely destroyed, and one site (26CK3451) had been demolished. Three additional sites (26CK1841, 26CK1842, 26CK1843) were reassigned to the new site number of 26CK3130 during data recovery (Myhrer and Lyneis 1985). While 21 sites were visited for inspection of possible indirect effects, those not relocated, destroyed, or demolished, as well as sites being combined into one site number, reduced the site count from 21 to 10. Consequently, ten sites continued to visual analysis, including photographic simulations (if needed), to determine potential visual effects.

Table 3-5. List of Sites Fully Evaluated for Indirect Effects

Site No.	Site Type	Current NRHP Recommendation	Visual Analysis Results
26CK1147, S1459, S1460	Historic Ammunition Dump	Unevaluated	No Adverse Effect
26CK3130	Prehistoric Pueblo	Eligible	No Adverse Effect
26CK3658	Historic Settlement	Eligible	No Adverse Effect
26CK3660	Historic Town (mostly destroyed)	Eligible	No Adverse Effect
26CK6403	Historic Tent Pad, Trash Scatter, and Prehistoric Lithic Scatter	Eligible	No Adverse Effect
26CK4348	Historic Railroad Camp and Ore Mill	Eligible-Railroad Camp, Unevaluated-Ore Mill	No Adverse Effect
26CK10119	Historic Trail	Eligible	No Adverse Effect
26CK10159	Historic Trail	Eligible	No Adverse Effect
26CK10160	Prehistoric Lithic Scatter, Historic Trail and Trash Scatter	Eligible	No Adverse Effect
26CK10165	Historic Wagon Road	Eligible	No Adverse Effect

3.2.1.3 THPO and SHPO Consultation

The BIA consulted with the Moapa THPO and the Nevada SHPO in March and May of 2022, respectively (Cantley to Daboda, 03/29/2022, Project No. 2021-127; Cantley to Palmer, 05/05/2022 [SHPO Undertaking no. UT # 2021-6828; 28413]). The BIA has made a determination of no adverse effect for the current undertaking. The Nevada SHPO has concurred with this determination (SHPO Undertaking no. UT # 2021-6828; 28413). Based upon tribal consultations, the APE does not contain archaeological sites or sacred places identified as having historic, cultural, or religious significance. The Moapa THPO has concurred with the BIA’s determination of no adverse effect

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

The Yahthumb Project would have No Adverse Effect on historic properties. The gen-tie crosses one archaeological site (26CK3658) that is currently recommended eligible for inclusion in the NRHP. The

site's features would be avoided during construction of the gen-tie line. Therefore, the undertaking would not cause any effects to those values of the historic property that make it eligible for the National Register.

A Monitoring and Discovery Plan (MDP) would be developed and followed by a professional archaeologist during any ground disturbing work in the area. If unknown archaeological deposits were encountered during construction, then all ground disturbing activities would need to cease within 50 feet (15 meters) of the discovery. Depending on jurisdiction, the THPO, SHPO, BIA, and/or the BLM would be notified within 24 hours to determine further course of action, which would likely involve assessment of the archaeological deposit by a professional archaeologist and a recommendation for inclusion into the NRHP. Direct effects to cultural resources are permanent and irreversible and any direct effect to a historic property that cannot be avoided requires mitigation of the adverse effect.

There would be no adverse effect to the railroad (site 26CK4429) and the Mormon Wagon Road/Old Spanish Trail (site 26CK3536/26CK3848) from the gen-tie line. The sections of both of these linear cultural resources within the direct APE are recommended non-contributing to the NRHP eligibility of the sites due to their current conditions. Therefore, the gen-tie line would not alter the characteristics that contribute to these two historic properties being recommended eligible or listed to the NRHP.

There were field visits to 19 sites to determine if there were visual effects. Based on the field review, visual effects were evaluated for 10 sites within the indirect APE. It was determined that no visual adverse effect will occur at any of these 10 sites.

3.2.2.2 No Action

Under the No Action alternative, the Proposed Action would not be developed and therefore would not create a change to any historic properties, or cultural or sacred resources. These lands would be available for future use by the Band as needed.

3.3 Migratory Birds

3.3.1 Affected Environment

Migratory bird species are protected under the Migratory Bird Treaty Act ([MBTA] 16 U.S.C. §§ 703–711). The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird, except under the terms of a valid permit issued pursuant to federal regulations. All species native to the U.S. or its territories are protected under the MBTA.

Migratory bird species found within the Moapa Valley include the American pipit (*Anthus rubescens*), ash-throated flycatcher (*Myiarchus cinerascens*), black throated sparrow (*Amphispiza bilineata*), blue grosbeak (*Passerina caerulea*), black-chinned hummingbird (*Archilochus alexandri*), cactus wren (*Campylorhynchus brunneicapillus*), loggerhead shrike (*Lanius ludovicianus*), Lucy's warbler (*Leiothlypis luciae*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), vermilion flycatcher (*Pyrocephalus rubinus*), greater roadrunner (*Geococcyx californianus*), Gambel's quail, (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), common raven (*Corvus corax*), and yellow-breasted chat

(*Icteria virens*) (Audubon 2021; BIA 2012). Additional Nevada State Listed species and BLM-Sensitive Species may also occur within the Project area, including the burrowing owl (*Athene cunicularia*), Le Conte’s thrasher (*Toxostoma lecontei*), loggerhead shrike (*Lanius ludovicianus*) verdin (*Auriparus flaviceps*), phainopepla (*Phainopepla nitens*), crissal thrasher (*Toxostoma crissale*), Bendire’s thrasher (*Toxostoma bendirei*), and golden eagle (*Aquila chrysaetos*)(**Appendix K**). The only portion of the Project that BLM-Sensitive Species and Nevada State Listed species apply is along the short section of the gentle near the Reid Gardner Substation on federal lands managed by the BLM.

The golden eagle is protected under the MBTA and the Bald and Golden Eagle Protection Act (16 U.S.C. § 668). The Project areas support suitable foraging habitat for golden eagles, but no suitable nesting habitat. The nearest nesting habitat for golden eagles is approximately five miles west and northwest of the proposed Project in the Arrow Canyon Mountain Range.

There are no Important Bird Areas (IBAs) within the Project areas; the nearest IBA is the Moapa Valley IBA approximately 15 miles east of the Project (Audubon 2021).

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Impacts on migratory birds and eagles from construction, O&M, and decommissioning would be minimized through implementation of design features and BMPs (**Appendix C**) and the Bird and Bat Conservation Strategy (BBCS) (**Appendix H**), which include the following measures:

- Scheduling vegetation treatments and other ground-disturbing activities to avoid the migratory bird breeding season (February 15 to August 31) to the extent practicable
- Pre-construction surveys for all bird species nests would be conducted if work must be scheduled during the migratory bird breeding season
- Pre-construction surveys for western burrowing owl within suitable habitat would be conducted within 30 days prior to construction
- Biological monitors to ensure protection of wildlife, including migratory birds
- Overhead power line structures designed to be avian-safe according to Avian Power Line Interaction Committee (APLIC) standards (APLIC 2006, 2012)
- Use of flight diverters and perch deterrents, where appropriate
- Minimal lighting focused inward and downward toward solar fields to avoid lighting habitats beyond the solar fields
- Proper disposal and storage of garbage
- Monitoring for presence of ravens would be conducted and a Raven Control Plan would be implemented
- Closing of holes and spaces during construction to prevent entrapment
- Implementation of the Worker Environmental Awareness Program (WEAP) and worker training

Migratory Birds

Implementation of the Proposed Action could affect migratory birds during the construction, O&M, and decommissioning phases from the potential to cause visual and auditory disturbance which could result

in avoidance of otherwise suitable habitats. This could indirectly contribute to stress and increased energetic costs as birds may end up nesting and foraging in less suitable habitat. Active bird nests in shrubs or near the ground could be affected during ground-disturbing activities which could result in nest abandonment, nest destruction, and loss of chicks or eggs. These impacts would be minimized by implementation of the BBCS (**Appendix H**), which includes BMPs such as conducting ground-disturbing activities outside the migratory bird season when practical or avoiding active nests if the work cannot be conducted outside of the migratory bird breeding season.

Burrowing owls may be present within the Project areas and are particularly susceptible to the impacts associated with ground-disturbing activities that can result in injury or mortalities to adult owls, nestlings, or eggs that occupy a previously undetected burrow. Adult birds and fledglings are likely to avoid moving vehicles and other construction equipment. Increased human activity and alterations to otherwise suitable habitats could displace birds. Impacts would be minimized by implementation of BMPs (**Appendix C**) including surveys prior to vegetation clearing during the breeding season for burrowing owls (February 15 through August 31).

Migratory birds are susceptible to collision and electrocution associated with overhead power lines. The Project proposes an overhead 230 kV gen-tie line that would total up to approximately 12.5 miles in length. Impacts associated with collision and electrocution would be minimized by implementation of design features and BMPs (**Appendix C**) which include designing overhead power lines to be avian-safe in accordance with APLIC suggested practices (APLIC 2006, 2012) and successful implementation of the BBCS (**Appendix H**).

Operation of the Project may also result in migratory bird mortalities from collision with the PV solar panels and other Project infrastructure. Collision potential would be greatest during bird migration season (Kosciuch et al. 2020). In addition, insectivorous birds may be attracted by high concentrations of insects drawn to the solar fields (Horváth et al. 2009). Collision with buildings, radio towers, and other structures, especially those with night lighting may contribute to mortality in small migratory birds (Longcore et al. 2012; Loss et al. 2014). However, bird mortality is expected to be minimal for the proposed Project. The Southern Paiute Solar Project is located on the Reservation approximately two miles south of the Yahthumb Solar Project and within the same habitat types and has been conducting avian mortality surveys since January 2017. Surveys from January 2017 to January 2019 (25 months) have found nine total avian mortalities at the solar site, four of which were determined to be caused by collision and all were common species (BIA 2021). This indicates that issues related to avian mortalities in this area would be minor. In addition, O&M staff would be required to participate in the WEAP training, which would include a reporting protocol for avian mortalities incidentally found during regular O&M activities.

Birds flying at night could be attracted to steady light sources in the Project areas and may adjust their flight altitudes, putting them at risk for collision with PV solar panels, power lines, or other Project infrastructure (Gauthreaux 1991; Longcore et al. 2012). Impacts associated with lighting would be minimized through use of minimal lighting within the solar field that is only used when needed and focused in and downward toward solar fields to avoid lighting habitats beyond the immediate area (**Appendices C and H**).

Little research exists regarding population-level impacts of PV solar facility mortality on birds. It has been theorized that water bird species could potentially mistake the solar panels for water features on which the birds would try to land, and this is referred to as the “lake effect hypothesis” (Horváth et al.

2009). These behaviors could potentially lead to collisions with PV solar panels resulting in mortality, injury, or stranding of species that require water to take off again (e.g., grebes and loons). Because bird fatality data for PV solar facilities is limited, science-based predictions of potential bird risk are also limited. Avian collision with PV panels was a cause of death at PV solar facilities identified in the Multiagency Avian-Solar Coordination Plan (The Multiagency Avian-Solar Collaborative Working Group 2016) but the level of mortality observed at solar facilities is variable and remains uncertain (Walston Jr. et al. 2016). Two studies from 2015 and 2016 reviewed avian mortality data from several PV solar facilities and concluded that additional research is needed to address hypotheses regarding how solar facilities may interact with bird populations, including whether some project features may attract birds to the facility and increase risk of mortality (Argonne National Laboratory and the National Renewable Energy Laboratory 2015; The Multiagency Avian-Solar Collaborative Working Group 2016). A more recent study from 2020 also reviewed avian mortality data from PV solar facilities in California and Nevada and came to four main conclusions: (1) the four most common species of birds impacted were species with populations in the millions and three of these four were ground-dwelling birds; (2) most bird impacts occurred in the fall; (3) there was no evidence that large-scale facilities result in greater impacts to nocturnal migrating birds or water-associated or water-obligate birds; and (4) most detections of impacts were of unknown cause (Kosciuch et al. 2020).

The presence of water birds within the vicinity of the Yahthumb solar fields is not expected since there are no major water bodies in the area to concentrate water birds during migration, breeding, or stopover periods. However, the proposed Project gen-tie line crosses the Muddy River, a perennial water source, near the Reid Gardner Substation. It is likely that more water birds would be found along the river, though the proposed crossing location is in a narrow portion that is disturbed and developed. As discussed previously, impacts associated with collision and electrocution would be minimized through implementation of design features and BMPs (**Appendix C**) which include designing overhead power lines to be avian-safe in accordance with APLIC standards (APLIC 2006, 2012) and successful implementation of the BBCS (**Appendix H**).

The impacts to migratory birds during decommissioning activities would be similar to the impacts that would occur during construction, including nest abandonment, nest destruction, loss of chicks or eggs, visual and aural disturbance, and habitat avoidance by migratory birds. These impacts would be minimized by implementation of the mitigation discussed for construction. 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 migratory birds and elimination of potential collision hazards.

While impacts on migratory birds would occur as the result of implementing the Proposed Action, these impacts would not affect populations and the implementation of design features and BMPs (**Appendix C**) and the BBCS (**Appendix H**) would minimize impacts. Therefore, implementation of the Proposed Action would have negligible, short- and long-term, adverse impacts on migratory birds.

Bald and Golden Eagles

The Project area does not contain any suitable nesting habitat for golden eagles, though there is the potential for golden eagles to forage in the vicinity of the Project given their proximity to areas that could potentially be used for nesting. Bald eagles have a low likelihood of foraging along the eastern-most portion of the gen-tie line where it crosses the Muddy River but this section of the Muddy River is very narrow and is disturbed and developed. Therefore, bald eagles are not expected to be impacted by

the proposed Project based on the lack of large bodies of water for feeding.

During construction, O&M, and decommissioning, foraging golden eagles may be subject to visual and noise disturbance potentially resulting in alteration of foraging behaviors. Based on the distance between the Project and the nearest nesting habitat (approximately five miles) and the general availability of suitable foraging habitat in the area, impacts are anticipated to be negligible. Golden eagles could still forage within the Project areas during O&M when there would be less human activity and disturbance.

Golden eagles are susceptible to collision and electrocution associated with overhead power lines. As discussed above these impacts would be minimized by implementation of design features and BMPs (**Appendix C**) and measures in the BBCS (**Appendix H**), which include designing overhead power lines to be avian-safe. Therefore, adverse impacts to golden eagles are highly unlikely.

The Proposed Action would have negligible, short- and long-term, direct and indirect adverse impacts on migratory birds and golden eagles. Implementation of mitigation measures would minimize impacts during construction, O&M, and decommissioning.

3.3.2.2 No Action Alternative

Under the No Action Alternative, the Yahthumb Solar Project would not be constructed and there would be no impacts to migratory birds.

3.4 Socioeconomics

3.4.1 Affected Environment

The Yahthumb Project would be located on undeveloped lands on the Reservation. Census data for the Reservation is available as Block Group 2 within census tract (CT) 59.02. Data for CT 59.02 covers a large portion of rural northern Clark County, in addition to the Reservation. Socioeconomic information is also provided for Clark County for comparison and because it physically borders the Reservation and some of the labor and materials employed in the construction of the Project would be sourced from the surrounding Clark County area. Data for the state of Nevada is also provided as a basis for comparison.

According to the 2018 American Community Survey 5-Year Estimate (U.S. Census Bureau 2018), there were 294 people residing on the Reservation, 1,295 people residing in CT 59.02, 2,141,574 people residing in Clark County, and 2,922,849 people residing in the state of Nevada. The racial makeup of the Reservation is predominantly American Indian and Alaskan Native (78 percent), which is substantially higher than the Indian population for the county and state (1 percent for both). Approximately 22 percent of the population in CT 59.02 is American Indian or Alaskan Native, but the majority (230 of 294) reside within the Reservation. The Hispanic population within the Reservation (15 percent) is smaller than that of CT 59.02 (28 percent), Clark County (31 percent), and Nevada (31 percent). **Table 3-6** summarizes demographic characteristics for each geographic area.

Table 3-6. Selected Demographic Characteristics

	Population	White (Percent)	Black (Percent)	American Indian / Alaska Native (Percent)	Asian (Percent)	Native Hawaiian / Pacific Islander (Percent)	Other Race (Percent)	Two or More Races (Percent)
Reservation	294	22 (8)	8 (8)	230 (78)	0 (0)	19 (7)	9 (3)	6 (2)
CT 59.02	1,295	855 (66)	76 (6)	282 (22)	0 (0)	19 (1)	47 (4)	16 (1)
Clark County	2,141,574	1,299,138 (61)	245,827 (11)	16,590 (1)	205,824 (10)	15,846 (1)	246,907 (12)	111,442 (5)
Nevada	2,922,849	1,935,103 (66)	261,123 (9)	35,845 (1)	234,693 (8)	19,352 (1)	296,234 (10)	140,499 (5)

Source: U.S. Census Bureau 2018

3.4.1.1 Employment, Earnings, and Income

In 2018, the unemployment rate on the Reservation was approximately 6.8 percent, which is lower than the rate for CT 59.02 (9.3 percent), Clark County (7.2 percent), and Nevada (6.9 percent). In 2018, the median income for a household on the Reservation was \$35,313, which is substantially lower than the median household income in CT 59.02 (\$62,560), the county (\$56,802), and the state (\$57,598). **Table 3-7** provides income and employment characteristics for each geographic area.

Table 3-7. Selected Income and Employment Characteristics

	Median Household Income	Poverty Rate (Percent)	Unemployment Rate (Percent)
Reservation	\$35,313	25.0	6.8
CT 59.02	\$62,560	10.0	9.3
Clark County	\$56,802	14.1	7.2
Nevada	\$57,598	13.7	6.9

Source: U.S. Census Bureau 2018

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. This is reflected in the census data which indicates the arts, entertainment, recreation, and hospitality industries are the largest employers in Clark County (282,094 employees or 28.1 percent of the workforce). The retail industry ranks fourth in the county and employs 118,647 workers or 11.8 percent of the workforce. In addition, hotel and resort renovation, development, and expansion within Las Vegas have traditionally been a mainstay of the Clark County economy. The census data indicate that 77,140 workers (7.0 percent of the workforce) are employed in the construction industry (U.S. Census Bureau 2018). In contrast, the largest employer within the Reservation is public administration (33 employees or 27.3 percent of the workforce). Education, healthcare, and social services is the second largest industry on the Reservation, employing 19 workers (15.7 percent of the workforce), and the arts, entertainment, recreation, and hospitality industries are third, employing 66 workers (13.2 percent of the workforce; U.S. Census Bureau 2018).

According to the U.S. Census Bureau (2016), 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 \$13,011. For a family of four with two children under the age of 18, the poverty income threshold is \$26,172. The median incomes for both the Reservation and Clark County are above the current poverty thresholds. Despite a lower unemployment rate, the Reservation has a substantially higher poverty rate (25 percent) as compared to CT 59.02 (10 percent), the County (14 percent), and the State (14 percent) With the exception of the Reservation, these are all relatively similar to the national poverty rate of 14.1 percent (U.S. Census Bureau 2018). These income data support the conclusion that there are environmental justice communities defined by income. In addition, Native American persons residing on the Reservation are considered an eligible environmental justice community as defined by Executive Order 12898.

Tribal and Public Revenues

Tribal revenue sources include lease income from other development projects on the Reservation as well as sales taxes generated by the purchase of goods and services from tribal businesses. Public revenues include sales and income (payroll) taxes.

3.4.2 Environmental Consequences

This section discusses effects on social and economic resources that may occur from implementation of the Proposed Action. The additional jobs created by the Project would be a benefit to the Moapa Band and community. In addition to employment benefits, there would also be benefits to Reservation-area businesses (both tribal and private) from the sale of food, gasoline, and water during construction and, to a lesser extent, during O&M. The Moapa Band would also benefit from the lease revenues generated over the life of the Project.

There are no specific federal thresholds of significance for socioeconomic impact assessments. Significance varies based on the setting of the proposed project (40 CFR § 1508.27[a]), but 40 CFR § 1508.8 states that 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.” 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).

3.4.2.1 Proposed Action

Population, Demographics, and Public Services

Most workers employed during all phases of the Project would be sourced from the labor pool within the Reservation and surrounding region. Therefore, the Yahthumb Project would not result in any long-term change in the population size, demographics, housing availability, or demand for services. During construction, the workforce for the Project would vary over the construction period and is expected to average up to approximately 200 with a peak of 400 workers, most of whom would be tribal members or Clark County residents. Those workers that could stay at hotels near the Project area during construction would be easily accommodated by the regional infrastructure which is designed for

seasonal demands and fluctuations from global tourism. Since mostly tribal and Clark County residents would be employed, the Project would not cause a temporary population increase that would necessitate additional public services or investment in infrastructure capacities that could not be provided from existing resources. Up to five full-time equivalent workers would be employed during the O&M phase and all would be tribal members and Clark County residents. Therefore, there would be no long-term impact on population, demographics, and public services on the Reservation and surrounding region. Decommissioning is expected to have similar impacts as construction, though less workers would be required and for a shorter period of time.

Employment, Earnings & Income

Construction employment and spending would provide a short-term economic benefit within the Reservation and Clark County. Construction would provide a short-term boost to the local/regional construction sector since most construction workers would be hired from within the Reservation and/or Clark County. Under the Tribal Employment Rights Ordinance agreement between the Moapa Band and the Applicants, tribal members would have first right of refusal for any job positions for which they are qualified. As examples of tribal employment on the Reservation solar projects that have been or are being constructed - two of the five operating staff for the existing Southern Paiute (K Road) Project are tribal members; the Eagle Shadow Mountain Project which is finishing construction employed over 190 tribal members during peak construction; and the Arrow Canyon Project which has initiated construction currently employs approximately 25 tribal members.

During construction of the Yahthumb Project, employment would reach an average of 200 workers with a peak not expected to exceed 400 workers at any given time. Construction is expected to take up to approximately 14 months.

Most of the workforce would be tribal members or would 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, any non-local workers would provide a temporary stimulus to the local economy as they spend per diem money on hotels, meals, and consumables. This spending in the area would also support local jobs.

The construction jobs are expected to be relatively high paying. These jobs are clean/renewable energy opportunities that are expected to grow at above-average rates and pay above-average wages. Therefore, the Yahthumb Project would help diversify the labor force of Clark County and add capacity and valuable utility-scale solar installation experience to the labor pool. The construction phase of the Project is expected to have a short-term, beneficial impact on unemployment levels. The level of employment impact would be minor for the county but moderate for Moapa Band members on the Reservation. As mentioned above, Moapa Band 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.

During O&M, payroll and Project-related spending would have a minor, long-term, beneficial impact on the employment and income within the Reservation and surrounding region. The impacts to employment and income from decommissioning would be similar, but less, than those from construction.

Tribal and Public Revenues

During construction, the Yahthumb Project would generate a non-recurring contribution to the Moapa Band and non-tribal public revenues from the sale of water, aggregate, and other materials. In addition, the Moapa Band could benefit from increased sales at the Tribal Plaza restaurant and store. The workforce would generate payroll taxes that would flow to federal, State, and local treasuries. In addition, tax revenues for the Reservation and Clark County would be generated from expenditures on materials, equipment, and supplies.

Over the term of the lease for the Yahthumb Project, the Project would generate an annual rent to the Moapa Band as specified in the lease agreement. This long-term, predictable revenue would be used by the Moapa Band to expand social programs, economic development, resource protection, and other programs that would benefit the Moapa Band. Payments would also be made to the Moapa Band by the Applicants in lieu of taxes, in accordance with the Tribal Tax Agreement.

In addition, the BLM would collect revenues from the annual rents for ROWs associated with the gen-tie line and existing access roads. In accordance with the provisions of Public Law 96-491 that established the BLM-managed designated utility corridor on the Reservation, “The Secretary of the Interior shall be responsible for establishing and collecting fees for the use of such right-of-way...[and] any payment of such fees to the Secretary...shall be made for the benefit of the Moapa Band of Paiutes.” This would provide additional long-term revenue to the Moapa Band.

During O&M, expenditures on materials and supplies would generate tax revenues for Clark County over the operational lifespan of the Project. Payroll taxes during O&M would also generate revenue for federal, state, and local treasuries. The potential effects on tribal and public revenues from decommissioning would be similar to those from construction. These activities would also provide a short-term stimulus to the local economy. Following decommissioning, the land occupied by the Project would become available for other uses.

Effects would be greatest during the construction and decommissioning phases due to the size of the workforce required. Although long-term benefits to employment and income would be less during O&M, the lease revenue generated by the Project would have a long-term, beneficial effect on tribal revenue. The beneficial effects to socioeconomics on the Reservation would be major, while the beneficial effects on the regional economy would be negligible.

Overall, the Project would have a minor, short-term, beneficial direct and indirect impact on tribal and public revenues during construction and decommissioning. During O&M, the Project would have a long-term, major, direct beneficial impact on tribal revenues, and a long-term, negligible, indirect beneficial impact on public revenues in the surrounding region.

3.4.2.2 No Action

Under the No Action Alternative, the Proposed Action would not be developed and no socioeconomic impacts (adverse or beneficial) would occur. The Moapa Band would not benefit economically from the lease income and sale of materials that would be generated by the solar Project. There would be no increase in employment and income on the Reservation or in Clark County, and no additional tax revenues would be generated.

3.5 Threatened and Endangered Species

3.5.1 Affected Environment

An official list of federally-listed species that may occur within the Project areas was obtained from the USFWS Information for Planning and Consultation System (IPaC) and additional species were also considered due to proximity to the Project area (USFWS 2021a). A copy of the USFWS official species list can be found in the Biological Assessment (**Appendix M**). **Table 3-8** identifies the species and their likelihood to occur within the Project area. There is no designated or proposed critical habitat for these species in the Project areas.

Table 3-8. Federally-Listed Species Considered			
Common Name	Scientific Name	Status	Potential to Occur within Project Areas
Moapa Dace	<i>Moapa coriacea</i>	Endangered	Low potential to occur along the northeastern portion of the gen-tie where it crosses the Muddy River. No potential to occur within the solar facility Project area. Nearest suitable habitat is associated with the Warm Springs area of the Muddy River eight miles north of the Project and 4.5 miles northwest of the gen-tie line crossing of the Muddy River. This species is primarily addressed due to the potential for groundwater withdrawals affect habitat in the Muddy River.
Mojave desert tortoise	<i>Gopherus agassizii</i>	Threatened	Known to occur within the Project area.
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Low potential to occur along the northeastern portion of the gen-tie line where it crosses the Muddy River. Not likely to occur within the solar facility Project area. Nearest suitable habitat is associated with the Warm Springs area of the Muddy River eight miles north of the Project and 4.5 miles northwest of the gen-tie crossing of the Muddy River.
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Threatened	Low potential to occur along the northeastern portion of the gen-tie line where it crosses the Muddy River. Not likely to occur within the solar facility Project area. Nearest suitable habitat is associated with the Warm Springs area of the Muddy River eight miles north of the Project and 4.5 miles northwest of the gen-tie crossing of the Muddy River.

Table 3-8. Federally-Listed Species Considered			
Common Name	Scientific Name	Status	Potential to Occur within Project Areas
Yuma Ridgway’s rail	<i>Rallus longirostris yumanensis</i>	Endangered	Low potential to occur along the northeastern portion of the gen-tie line where it crosses the Muddy River. Not likely to occur within the solar facility Project area. Nearest suitable habitat is associated with the Overton Wildlife Management Area of the Muddy River 18 miles from the Project.
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Low potential to occur within the Project area. May migrate through the Project area, but there are no suitable meadows and fields with milkweed species (<i>Asclepias</i>) in the area. Few nectar-producing plants occur within the Project area.

Moapa Dace

The Moapa dace was listed as an endangered species under the Endangered Species Act (ESA) on March 11, 1967 (USFWS 1967). The original recovery plan for this species was prepared in 1983 and subsequently revised in 1996 (USFWS 1983a, 1996). Threats to the Moapa dace include habitat loss and alteration, introduction of non-native species, fragmentation, and parasites (USFWS 2009).

The Moapa dace inhabits a variety of habitats throughout its several life stages. As individuals age, they occupy habitats with increasing flow velocities: larval dace are limited to slackwater of the upper reaches of tributaries of the Muddy (Moapa) River, and adults can be found in the river’s mainstem. The species prefers warmer temperatures (67–89.6°F); cooler temperatures in the middle portion of the Muddy River mainstem may function as a barrier to downstream movements (USFWS 1996). The species is omnivorous and often forages from drift stations in large groups (up to 30 individuals). These sites are often characterized by overhanging vegetation or particularly deep areas (USFWS 1996).

The Moapa dace is endemic to and occurs in the Muddy River system (and associated thermal spring systems). Specifically, it occurs in the Warm Springs area which is located approximately eight miles north of the Project and 4.5 miles northwest of the gen-tie crossing of the Muddy River. Previous surveys found adult Moapa dace occurring in low numbers in restricted portions of three springs and less than two miles of spring outflow and river in the Warm Springs area (USFWS 1983a). Moapa dace likely once inhabited 25 springs and approximately 16 kilometers (9.9 miles) of the upper Muddy River (Ono et al. 1983).

Mojave Desert Tortoise

The Mojave desert tortoise was listed as threatened under the ESA on April 2, 1990 (USFWS 1990). A total of 6.4 million acres of critical habitat was designated in 1994 (USFWS 1994a). Genetics, morphology, behavior, ecology, and habitat use were used to define recovery units for six distinct population segments of the desert tortoise in the 1994 Recovery Plan (USFWS 1994b). The boundary of these units was refined in the Revised Recovery Plan (USFWS 2011) The Project is located within the Northeastern Mojave Recovery Unit, which encompasses almost five million acres extending from southwestern Utah/northwestern Arizona (northern boundary) to Las Vegas/Las Vegas Wash (southern boundary). This unit includes the Beaver Dam Slope, Gold Butte-Pakoon, and Mormon Mesa critical

habitat units, though there is no critical habitat present within the Project areas (USFWS 2019c). Tortoises in this portion of the Mojave Desert are active in late summer and early autumn in addition to spring. This region receives up to 40 percent of its annual rainfall in the summer which supports two distinct annual floras on which tortoises can forage. Desert tortoises feed on cacti, perennial grasses, and herbaceous perennials. Desert tortoises dig burrows (usually located under shrubs) and den in caliche caves in bajadas, washes, or caves in sandstone rock outcrops for winter hibernation and summer estivation (USFWS 2011, 2019b). Additional detail about the natural history and status of desert tortoise can be found in the Biological Assessment that was prepared for the Project (**Appendix M**).

Two separate desert tortoise surveys were conducted to assess the presence of the Mojave desert tortoise in the Project area. The first survey was conducted in October 2020 and the second survey took place in May 2021. These surveys covered the entire 1,695-acre solar facility action area for the Project. The surveys covered 100 percent of the Project area and were conducted in accordance with current USFWS protocols (USFWS 2019b). The field surveys were conducted to determine presence or absence of desert tortoises, estimate the number of tortoises (abundance), and assess the distribution of tortoises within the Project area (USFWS 2019b)(Allied Pacific Partners 2021). Additionally, a survey was conducted in September and October 2018 for the Eagle Shadow Mountain (ESM) Solar Project’s gen-tie, which completed construction in 2021 and is located adjacent to the proposed Yahthumb gen-tie line (Newfields 2018). The desert tortoise data from this 2018 survey was included for the proposed Yahthumb gen-tie line (**Table 3-9, Figure 3-1**).

A total of 14 adult desert tortoises (≥ 180 mm midline carapace length [MCL]) and two juveniles were observed during the 2020 and 2021 surveys (**Table 3-9, Figure 3-1**). Two adult desert tortoise were observed along the ESM gen-tie line. These tortoises were observed approximately 30 feet and 170 feet from the proposed Yahthumb gen-tie line. Desert tortoise sign (i.e., scat, carcasses/shell fragments, tracks, pallets, and burrows) were observed throughout the Project area. The estimated number of adult tortoises within the Project area was calculated to be 29.1, with a 95-percent confidence interval of 15.06 to 56.08 adult tortoises.

Desert tortoise health assessments will be conducted within the Project Area during 2022. It is likely that more tortoises will be found during health assessments resulting from different survey methods and more time spent surveying.

Project Components	Number of Adult DT Observed	Number of Juvenile DT Observed	Estimated Number of Tortoises within Each Project Area	95% Confidence Interval (Lower - Upper)
Yahthumb Solar Lease Area	14	0	29.1	15.06 – 56.08
ESM Gen-Tie (adjacent to Yahthumb Gen-Tie)	2	0	n/a	n/a
Totals	16	0	29.1	15.06 – 56.08

Source: Allied Pacific Partners 2021

Southwestern Willow Flycatcher

On February 27, 1995, the southwestern willow flycatcher was listed as endangered within its entire

range under the ESA (USFWS 1995). Critical habitat for the species was originally established in 1997 (USFWS 1997) but was subsequently vacated. Incidental protection was provided along the Virgin River and its 100-year floodplain from the Arizona/Nevada border to Halfway Wash in Nevada based on designation of critical habitat for two fish species, woundfin (*Plagopterus argentissimus*) and Virgin River chub (*Gila seminuda*) (USFWS 2000).

Critical habitat was again proposed on October 12, 2004 (USFWS 2004), redefined and re-instituted in 2005 (USFWS 1997, 2005), and designated in 2013 (USFWS 2013). Critical habitat for the southwestern willow flycatcher in Nevada is currently limited to portions of the Virgin River above its confluence with the Muddy River, approximately 24 miles southeast of the Project (USFWS 2005).

For nesting, southwestern willow flycatchers require dense riparian habitats with microclimatic conditions dictated by the local surroundings. Saturated soils, standing water, or nearby streams, pools, or cienegas are components of suitable nesting habitat. No suitable riparian or microhabitat conditions exist within the Project areas. The closest known breeding habitat for this species is located along the Muddy River at Warm Springs Ranch approximately eight miles north of the Yahthumb solar field and 4.5 miles northwest of the gen-tie line crossing of the Muddy River. During 2019 surveys within Warm Springs Ranch, eight southwestern willow flycatcher territories were identified, including two confirmed pairs, three unpaired residents, and one non-resident (Southern Nevada Water Authority [SNWA] 2019) but there is no suitable habitat for the species along the Muddy River where the proposed gen-tie line would cross or within or near the Project solar field.

Yellow-billed Cuckoo

On October 3, 2014, the yellow-billed cuckoo was listed as threatened under the ESA (USFWS 2014a, 2014b). Critical habitat has not yet been designated but was proposed on February 27, 2020 (USFWS 2020a). The yellow-billed cuckoo has always been rare in Nevada. There are still small areas of suitable habitat within the state, with documented breeding occurring very rarely in southern Nevada. Yellow-billed cuckoos may still utilize remnant habitats present within the state during migration. The scattered cottonwoods on the Colorado River tributaries (Virgin, Muddy, and Pahrnagat) are the last places in Nevada where the yellow-billed cuckoo can potentially occur.

The only known nesting sites in Nevada for the yellow-billed cuckoo are at Warm Springs Ranch Natural Area along the Muddy River in the Moapa Valley (SNWA 2019) approximately eight miles north of the solar field and 4.5 miles northwest of the gen-tie line crossing of the Muddy River. While two individual cuckoos were detected during 2019 surveys at Warm Springs Natural Area, there is no suitable habitat for the species along the Muddy River where the proposed gen-tie line crosses or within or near the Yahthumb solar facility.

Yuma Ridgway's Rail

The Yuma Ridgway's rail (previously called the Yuma clapper rail) was listed as endangered under the ESA on March 11, 1967 (USFWS 1967). The Recovery Plan was finalized in 1983 and portions of the recovery action plan were initiated over the ensuing years (USFWS 1983b). The Yuma Ridgway's rail is one of the smaller subspecies of clapper rail, with adult males standing eight inches tall and weighing 266.8 grams, on average (Todd 1986). Females are slightly smaller. Adult Yuma clapper rails of both

sexes are similar in plumage; they possess a long, slender bill and long legs and toes compared to body size (Todd 1986).

The present range of the Yuma Ridgway's rail in the U.S. includes portions of Arizona, California, and Nevada. The Yuma Ridgway's rail lives in freshwater marshes dominated by cattail (*Typha* sp.) and bulrush (*Scirpus* spp.) with a mix of riparian tree and shrub species (*Salix exigua*, *S. gooddingii*, *Tamarix* spp., *Tessaria sericea*, and *Baccharis* spp.) along the shoreline of the marsh (Eddleman 1989). This species is known to occur along the Muddy River within the Overton Wildlife Management Area approximately 18 miles southeast of the Project. No suitable habitat for this species occurs within or near the Project area. However, recent research suggests this species can undertake long migrations and that movement is not limited to river corridors. A recent study using satellite transmitters on Yuma Ridgway's rails found that, while this species has been considered non-migratory, some Yuma Ridgway's rails conduct fall migratory movements between the U.S. and Mexico, migrating long distances over inhospitable terrain (Harrity and Conway 2020). This indicates that while breeding habitat does not occur in the Project area, this species may migrate over the Project.

Monarch Butterfly

The monarch butterfly was listed as a candidate species under the ESA on December 17, 2020 (USFWS 2020b). The monarch butterfly is a species of butterfly in the order Lepidoptera that occurs in North, Central, and South America; Australia; New Zealand; islands of the Pacific and Caribbean, and elsewhere (USFWS 2020c). Adult monarchs are large and conspicuous with bright orange wings surrounded by a black border and covered with black veins. Adult monarchs are sexually dimorphic, with males having narrower wing venation and scent patches (USFWS 2020c). During the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias* spp.), and larvae emerge after two to five days. Larvae develop over a period of 9 to 18 days, feeding on milkweed and sequestering toxic cardenolides as a defense against predators. The larva then pupate into chrysalis before eclosing 6 to 14 days later as an adult monarch butterfly (USFWS 2020c).

Monarchs begin migrating in the fall in western North America to overwintering groves along the California coast into northern Baja California. Monarchs in Nevada typically migrate to California (Southwest Monarch Study Inc. 2018). In early spring (February-March), surviving monarchs break diapause and mate at the overwintering sites before dispersing and beginning migration northward. In the southwestern states, migrating monarchs tend to occur more frequently near water sources (Morris et al. 2015). Monarch butterflies during breeding and migration require a diversity of blooming nectar resources and milkweed embedded within this diverse nectaring habitat. Within the Project area, there is a small amount of suitable nectar-producing plant species but no milkweed species have been observed during field surveys. Monarchs may migrate through the Project area, but it is unlikely that breeding would occur. Monarchs have a low likelihood of occurrence due to the lack of meadows and fields with an abundance of nectar-producing plants and milkweed species.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Five federally listed species and one candidate species have the potential to occur in or around the

Project areas and have the potential to be impacted if the Proposed Action is implemented (see **Table 3-8**). Surveys for federally listed species and analysis of their habitat indicate that only the Mojave desert tortoise occurs in the proposed Project areas. The other four species (Moapa dace, southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail) are known to occur in habitats in the region along the Muddy River and are analyzed in this section due to their proximity to the proposed gen-tie. Potential impacts are summarized for these species below and more detail can be found in the Biological Assessment that has been prepared concurrently with this EIS (**Appendix M**).

Mojave Desert Tortoise

The potential effects to Mojave desert tortoise resulting from implementation of the Proposed Action include:

- Injury or mortality from construction activities
- Temporary stress from handling during translocation efforts
- Temporary constriction of movement during construction
- Disturbance from vibrations during construction near the boundary of the construction areas
- Temporary and permanent loss of suitable habitat and burrows
- Noise and lighting effects on behavior and movement
- Exposure to chemicals (herbicides, palliatives, and spills from equipment)
- Increased raven and other predator populations resulting from perches provided by solar structures, perimeter fencing, overhead collector line structures, and human introduction of trash

The Proposed Action includes implementation of mitigation measures intended to avoid, reduce, and minimize effects on the Mojave desert tortoise, as identified in the Biological Assessment for the Project (**Appendix M**) and list of BMPs (**Appendix C**). The minimization measures and BMPs include preconstruction surveys, biological monitoring, temporary exclusionary fencing, translocation of desert tortoise out of construction areas, and implementation of the Integrated Weed Management Plan (**Appendix F**), Raven Control Plan (**Appendix I**), and WEAP during construction, O&M, and decommissioning.

Potential construction-related effects on the desert tortoise would include mortality or injury from being crushed by moving vehicles while outside of burrows and being crushed while in burrows during ground disturbing activities. Implementation of the Proposed Action, particularly during construction, could also temporarily disturb desert tortoises by creating vibrations, noise, and lighting. Such disturbance could cause tortoises to temporarily avoid otherwise suitable and occupied habitats near the construction activities. Desert tortoises would also be affected during translocation which can result in harassment, injury, and/or mortality. Refer to the Biological Assessment (**Appendix M**) for detailed analysis of these potential effects.

These construction-related effects could impact up to 57 desert tortoises. These impacts would be minimized by the installation of exclusionary fencing and translocation of desert tortoises outside of the construction areas and the implementation of other BMPs and minimization measures (**Appendix C**). While there is a potential for some adult desert tortoises to be injured or killed, the numbers are expected to be small. Adult desert tortoises are more easily detected during preconstruction surveys because of their large size, and therefore it is expected that all adult desert tortoises that occur within

the construction-phase exclusionary fence would be identified and translocated. Because of the difficulty in locating juvenile desert tortoises and eggs, some may not be found during preconstruction surveys and could be crushed or injured during Project construction. Capturing, handling, and relocating desert tortoises out of the solar site could also result in injury or death (Blythe et al. 2003). To minimize this, tortoises would be handled in accordance with USFWS handling protocols.

Temporary desert tortoise exclusionary fencing would be installed prior to construction and desert tortoises would be relocated via clearance surveys prior to the construction phase of the Project. Tortoises within approximately 500 meters (1,640 feet) of the exclusionary fence for the Project would be relocated outside the fence and those on the interior of the solar field (greater than 500 meters [1,640 feet] from the fence) would be moved to temporary holding pens and returned to the site following construction. The recipient sites for these translocated desert tortoises are shown in the Biological Assessment for the Project (**Appendix M**) and would be included in the Desert Tortoise Translocation Plans that would be appended to the Biological Opinion.

The Project would be constructed over approximately 12 to 14 months. Construction-related effects to desert tortoise would also be minimized by implementation of several Project plans including the Raven Control Plan (**Appendix I**), which would require trash and litter control and reduce potential for predator-related effects on desert tortoises; the WEAP, which would educate all Project personnel about desert tortoise; and the Desert Tortoise Translocation Plan which would guide translocation efforts for the Project.

In addition to the effects of construction on the tortoise, temporary and permanent disturbance to desert tortoise habitat would occur (**Table 3-10**). For the temporary disturbance, vegetation would be impacted initially during construction. The vegetation would be trimmed to a height of 18 inches and driven over and crushed. This treatment would leave the roots intact allowing herbaceous and woody vegetation to re-establish following construction, so that these impacts to desert tortoise habitat would not be permanent.

Table 3-10. Acres of Disturbance to Desert Tortoise Habitats			
Project/Area	Temporary Disturbance (acres)	Permanent Disturbance (acres)	Total Disturbance (acres)
On-site Components			
Yahthumb Solar Project	1,129	297	1,426
Off-site Components			
Gen-tie	44	10	54
Site Access Roads	0	2	2
Temporary Water Pipeline	11	0	11
Total¹	1,184	309	1,493

O&M activities along the gen-tie lines, access roads, and within the solar site could result in mortality or injury of tortoises from being crushed by vehicles. Desert tortoises are expected to re-inhabit the solar field during operations because the perimeter fences would be elevated to allow their passage but the level of their potential re-use of the habitat within the solar field is unknown. In addition, implementation of mitigation measures and BMPs such as reduced speed limits and environmental awareness training for personnel would minimize impacts to desert tortoises during O&M activities. Decommissioning would result in similar effects as those described for construction.

The Proposed Action would have moderate, localized, short-term, adverse impacts on Mojave desert tortoise during construction and decommissioning from harm, harassment, injury, and possible death to tortoise from ground-disturbing activities and tortoise translocation. Implementation of the Proposed Action would have minor, localized, long-term, adverse impacts on Mojave desert tortoise during O&M as the result of permanent disturbance of 309 acres of suitable habitat for desert tortoise and temporary disturbance of 1,184 acres that is expected to be returned to suitable habitat following construction activities. Impacts would be minimized through implementation of Project design features and BMPs (**Appendix C**) and the Raven Control Plan (**Appendix I**).

The Biological Assessment for the Project determined that implementation of the Proposed Action may affect and is likely to adversely affect the Mojave desert tortoise (**Appendix M**). Implementation of the Proposed Action would have moderate, localized, short-term, direct and indirect adverse impacts on Mojave desert tortoise during construction and decommissioning, and minor, localized, long-term, indirect adverse impacts on Mojave desert tortoise during O&M.

Moapa Dace

The Moapa dace is only known to occur in the Muddy River and several associated headwater springs in the Warm Springs area. The Moapa dace is unlikely to occur within the Muddy River in the vicinity of the proposed gen-tie line. Additionally, the gen-tie line would span the river so the Moapa dace would likely not be affected by the construction of the Project. Up to 500 acre-feet (AF) of groundwater would be withdrawn over approximately 12 to 14 months for construction of the Project. O&M water demand is not expected to exceed 10 acre-feet per year (AFY). These withdrawals represent the only potential effect to this species. The effects of groundwater withdrawals of up to 16,100 AFY were previously analyzed in a 2006 Programmatic Biological Opinion (PBO) that addressed groundwater withdrawals in the Lower White River Flow System (LWRFS) Hydrographic Basin (USFWS 2006). Groundwater withdrawals for the Project would contribute to current and future adverse effects that were analyzed in the PBO and the Biological Assessment for the Project determined that groundwater pumping associated with the Proposed Action may affect and is likely to adversely affect the Moapa dace (**Appendix M**).

Southwestern Willow Flycatcher, Yellow-Billed Cuckoo, and Yuma Ridgway's Rail

No suitable habitat for the southwestern willow flycatcher, yellow-billed cuckoo, or Yuma Ridgway's rail occurs within or adjacent to the Project solar field. These species may use the nearby Muddy and Virgin Rivers for migration to and from breeding habitat and during dispersal, and these species could occur in the vicinity of the gen-tie line crossing of the Muddy River where there is suitable habitat upstream and downstream. Additionally, these species could migrate over the Project area.

The Project gen-tie lines would be constructed above ground and there is potential that southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail could collide with them. However, the likelihood of this impact is relatively low due to the low probability of these birds occurring within the Project area and along the Muddy River in the vicinity of the gen-tie line.

Groundwater withdrawals proposed for the Project could result in insignificant reductions in flow in the Muddy River, but the magnitude of effects to these species or their habitats would be too small to be discernable and there is not likely to be any effect on riparian vegetation along the Muddy River.

A migrating or dispersing southwestern willow flycatcher, yellow-billed cuckoo, or Yuma Ridgway's rail could collide with the PV solar panels within the solar field but is expected to be extremely unlikely to occur. These birds could fly over the Project areas but are not likely to use habitats within the Project areas because of lack of suitability for these species.

The USFWS recently addressed the potential for solar projects to cause injury or mortality to Yuma Ridgway's rail and yellow-billed cuckoo because two mortalities of Yuma Ridgway's rails and one yellow-billed cuckoo had been documented at solar facilities in California even though the circumstances and causes of death have not been confirmed (USFWS 2019a). For the Eagle Shadow Mountain Solar Project (ESMSP) and the Southern Bighorn Solar I and II Projects, located near to and within similar habitats as the Yahthumb Solar Project, the USFWS recognized that the low number of known recorded mortalities, the lack of habitat in the area, and the long distance from any known occurrence of these birds suggests low potential for mortality associated with solar projects in this area (USFWS 2019a, 2021b, 2021c). In addition, post-construction monitoring for the Southern Paiute Solar Project (located nearby and south of the Project) from January 2017 to July 2019 found a total of nine avian mortalities, none of which were federally listed bird species (BIA 2019). Therefore, the potential for interactions between Yuma Ridgway's rail, southwestern willow flycatcher, and yellow-billed cuckoo and PV solar facilities are improbable and effects are expected to be negligible.

Due to the low numbers of these species that occur in the vicinity of the Project, there may be discountable impacts to these species if they migrate along the Muddy River corridor. Potential risk would be insignificant and discountable and potential indirect effects would be negligible. The Biological Assessment for the Project determined that the Proposed Action may affect, but is not likely to adversely affect, the southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail (**Appendix M**). The Proposed Action would have negligible, localized, short- and long-term, indirect adverse impacts on these species.

Monarch Butterfly

There is a low amount of suitable habitat for monarch butterflies within the Project area. The low number of nectar-producing plant species and milkweed within the Project area lowers the potential for monarch butterflies to use the Project area at any time during the year. Monarchs may migrate over/through the Project area on their yearly migration to the California coast for overwintering, but it is unlikely that they would use the Project area. Direct impacts could include direct mortality of monarchs due to construction activities. Implementation of the Proposed Action, particularly during construction, could also temporarily disturb monarch butterflies by creating vibrations, noise, and lighting that may prompt them to not use the area surrounding the Project. Indirect impacts could include the conversion of potentially suitable habitat and the destruction of potentially suitable nectar-producing plants and milkweed species. Additionally, the Project could introduce weeds and invasive plant species that may replace more desirable vegetation. The Integrated Weed Management Plan would prevent or minimize the spread/colonization of weeds on-site and off-site.

The Proposed Action would have negligible, localized, short- and long-term, direct and indirect, adverse impacts on monarch butterflies.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the Yahthumb Solar Project would not be constructed and there would be no effects on any threatened, endangered, or candidate species.

3.6 Vegetation

3.6.1 Affected Environment

The Project is located in the Mojave Warm Desert and Mixed Desert Scrub habitat. These habitats support a diverse array of wildlife species including many birds, small mammals, and reptiles that depend on or at least partially use this habitat (Wildlife Action Plan Team 2012).

Throughout the Mojave Desert, native understory vegetation is being replaced with invasive species such as red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), Sahara mustard (*Brassica tournefortii*), halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola* spp.). Non-native annual grasses such as red brome, cheatgrass, and Mediterranean grass (*Schismus barbatus*) compete with native forage plants, and the fuel these plants create has led to increased fires in parts of the Mojave Desert where they were historically rare (Invasive Weed Awareness Coalition 2006). In riparian areas, dense stands of saltcedar (*Tamarisk* spp.) have replaced native riparian vegetation communities throughout much of the region. Climate change is also anticipated to have a significant effect on desert scrub communities with creosote-bursage communities expanding northward, while blackbrush communities losing much of their shrub cover (Wildlife Action Plan Team 2012).

Land cover types in the Project area were identified using the Southwest Regional Gap Analysis Project data (Lowry Jr. et al. 2005; U.S. Geological Survey [USGS] 2005), which uses satellite imagery to delineate land cover types (vegetation communities). Vegetation in the Yahthumb lease study area and the off-site components is primarily composed of Sonora-Mojave Creosotebush-White Bursage Desert Scrub (90 percent), while North American Warm Desert Wash (8 percent) accounts for a majority of the remainder of the vegetation. Very small areas of Invasive Southwest Riparian Woodland and Shrubland are also present in the area accounting for less than two percent (**Figure 3-2**). **Tables 3-11**, **Table 3-12**, and **Table 3-13** present the acreages of each dominant vegetation community by proposed Project feature for Reservation lands, BLM-managed lands, and private lands, respectively.

On the Reservation, the Project area and off-site components are composed primarily of Sonora-Mojave Creosotebush-White Bursage Desert Scrub and North American Warm Desert Wash with small areas of Invasive Southwest Riparian Woodland and Shrubland.

Figure 3-2 shows the distribution of vegetation communities in the vicinity of the solar fields and along the off-site components. **Table 3-11** provides the acreage of the each of the vegetation communities in the Project area on Reservation land, including associated access road and collector line ROWs. On federal land managed by the BLM, the Project area includes the majority of the gen-tie ROW, portions of the access road options, and a majority of the temporary water pipeline. These areas are also dominated by Sonora-Mojave Creosotebush-White Bursage Desert Scrub and North American Warm Desert Wash, but also contain small areas of Invasive Southwest Riparian Woodland and Shrubland. **Table 3-12** provides the acreage of the vegetation communities in the Project area on BLM-

managed land.

On the private land owned by NV Energy near the Reid-Gardner Substation, the Project area includes small portions of the gen-tie line (approximately 1.1 miles) that are dominated by the Sonora-Mojave Creosotebush-White Bursage Desert Scrub vegetation community and include a small area of Invasive Southwest Riparian Woodland and Shrubland. **Table 3-13** provides acreage of the vegetation communities in the Project area on privately owned land.

Sonora-Mojave Creosotebush-White Bursage Desert Scrub

Creosote scrub is typical of the Mojave Desert and is the most abundant vegetation community in the region and within the Project area. Creosote scrub occurs on well-drained sandy flats and bajadas from 150 to 1500 meters (492–4,921 feet) elevation in Nevada. Its range extends from the Colorado River on the south to Pahrangat Valley on the north (Wildlife Action Plan Team 2012). This community is typically dominated by creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*), which can be sparse to moderately dense (2–50 percent cover). Many other shrubs, dwarf-shrubs, and cacti may be present, often as a sparse understory. In southern Nevada, common species include saltbush (*Atriplex* spp.), Mormon tea (*Ephedra nevadensis*), desert wolfberry (*Lycium andersonii*), brittlebush (*Encelia farinosa*), and beavertail cactus (*Opuntia basilaris*). The herbaceous layer is typically sparse but can be abundant with ephemerals after spring rains. Herbaceous species common in the region include phacelia (*Phacelia* spp.), desert trumpet (*Erigonium inflatum*), cryptantha (*Cryptantha* spp.), and low woollygrass (*Dasyochloa pulchella*) (USGS 2005).

Creosotebush is used by many desert animals for shelter and forage. The roots of the creosotebush help to stabilize the soil and support burrows for a variety of reptiles and amphibians, including the desert tortoise (*Gopherus agassizii*), and mammals such as the kit fox (*Vulpes macrotis*). Other animals bed in or under the bushes and birds use them for perching and nesting (Wildlife Action Plan Team 2012). On the Reservation, the Yahthumb solar site includes approximately 1,282 acres of creosote scrub vegetation and the off-site components on Reservation land contain approximately one acre. On federal land managed by the BLM, there are approximately 53 acres of creosote scrub vegetation. On private land owned by NV Energy, there are approximately three acres of creosote bush scrub vegetation.

North American Warm Desert Wash

The desert wash vegetation community is restricted to the small, intermittently flooded washes scattered throughout the Project area and does not occur on private land. The vegetation of desert washes is highly variable, ranging from sparse and patchy to moderately dense. It typically occurs along the banks of washes but may occur within the channel. The woody layer is typically intermittent and relatively open and is usually dominated by shrubs and small trees such as catclaw (*Senegalia greggii*) and desert willow (*Chilopsis linearis*) (USGS 2005). In southern Nevada, washes tend to support a higher diversity and density of cacti and yucca than the surrounding landscape. Vegetation surveys conducted for previously approved solar projects on the Reservation (BIA 2012, 2014, 2019a) identified numerous cacti and yucca species including cholla (*Cylindropuntia* spp.), barrel cactus (*Ferocactus cylindraceus*), hedgehog cactus (*Echinocereus engelmannii* var. *chrysocentrus*), and Mojave yucca (*Yucca schidigera*). Higher densities of big galleta grass (*Pleuraphis rigida*) are also commonly reported in washes in this region.

On the Reservation, the Yahthumb solar field includes approximately 118 acres of desert wash vegetation while none occurs on the off-site components on Reservation land. On federal land managed by the BLM, there are approximately seven acres of desert wash vegetation. No desert wash vegetation occurs on private land.

North American Invasive Southwest Riparian Woodland and Shrubland

This community represents areas that are dominated by introduced woody species such as saltcedar and Russian olive (*Elaeagnus angustifolia*) (USGS 2005). Due to the lack of perennial water in the Project area, this vegetation is limited to approximately 26 acres that includes a few small patches of saltcedar along larger drainages within the solar field area and approximately two acres along the gen-tie on private land. This vegetation type does not occur within the Project area on BLM-managed land.

Table 3-11. Major Vegetation Communities in the Project Areas on BIA-managed Lands				
Project Component	Creosote Scrub (acres)	Desert Wash (acres)	Invasive Riparian Woodland (acres)	Total (acres)
On-site Solar Project Components				
Yahthumb Solar Field and Ancillary Facilities	1282	118	26	1426
Off-site Components				
Site Access Road – Primary	0	0	0	0
Temporary Water Pipeline	1	0	0	1
Off-site Components Total	1	0	0	1
On- and Off-site Components Total	1283	118	26	1427

Table 3-12 Major Vegetation Communities in the Project Area on BLM-managed Lands				
Project Component	Creosote Scrub (acres)	Desert Wash (acres)	Invasive Riparian Woodland (acres)	Total (acres)
Off-site Components				
Gen-tie Line	42	6	0	48
Temporary Water Pipeline	9	1	0	10
Site Access Road – Primary	2	0	0	2
Off-site Components Total	53	7	0	60

Table 3-13. Major Vegetation Communities in the Project Area on Private Lands				
Project Component	Creosote Scrub (acres)	Desert Wash (acres)	Invasive Riparian Woodland (acres)	Total (acres)
Off-site Components				
Gen-tie Line	3	0	2	5
Off-site Components Total	3	0	2	5

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

Under the Proposed Action, vegetation would be permanently cleared from internal Project roadways and at inverter equipment, the BESSs, and the substation. Estimated acres of permanent disturbance to vegetation include 297 acres for the solar facility and 12 acres for the off-site Project components (**Table 3-14**). Most permanent vegetation removal would occur within the creosote scrub vegetation community.

Prior to construction, vegetation within the solar arrays would be mowed to a height of 18 inches leaving the roots intact to facilitate regrowth during operations. Construction equipment would drive over and crush the vegetation during installation of the arrays. Where trenches are excavated for the installation of electrical conduits, vegetation would take longer to regrow because of the destruction of root systems. Vegetation would also be cleared permanently from internal Project roadways, and at inverter equipment, the BESSs, and the substation during construction.

Table 3-14 lists permanent and temporary disturbance within each of the major vegetation communities for each of the on-site Project components and the off-site Project components. Estimated acres of temporary disturbance to vegetation are 1,129 acres for the solar facility and 55 acres for the off-site Project components.

Construction of off-site Project components would require vegetation clearing. This would include the gen-tie line where some of the vegetation would be permanently disturbed for structure work areas, new roads, and spur roads.

Access to the solar fields would be provided by a combination of existing roads and new roads. The existing Ute Road would provide access to central and southern portions of the solar site. An existing road within the utility corridor would be upgraded from Ute Road for about 1.1 miles and a new spur road would be built for about 0.5 mile to provide access to the northern portion of the solar site. Secondary access would be provided via existing roads within the designated utility corridor. The new road surfaces would be widened to 24 feet with a 5-foot shoulder in all areas where the road is not currently wide enough. This would permanently disturb approximately two acres of vegetation communities on Reservation lands within the BLM-managed designated corridor and no temporary disturbance would occur. Permanent and temporary disturbance within each vegetation community for offsite access roads is listed in **Table 3-14**.

Impacts to vegetation from construction, O&M, and decommissioning of the Project are primarily associated with soil disturbance and vegetation management. Soil disturbance from ground-disturbing activities and the use of vehicles and heavy equipment in the solar field and gen-tie line ROW has the potential to reduce the native seed bank and could introduce or spread invasive plant species and noxious weeds. Reduction of native plant cover could leave bare areas that would be susceptible to the establishment of invasive plant species and noxious weeds and increased erosion.

Invasive plant species and noxious weeds may be transported to the site in hay bales and straw wattles used for erosion control and construction equipment and vehicles, if not properly cleaned. Repeated crushing and trimming of vegetation within the solar fields and shading by solar panels could create conditions that are more favorable for non-native plants, including invasive plant species and noxious weeds.

Dust generated by construction, O&M, and decommissioning activities, and by vehicles and equipment travelling on access roads, could also indirectly affect vegetation by reducing photosynthetic activity. Some of these effects could extend to vegetation outside the Project areas. The implementation of dust control measures (**Appendix C**) would minimize the potential effects to vegetation. Surface water flows would continue to pass through the Project sites, so there would be no effects on downstream vegetation from altered or reduced surface water flows.

The implementation of design features and BMPs (**Appendix C**) would reduce the potential for adverse effects to vegetation. Invasive plant species and noxious weeds within the Project areas would be managed with mechanical treatments whenever possible. Herbicides approved by the Moapa Band and/or BLM (as appropriate) would be used if necessary. The treatment (mechanical or chemical) of invasive plant species and noxious weeds could result in inadvertent injury to native plants that are in close proximity. An Integrated Weed Management Plan (**Appendix F**) has been developed that specifies procedures for managing vegetation and minimizing the spread of invasive plant species and noxious weeds.

Prior to the end of the lease for the Project, the solar fields would be taken out of service and associated on-site and off-site facilities would be removed. Some buried components (such as cabling) may be left in place. The Applicants have prepared a draft Decommissioning Plan (**Appendix G**) to minimize the adverse effects of the permanent closure of the facilities. The final Decommissioning Plan would be developed near the time of decommissioning in coordination with the Moapa Band, BIA, and BLM with input from other agencies. Following decommissioning, all disturbed areas would be stabilized and revegetated as described in the draft Decommissioning Plan and Site Restoration Plan (**Appendices G and E**). The area of temporary vegetation disturbance associated with decommissioning would be comparable to the area temporarily disturbed during construction.

Implementation of the Proposed Action, including both onsite and offsite facilities, would result in the temporary and permanent loss of the acres of vegetation identified in **Table 3-14**. With the implementation of design features and BMPs, the Proposed Action would have minor, short- and long-term, direct and indirect adverse impacts on vegetation.

Table 3-14. Temporary and Permanent Disturbance by Major Vegetation Community

Project Component	Creosote Scrub		Desert Wash		Invasive Riparian Woodland		Total Disturbance Acres	
	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres
Yahthumb On-site Solar Project Components								
YahThumb Solar Field and Ancillary Facilities	1019	263	90	28	20	6	1129	297
Yahthumb Off-site Components								
Gen-tie Line	38	8	5	1	1	1	44	10
Site Access Roads - Primary	0	2	0	0	0	0	0	2
Temporary Water Pipeline	10	0	1	0	0	0	11	0
Off-site Components Total	48	10	6	1	1	1	55	12
On- and Off-site Components Total	1067	273	96	29	21	7	1184	309

With the implementation of the BMPs and other design features in **Appendix C**, no additional measures to minimize impacts are recommended.

3.6.2.2 No Action

Under the No Action Alternative, the Moapa Band would not approve the lease for the Yahthumb Solar Project and the solar field would not be constructed. The BLM would not approve the ROW, and the gen-tie lines and associated access roads would not be constructed. There would be no temporary or permanent removal of vegetation, and vegetation would not need to be trimmed for the O&M of the solar fields. Therefore, there would be no impacts to vegetation under the No Action Alternative.

3.7 Visual Resources

The term “visual resources” refers to the composite of basic terrain, geologic, and hydrologic features; vegetative patterns; and built features that influence the visual appeal of a landscape. Visual impacts are defined as the change to the visual environment resulting from the introduction of modifications to the landscape. This section describes the existing context of the visual environment and assesses the potential impacts from the Proposed Action and the No Action Alternative within the visual resource study area.

3.7.1 Affected Environment

The proposed Yahthumb Project area is located in the Basin and Range physiographic province. The prominent natural features within the visual resource study area include the Arrow Canyon Range to the west. The area contains exposed rock and soil and vegetation characteristic of the Mojave Desert dominated by low, widely spaced shrubs such as creosotebush, 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 with elevation.

There are several built features within the visual resource analysis area. Near the Project location, the built features include two solar projects and another under construction, several large transmission lines with varying sizes and types of structures (mostly within the designated utility corridor), existing roads, and a railroad. The natural landscape setting has been heavily modified by these exiting projects and utilities. The Reid-Gardner Substation where the gen-tie would connect is also visible from I-15 at locations north of the Project area.

The proposed Yahthumb solar field is located in the west central part of the Reservation and west of I-15. The existing landscape character and condition of the lease option area for the Yahthumb Project is relatively uniform with southeastern sloping gentle grades and common vegetation communities and patterns.

As confirmed in the previous EISs for the other solar projects on the Reservation, the overall scenic quality of the area is low due to the lack of variety and distinctiveness of the landforms and vegetation when compared to the region in which it occurs (BIA 2012: pages 3-80 through 3-83; BIA 2014a: Pages 3-62 through 3-65; BIA 2016: Pages 3-66 through 3-68; BIA 2019a: page 3-61 to 3-62; BIA 2021: Page 3-32; BIA 2022: pages 3-52 through 3-55). The landforms are relatively flat and while the local mountain ranges add visual interest, there is little variety and contrast in the local vegetation and the landscape color variations are subtle. In addition, the manmade modifications detract from the natural visual character.

The small portion of the gen-tie on BLM-administered land is near the existing Reid-Gardner Substation and the multiple high voltage transmission lines that run through the area. The BLM Resource Management Plan (RMP) indicates that these BLM lands are designated as Visual Resource Management (VRM) Class IV because of the high level of modification to the landscape in this area. This classification allows major modifications of the existing character of the landscape. Likewise, while not formally classified because it is located on the Reservation, the lands within the BLM-managed designated utility corridor would also be considered to be VRM Class IV. This is consistent with how BLM manages utility corridors on federal land.

A viewshed analysis was conducted by overlaying the proposed Yahthumb Project on a Digital Elevation Model (DEM) of local terrain. A height of 20 feet above site grade was used for the solar site to determine the areas from which the solar facility (PV solar modules and associated facilities) could be visible within 10 miles of the solar fields. Transmission structures 150 feet tall were also evaluated in the visibility analysis to identify the areas within five miles from which the proposed gen-ties could potentially be seen. The locations of travel routes and historic trails (for example, I-15 and the OSNHT) were also overlain on this map. **Figure 3-3** shows the areas from which the solar facilities and gen-tie lines could potentially be visible.

As shown on **Figure 3-3**, the proposed Project and gen-ties could be seen from surrounding areas primarily north, east and south of the Project area. These include locations on I-15, Valley of Fire Highway, and the Old Spanish National Historic Trail (OSNHT). There are no residences or other high use areas / sensitive viewpoints in the immediate area.

3.7.1.1 Key Observation Points

Key Observation Points (KOPs) represent a critical or typical viewpoint at or near an identified location. They are used to provide representative views from locations where the Project could be visible by people to evaluate visual impacts of a proposed action. I-15 is the location from which the proposed Yahthumb Project could be potentially seen by the most people. Also, the Project could be seen by travelers on the Valley of Fire Highway, and from portions of the OSNHT near the Project.

KOP locations were selected through consultation with the BIA and cooperating agencies and represent views from locations where the Yahthumb Project could be seen as identified by the visibility analysis. Linear viewpoints were selected along I-15, the Valley of Fire Highway, and the OSNHT to provide views representative of many locations around the Project. As shown on **Figure 3-4**, the linear platforms from which the Project could potentially be seen include approximately 12 miles of I-15, about 11 miles of Valley of Fire Highway, and about 18 miles of the OSNHT. A stationary viewpoint at the housing at the northern end of the Reservation was also selected. **Figure 3-4** shows the KOP locations that were selected, and they are described below:

- KOP 1 – This location is on Lytle Road near housing at the north side of the Reservation. The solar field could potentially be seen by residents of this area. This view looks southwest and is located approximately 7.5 miles northeast of the Yahthumb Project. The existing view is dominated by the horizontal lines and colors associated with the road in the foreground. The middleground contains disturbed areas and the background contains creosote/scrub desert displaying colors of browns, tans, and yellows with the foothills of the Arrow Canyon range on the right in the distance. **Figure 3-5a** shows the existing view from this location.
- KOP 2 – This view looks southwest and is on southbound I-15 about seven miles northeast of the proposed solar site. The existing view is contains disturbed area associated with I-15 in the foreground. The middleground contains creosote/scrub desert displaying colors of browns, tans, and yellows with the foothills of the Arrow Canyon range in the distance. **Figure 3-6a** shows the existing view from this location.
- KOP 3 – This view is looking west on southbound I-15 about five miles east of the proposed solar site. The foreground and middleground of the existing view is dominated by typical desert vegetation displaying colors of browns, tans, and yellows. Some small areas of white associated with exposed caliche soils can also be seen. The Arrow Canyon foothills and mountains are in the background. **Figure 3-7a** shows the existing view from this location.
- KOP 4 – This location is where I-15 and the OSNHT intersect southeast of the site from which the solar field could be seen. This view looks northwest and is located approximately 3.5 miles southeast of the Yahthumb Project. The existing view is dominated by disturbed areas near I-15 in the foreground. The middleground contains vegetation such as creosote/scrub desert displaying colors of browns, tans, and yellows. The foothills of the Arrow Canyon are in the distance. **Figure 3-8a** shows the existing view from this location.
- KOP 5 – This point is on the Valley of Fire Highway where it crosses the OSNHT about seven miles south of the proposed solar project. This existing view is representative of the view of

travelers on the highway and from the OSNHT looking north. It is dominated by the horizontal lines and colors associated with Valley of Fire Highway in the foreground and middleground. Part of the middleground contains vegetation exhibiting browns, tans, greens, and yellows. The existing Southern Moapa Solar Project can be seen as a thin dark horizontal line in the background at the base of the foothills of the Arrow Canyon mountains. **Figure 3-9a** shows the existing view from this location.

3.7.2 Environmental Consequences

This assessment considered the regional visual character of the Project area, visual features of the proposed Yahthumb Project, representative views of the project from KOPs, and change in landscape character that would result from proposed Project implementation.

3.7.2.1 Proposed Action

The proposed Yahthumb Project is located on relatively flat terrain below the foothills of the Arrow Canyon Mountains. There are many locations from the linear viewpoint on I-15, Valley of Fire Highway, and OSNHT from which the Project would be visible. The dominant man-made Project features that would be visible would be the solar field.

Within the viewshed from I-15, Valley of Fire Highway, or the OSNHT there are other existing built elements that are similar in form, line, color, texture, and scale to the proposed Yahthumb Project. In addition to the highways themselves, on the east side of I-15 these include the under-construction Gemini Solar Project and the west side of I-15 these include two existing solar projects and one under construction, and the multiple transmission lines primarily within the designated utility corridor, and the railroad west of I-15.

Short-term visual impacts would occur during construction from the exposure of lighter colored soils from site clearing, generation of fugitive dust, movement of equipment and vehicles, stockpiling of materials, and the introduction of the lines, forms, and colors of the solar field components. These short-term impacts may last up to 14 months during construction.

Long-term, the presence of the Project would change the existing landscape character and visual quality of the area. The Proposed Action would introduce solar field elements (rows of PV solar panels, inverters, and other equipment) not currently present within the area, although these elements are present nearby. The proposed Project would not be visually prominent within the foreground and middleground zones but would be visible in the background of most views of the Project.

The proposed gen-tie lines would also not be readily visible because it would be adjacent to and parallel to the many existing transmission lines within the utility corridor. They would be consistent with the existing lines there and would not attract the attention of the casual observer.

As shown on **Figure 3-3**, the Yahthumb solar facilities would be visible from I-15 from areas north, south, and east of the Project. The Project would be visible from Valley of Fire Highway between its intersection with I-15 and where it enters the foothills of the Muddy Mountains. Views of the Project from both highways would be limited and would vary by the lane / direction the vehicle is traveling in and the local topography and vegetation along the roadway.

The five KOPs were identified in consultation with the involved agencies. KOPs 2, 3 and 4 are located on I-15 and representative of the views from I-15 in the vicinity of the Project. KOP 1 is representative of the view from the housing area at the north end of the Reservation. KOP 5 is representative of the views from the Valley of Fire Highway. KOPs 4 and 5 are representative of views from segments of the Congressionally designated location of the OSNHT.

A visual simulation was prepared for each KOP to depict the view of the Yahthumb Project from each location. **Figures 3-5b** through **3-9b** show the visual simulations of the Proposed Action from KOPs 1 through 5.

Effects on Views from I-15

The Yahthumb solar field would be visible in the background of the views of travelers on I-15. Southbound motorists on I-15 would have peripheral views of the Proposed Action from the freeway for approximately 61 percent of the miles where the Project could be visible (7.2 of the approximately 12 miles). This would equate to approximately six minutes when driving at 75 miles per hour (mph). Northbound motorists on I-15 would have peripheral views of the Proposed Action for approximately 38 percent of the time (4.6 of the 12 miles) or for approximately four minutes when driving at 75 mph. Traveling in both directions, the views of the Proposed Action would be partially intermittent / obstructed due to intervening landforms and vegetation. **Figure 3-6b** shows a simulation from southbound I-15 (KOP 2) at a location about seven miles from the Project, **Figure 3-7b** shows a simulation from I-15 about five miles away (KOP 3), and **Figure 3-8b** shows a simulation of the Project from I-15 (KOP 4) at approximately 3.5 miles from the Project. As shown in each of these simulations, the Project would be visible as a very thin line at the base of the Arrow Canyon foothills but would not be noticeable to the motorists on the highway.

The proposed gen-tie line would not be readily visible to northbound or southbound motorists. The new line would be adjacent to and behind the multiple other high voltage lines that occur within the utility corridor.

Effects on Views from Valley of Fire Highway

The Yahthumb solar field would be visible in the background of the views of westbound travelers on Valley of Fire Road. Westbound motorists on Valley of Fire Highway would have direct views of the Proposed Action for nearly all of the 11 miles where the Project could be visible from this road. This would equate to approximately 18 minutes when driving at 35 mph. The proposed gen-tie lines would not be readily visible from Valley of Fire Highway. The lines would not be discernable to the casual viewer for the reasons described above and because of distances from which they would be viewed.

Figure 3-9b shows a simulation from westbound Valley of Fire Highway (KOP 5) at a location where the highway crosses the OSNHT. This view is about seven miles south of the solar Project. The Project would be visible as a thin band at the base of the distant Arrow Canyon foothills above the existing Southern Moapa Solar Project which is readily visible in the middleground. In addition, the Gemini Solar Project (which is currently under construction) would be readily visible in the foreground of this view once constructed. As a result, the proposed Project would likely not be easily discernable to the casual viewer from views along Valley of Fire Highway.

Effects on Views from the OSNHT

The Yahthumb solar field would be visible in the middleground and background of views of from the OSNHT. The Project would not be visible from much of the OSNHT in the area because the trail follows the California Wash drainage for much of this distance at a lower elevation from which the Project would not be visible (**Figure 3-3**). Two previously described KOPs (KOP4 and KOP 5) show views from the OSNHT where it crosses the local highways. As shown in the simulations from these OSNHT locations (**Figure 3-8b** and **Figure 3-9b**), visitors on the trail would have views where the Proposed Action would be visible but not noticeable in the background of the views.

Effects on Views from Housing at the Northern End of the Reservation

The Yahthumb solar field would be visible in the far background of the residents of housing at the norther end of the Reservation. **Figure 3-5b** shows a simulation of a view of the Proposed Action from Lyttle Road that accesses housing in this area (KOP 1). From this elevated viewpoint 7.5 miles north of the site, the Project could be visible as a very thin line on the horizon in the distance but would not be noticeable.

Light and Glare

Light. The proposed Yahthumb Project solar field is located on the Reservation. There is currently no source of light or glare within the Project footprint. Lighting could be used during construction if needed. During operations, sources of light would be located on the solar site primarily at the substation 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 Yahthumb Project is not anticipated to create a new source of substantial light which would adversely affect nighttime views in the area and would not impact users of the nearby areas (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 generally 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. PV solar projects use single-axis tracking mounting structures to rotate the panels throughout the day to keep the panels perpendicular to the sun to maximize solar absorption and energy output. This consistent orientation of the panels towards the sun results in the majority of incoming light being reflected back into the sky.

The amount of light reflected upwards would not be expected to potentially affect training conducted at Nellis Air Force Base (NAFB) or any 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 two 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 since it is made of the same material. Therefore, the intensity of the reflected light would be low. Also, light intensity decreases with distance from the source so the intensity of light reflected from the PV solar panels at locations any distance from the source would be a small fraction of its original intensity. In addition, any viewers who could see the reflected light would also be exposed to significantly brighter ambient light.

The proposed Yahthumb Project would not use materials that 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 daytime views in the area or affect local aviation / training.

In the long-term, the Proposed Action would result in local, moderate, direct adverse impacts to visual resources in the area.

3.7.2.2 No Action

Under this alternative, the Yahthumb Project would not be developed so there would be no additional impact to visual resources.

3.8 Water Resources

3.8.1 Affected Environment

The proposed Yahthumb Solar Project is in the northeastern portion of the Mojave Desert in the California Wash Groundwater Basin within the Colorado River watershed (NDWR 2021). The Arrow Valley Range lies to the west and the North Muddy Mountains lie to the east. The project lies east of the California Wash watershed which flows north to the Muddy River. The elevation within the Project lease area ranges from about 2,050 to 2,275 feet above mean sea level.

3.8.1.1 Surface Water

The proposed Yahthumb project area is located on relatively flat topography. The Project area drains to the east-southeast via ephemeral waterways to the California Wash located 3.0 to 3.5 miles from the eastern site boundary. California Wash flows north into the Muddy River. The Muddy River, which drains to the Virgin River, is the only non-ephemeral (perennial) surface water within the project area and is located about 6.5 miles north of the Project lease area. The drainages along the gen-tie route are also within the California Wash watershed. **Figure 3-10** shows the floodplains designated by FEMA)for the project area.

A preliminary hydrology study will be conducted for the Yahthumb Project area to determine flow paths and flow volumes onto and from the site.

Surface Water Quality

The EPA regulates water quality on tribal lands under Section 401 of the Clean Water Act (CWA). Additionally, Section 303(d) of the CWA requires the NDEP to develop a list of impaired waterbodies needing additional work beyond existing controls to achieve or maintain water quality standards. The NDEP has furthermore 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.

There are no perennial waterbodies within the solar site and consequently no surface water quality data available. The ephemeral drainages leaving the solar project lease area are tributaries to California Wash which flows to the Muddy River, a perennial water. The Muddy River is fed by springs connected to the regional groundwater system. It is considered impaired and is on Nevada's 303(d) list for exceeding state water quality standards (NDEP 2014).

The entire flow of the Muddy River is derived from 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 (Mifflin 2001).

The river is managed via the Muddy River Recovery Implementation Program - a coordinated, multi-agency effort to protect the species and habitat of the Muddy River, while ensuring the responsible management of water resources in the Muddy River and Coyote Spring Valley (SNWA 2015).

3.8.1.2 Groundwater

The water proposed to be used by the Yahthumb Project during construction and operation would be provided by the Moapa Band from either an existing groundwater well located on the Reservation near the existing Eagle Shadow Mountain Solar Project in Section 15, T16S, R64E or a new well developed on the solar site. If a new well(s) is developed on site, it would be located near the main site entrance.

The bedrock of the upland portions 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. Locally, alluvial gravel aquifers with a thickness of up to 100 feet occur beneath the narrow floodplains of the major local drainages such as California Wash.

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/or contaminants from mining or energy operations. Groundwater in the California Wash is generally high in salinity.

3.8.1.3 Water Rights

The water provided from the existing well or a new well(s) is part of a 2,500 AFY groundwater right issued to the Moapa Band by the State Engineer in 1989. These groundwater rights are described in the MSEC FEIS (BIA 2014, Section 3.5.3, page 3-14).

3.8.1.4 Jurisdictional Waters, Drainages, and Riparian Areas

There are no perennial waterbodies within the solar Project area but the Muddy River (a perennial stream) would be crossed by the proposed the gen-tie route. California Wash is located east and southeast of the Project and is connected to the Muddy River which is connected downstream to a Traditionally Navigable

Water (TNW). Of the four primary ephemeral drainage systems identified within the solar lease area, three drain directly into California Wash and into the Muddy River northeast of the Project (see **Figure 3-11**). The proposed gen-tie route crosses five ephemeral drainage systems and the Muddy River. All of the main ephemeral drainage systems eventually drain into the Muddy River while two smaller tributaries of these drainages are disconnected from the Muddy River.

Aquatic resources within the Project area are comprised of dry land fluvial systems. Alluvial fans, bajadas, and alluvial plains within xeric desert environments exhibit a high degree of variability in the specific location of surface flows and often change pathways from storm to storm. The spatial extent of aquatic features (all ephemeral washes) was delineated in the field and using aerial imagery in accordance with US Army Corps of Engineers (USACE or Corps) guidance in published manuals and field guides to identify potentially jurisdictional waters of the United States (WOUS).

No TNWs, Relatively Permanent Waters (RPWs) or wetlands were identified within the solar Project area. The Muddy River, to which all project-area ephemeral drainages that are connected to California Wash flow, is the only RPW near the Project area and it is crossed by the proposed gen-tie. Most of the ephemeral drainages leaving the solar site and two within the gen-tie corridor could be considered jurisdictional by the Corps under the current Corps guidance (pre-2015). Other features, such as erosional gullies, swales, washes that are not connected to California Wash or the Muddy River would not be regulated under the current Corps guidance. None of the ephemeral drainages would be regulated under the Navigable Waters Rule that was recently challenged in Arizona.

Drainage morphology in the ephemeral features ranges from 1.5-foot-wide single channels to features up to 85 feet wide (bank to bank). Several drainages lost identifiable flowpath organization as they went downslope and surface characteristics were consistent with sheet flow (continuous and well-developed upland vegetation and no definable bed and bank).

Limited xero-riparian habitats were associated with many of the ephemeral washes in the Project area. Desert wash habitats are associated with the small washes that cross the various portions of the project area. These habitats typically resemble the creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) habitats that dominate the upland portions of the Project area but have a higher overall density of vegetation as well as a greater abundance of big galleta grass (*Pleuraphis rigida*). Other species may include California buckwheat (*Eriogonum fasciculatum*), Mojave yucca (*Yucca schidigera*), and catclaw (*Senegalia greggi*).

3.8.2 Environmental Consequences

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

3.8.2.1 Proposed Action

Surface Water

Surface water quality can be degraded by increasing rates of erosion and sedimentation, introducing contaminants, or otherwise changing the character of surface waters. There is very little precipitation within this part of the Mojave Desert, but suspended sediments could be high during significant storm

events. The Applicant's SWPPP and emergency response plan (construction phase) and Spill Prevention, Control, and Countermeasure (SPCC) Plan (operation phase) would minimize impacts from these sources making potential impacts minor.

The Project has been configured to avoid construction within the largest washes located on the solar site and along the gen-tie. The site plan has been designed to allow all surface flows upstream of the site to flow to the ephemeral drainages downstream of the site. Overall drainage patterns on site would be maintained and this would help minimize the loss / disturbance of these drainages, would help maintain drainage functions, and would help reduce erosion and sedimentation impacts during and following construction. In addition, avoidance of grading larger drainages would result in reduced construction costs and improvement to the effectiveness of post-closure reclamation. Limited grading would take place within the solar sites, leaving most of the site naturally vegetated, reducing the potential for erosive runoff.

By avoiding the development of areas of high flood depths and velocities, the proposed solar development on the site would minimize effects to local hydrology and flood flows as well as the corresponding erosion and sedimentation. In general, flow depths on the site after development of the Project would remain similar or less than pre-development conditions.

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

Construction activities causing ground disturbance, such as grading and "drive and crush", would disrupt the soil surface and dislodge biological crusts that bind soil together. Minimizing disturbance on the solar site to only those areas where necessary would reduce the surface area subject to increased erosion.

The Applicant would develop and implement erosion and sedimentation control measures to minimize water quality impacts during the life of the 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 prior to the beginning of construction and the resulting potential impacts on surface waters are expected to be minor.

Decommissioning activities would result in water quality and hydrology impacts similar to but less than construction. Once decommissioning has occurred and vegetation has reestablished, erosion would naturally be controlled.

Gen-tie structures would not be expected to affect surface water flows as the pole locations would be located outside the larger drainages and foundations would be designed to withstand the anticipated low-velocity flooding during a 100-year storm event at these locations. This conclusion is supported by the presence of existing transmission lines in this area. With proper implementation of these design

elements, including adaptive management of practices, effects related to flooding would be reduced to negligible levels.

Groundwater

The Yahthumb Project would require up to 500 acre-feet (AF) over the 12 to 14-month construction period and up to approximately 10 acre-feet per year (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 consumptive uses. For construction and operation, water would be supplied by the Moapa Band from their existing well located southwest of the Yahthumb site or a new well that would be developed on the solar site.

The potential impacts of groundwater withdrawal from the California Wash hydrographic basin were evaluated in an earlier study on the potential extraction of up to 7,000 AFY of groundwater (Mifflin 2001). This proposed water use is over ten times more than the collective use by all proposed solar projects on the Reservation. 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.

Under both options for the Moapa Band to provide water to the Yahthumb Project (from an existing well or new well on site,) the wells are also located in the California Wash basin. The proposed long-term use of 10 AFY total proposed for the Yahthumb Project would not be expected to impact local water levels or flows at the Muddy River Springs area.

Groundwater is located well below ground surface so any hazardous materials or waste produced by the Project would not be expected to affect groundwater quality. In addition, a Hazardous Materials and Waste Management Plan and SPCC Plan would be prepared for the Project to protect the environment from 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 to the groundwater so the potential for impacts is low.

Water Rights

The relatively low amount of groundwater water used during construction (up to 500 AF) and the short duration of use for construction (12 to 14 months) would not be expected to impact groundwater uses. The use of up to 10 AFY during operations would also not be expected to impact local water levels or flows. Additionally, the 10 AFY would not cause the Moapa Band to exceed their currently issued 2,500 AFY groundwater right. Therefore, the Project's proposed use of tribal groundwater would not have a negative impact on Band's water rights. The use of this water would help demonstrate their legitimate need for these water rights against any adverse claims by others in the future.

It is acknowledged that there is some uncertainty regarding the quantity of groundwater that can be sustainably pumped and the associated water rights based on the Nevada State Engineer's findings on the Lower White River Flow System (LWRFS) discussed in Order #1309 issued on June 15, 2020. Future decisions issued by the Nevada State Engineer could address these issues.

Jurisdictional Waters, Drainages, and Riparian Areas

As described above, most of the ephemeral washes in the Project area are potentially jurisdictional WOUS under the current guidance. **Figure 3-11** shows the potentially jurisdictional waters identified on the site. The conceptual site plan currently avoids all the major washes and most of the smaller washes. Minor grading may occur in the smaller washes, piles may be driven into them, and access roads and collector lines would cross them.

It is expected that the USACE would also assert jurisdiction over some of the ephemeral drainages located along the gen-tie route. Jurisdictional WOUS crossed by the gen-tie would be impacted primarily from upgrading existing roads or the establishment of new access and spur roads to provide the needed access along the ROW. Pole locations for the gen-tie would be located outside defined drainage channels and the drainages would be spanned by the line.

The amount of WOUS that would be impacted by the solar arrays and associated components would be approximately 11.3 acres. Detailed field mapping would occur prior to construction to determine the exact extent of WOUS and would be coupled with the final design to determine the impact acreages and type(s) of permit that would be required for the Project. The required applications would be submitted at that time. Impacts resulting in the loss of 0.5 acre or less would be covered by Nationwide Permits (NWP) 51 (renewable energy projects), NWP 14 (road crossings), or a combination of both. NWP 51 authorizes the loss of up to 0.5 acre. Under NWP 14, each separate distinct road crossing of a waterbody is treated as a separate and complete project and limits impacts to jurisdictional waters to 0.5 acre for each crossing. The roads associated with each crossing would impact less jurisdictional WOUS than the 0.5-acre limit for NWP 14. If impacts to jurisdictional WOUS are greater than 0.5 acre, the Project would obtain an Individual Permit (IP). Section 404 permits (individual and some NWPs) would require Section 401 certifications. The EPA would administer this for activities on tribal lands.

The amount of WOUS that would be impacted by the gen-tie (gen-tie road crossings) would be minor. These impacts would be covered by NWP 57 (utility line activities). Under this NWP, each separate distinct crossing of a waterbody by a utility line is treated as a separate and complete project and NWP 57 limits impacts to jurisdictional waters to 0.5 acre for each crossing. The roads associated with each crossing would impact less jurisdictional WOUS than the 0.5-acre limit for NWP 57. Authorizations under NWP 57 will require individual Section 401 certification which would be administered by the EPA for activities on tribal lands.

Adverse impacts to surface water resources including potential jurisdictional WOUS resulting from the Proposed Project would be minor and short-term. Major drainages would be avoided by the layout of the solar project and gen-tie route. Erosion and sedimentation would be expected to increase during construction but would be mitigated by the application of stormwater controls and other BMPs. Impacts to groundwater would be negligible.

3.8.2.2 No Action

Under the No Action Alternative, the proposed Yahthumb Project would not be constructed so there would be no corresponding effects on water resources.

3.9 Cumulative Impacts

This section analyzes cumulative impacts of the proposed Yahthumb Project in conjunction with other development 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 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 Yahthumb Project, that are reasonably foreseeable, or would be constructed or commence operation during the timeframe of activity associated with the proposed Project.

3.9.1 Cumulative Projects

The cumulative scenario includes projects within the same geographic and temporal scope as the Yahthumb Project. For the purpose of this analysis, the geographic scope for cumulative effects has been defined as within the Muddy River and California Wash watersheds within five miles of the Project area for physical and most biological resources as this area provides natural boundaries for these resources. The geographic scope for socioeconomic impacts is within the local community or northern part of Clark County. The cumulative effects area for visual resources would be ten miles. Nearly all current or foreseeable projects that could take place within the area would be located on the Reservation or BLM-managed land respectively, so would be subject to NEPA and would also evaluate local cumulative impacts.

As with the geographic scope of the cumulative analyses, the temporal scope (construction, O&M) of each analysis varies by resource area. For this analysis, the temporal scale has been limited to projects constructed within the last five years because restoration activities have normally been implemented within that time and to projects that may be constructed within the next 10 years as details for potential projects beyond 10 years are not normally available.

The cumulative scenario includes 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.

As discussed in the introduction to this Chapter, several additional solar projects are located on the Reservation and have been previously analyzed in NEPA documents. The previously evaluated solar projects on the Reservation are:

- K Road Moapa Solar Facility (K Road)/Southern Paiute Solar Project
- Aiya Solar Project (Aiya)
- Eagle Shadow Mountain Solar Project (ESMSP)
- Moapa Solar Energy Center (MSEC) / Arrow Canyon Solar Project (ACSP)
- Southern Bighorn Solar Project I (SBSP I) and Southern Bighorn Solar Project II (SBSP II)
- Chuckwalla Solar Projects

In addition to these projects on the Reservation, there are other solar projects in the vicinity that have been or could be developed and could cumulatively contribute to impacts to various resources. The list below identifies these and other nearby solar projects that could contribute cumulatively to impacts generated by the proposed Yahthumb Project. The potential cumulative impacts are discussed in the impact analysis for each resource below.

<u>Project</u>	<u>Size</u>	<u>Location</u>	<u>Status</u>
Gemini Solar Project	690 MW, 7100 acres	BLM, 1 mi SW	Under construction
Dry Lake Solar Energy (Harry Allen)	20 MWS, 155 acres	BLM, 5 mi SW	Planned
Dry Lake Solar Energy Center	150 MWS, 694 acres	BLM SEZ, 6 mi SW	Planned
Harry Allen Solar	130 MWS, 725 acres	BLM SEZ, 6 mi SW	Planned
Dry Lake East Leasing Area	1,813 acres	BLM, 4 mi SW	Proposed
Red Flats Solar	500 MWS, 4000 acres	BLM, 4 mi NE	Proposed
Red Valley Solar	200 MWS, 2000 acres	BLM, 10 mi N	Proposed
Greenlink West Transmission	525kV line, 350 miles	BLM, 10 mi W	Proposed
Eastern Nevada Transmission	230kV lines, 21/33 miles	BLM, 9 mi NE	Proposed

This analysis evaluates the past, pending and current/future projects which are summarized in the sections below.

3.9.2 Cumulative Impacts by Resource

For this analysis, cumulative resource impacts are the combined direct and indirect effects of the present and reasonably foreseeable future actions, plus the direct and indirect impacts of the proposed Yahthumb Project.

Climate Change

Cumulatively, as discussed previously, there are several utility-scale solar projects in addition to the Proposed Action that have been developed or planned in the region. These include the previously approved solar projects and the planned Chuckwalla Solar Projects on the Reservation as well as multiple planned and proposed solar projects on nearby BLM-managed federal lands. Like the Proposed Action, all approved and foreseeable projects would each have very minor short-term contributions to GHG emissions during construction and decommissioning from construction equipment. All these projects (existing and foreseeable) would cumulatively contribute to long-term beneficial impacts on climate change by offsetting GHG emissions from fossil fuel electrical generation that is replaced by solar generation.

Cultural Resources

Cumulatively, the other previously approved and planned solar projects in the region identified above could, or have, affected cultural resources, and could affect resources with similar information about a

particular Native American group or timeframe. Impacts on cultural resources from other projects in the area would result largely from foreseeable additional solar developments. These projects and other projects under BLM, BIA, or any other federal jurisdiction in the region would also be subject to Section 106 of the NHPA requirements, necessitating similar avoidance, impact minimization, or mitigation measures as the Yahthumb Project. The proposed Yahthumb Project combined with all other solar development projects in the region could cumulatively result in substantial impacts. The Proposed Action's contribution to these cumulative effects on cultural resources would be negligible because the identified potential adverse effects would be addressed through avoidance measures for sites currently recommended eligible for inclusion or listed in the NRHP.

Socioeconomics

Cumulatively, there are several utility-scale solar projects in addition to the Proposed Action that have been approved or planned in the region located both on federal lands and on the Reservation. As identified in the introduction to Chapter 3, there are multiple solar projects that have been approved on the Reservation including two existing solar projects (Southern Paiute and ESM), one under construction (ACSP), and three that have already been approved but not yet constructed (Aiya, SBS, and SBS2). In addition, the Chuckwalla Solar Projects are also proposed on the Reservation and currently in the NEPA process. Together, these solar projects on the Reservation would generate a significant amount of lease revenue for the Moapa Band and employ tribal members reducing unemployment and increasing earnings. Based on the recently constructed or ongoing projects on the Reservation, each foreseeable Reservation solar project (including the Yahthumb Project) could employ up to 100 to 200 tribal members during construction. In addition, after construction, up to 40 percent of their operational staff could be tribal members resulting in 20 or more long-term jobs.

Construction of the other proposed solar facilities on BLM lands in the area could also generate employment opportunities for tribal members and would also generate additional revenue from the purchase of goods and services. The approved and foreseeable projects (both on and off the Reservation) would also employ other workers within Clark County and purchase additional goods and services within the county. Payroll and sales taxes generated from this employment and purchase of materials would generate additional revenue for the county and state. The approved and proposed solar projects would create an increased demand for construction workers and other skilled jobs in the renewable energy sector. This could contribute to regional construction labor shortages.

Cumulatively, effects of the Proposed Action and other regional projects would result in moderate, beneficial effects on socioeconomics. These effects would be moderate within the Reservation and minor regionally.

Threatened and Endangered Species

Cumulatively, construction of the proposed Project and the other solar projects in the area on the Reservation and on nearby federal lands identified above would affect desert tortoise habitat within the Northeastern Mojave Recovery Unit for Mojave desert tortoise and more specifically within the California Wash and Dry Lake playa watersheds. Each of these projects could increase desert tortoise mortality and injury over the short-term during construction due to collisions with vehicles and equipment, crushing of burrows and eggs, and harm and harassment during translocation. The presence of multiple solar projects on the Reservation and on BLM-managed lands in the region could also restrict some movement and impact connectivity. Together, these impacts could have moderate impact on local

tortoise populations but impacts are anticipated to be lessened by the current requirements for vegetation to be trimmed and driven over and crushed to leave the roots intact allowing more rapid re-establishment following construction and for open fencing for each of the recent and proposed projects. While some of the past solar projects have been fenced to restrict tortoise movement, those currently under-construction and foreseeable projects would allow desert tortoise to re-inhabit and move through the sites after construction as required by USFWS.

There are more than five million acres within the Northeastern Mojave Recovery Unit for Mojave desert tortoise and approximately 4,800 acres have been developed as part of previously approved and constructed solar projects. Another approximately 34,500 acres of solar projects are currently proposed for future construction within the Unit (USFWS 2021b). The combined acreage of these projects would make up 0.92 percent of the recovery unit. The relatively small size of the Yahthumb Project in comparison to the recovery unit (0.04 percent) and the cumulative projects (0.92 percent) along with implementation of design features, BMPs, and management plans would result in the Proposed Action and foreseeable projects having a moderate short-term and minor long-term contribution to the cumulative effects on the Mojave desert tortoise within the region.

Vegetation

Cumulatively, several projects or actions in the general area would contribute to impacts to vegetation including other existing and proposed solar development and associated transmission lines located on the Reservation and nearby federal lands. The Proposed Action would result in the temporary loss of approximately 1,184 acres of vegetation and the permanent loss of approximately 309 acres of vegetation. The other approved and planned projects on the Reservation and on BLM-managed federal land in the region identified above would potentially impact thousands of additional acres of vegetation. The Yahthumb Project and the other cumulative projects are located within the California Wash and Dry Lake playa watersheds. Most of the acreage impacted by the Yahthumb Project and the other cumulative projects would occur predominantly within the creosote-white bursage desert scrub vegetation community which is the most common vegetation / habitat type throughout the region. The combined acreage of the two watersheds is approximately 300,000 acres and the identified approved and proposed projects listed in the introduction of this Chapter together would total approximately 32,000 acres. Therefore, the cumulative impacts from the projects to the common vegetation types in the area would represent about 11 percent of the total acreage within the two watersheds and a very small fraction of these vegetation types in the region.

Most lands within the region that would be affected by other actions are on the Reservation or federally managed lands. These projects, like the Proposed Action, would need to develop and implement mitigation measures to minimize potential effects to vegetation. With the implementation of design features and BMPs for these projects as well as the Proposed Action, there would be moderate, short- and long-term, adverse impacts on vegetation in the region.

Visual Resources

Cumulatively, several solar projects and associated infrastructure have been and are planned to be foreseeably developed within the regional viewshed where the Yahthumb Project is proposed. As described above, several solar projects have been approved and proposed on the Reservation and the nearby BLM-managed federal lands. These projects would all contribute to impacts to visual resources along I-15 in the Dry Lake and California Wash drainages within the Moapa Valley. The combined acreage of these two watersheds is approximately 300,000 acres. In the aggregate, the Proposed Action and these additional actions on the Reservation and nearby federal lands would generally result in a transformation of about 32,000 acres of the natural landscape to a more developed setting with addition of more solar arrays and associated gen-tie lines to the many solar projects and transmission lines that already exist in this area. The Proposed Action would have a minor to moderate contribution to the cumulative effects to visual resources because of the scale and strong contrast of the existing projects in place. Visual resource impacts created by the solar facilities would be largely reversible with decommissioning of the projects at the end of their useful life and restoration of the landscape.

Views from I-15, the primary viewing platform from which to see the projects in the Moapa Valley, would be changed for the long-term. It is anticipated that views of, from, and on the Reservation would also be changed substantially in the long-term. Cumulatively, these existing, approved, and foreseeable actions would result in moderate to major, long-term, adverse impacts to visual resources that would reduce scenic quality and notably transform the characteristic landscape.

Water Resources

Cumulatively, surface waters on the Yahthumb Project site and on the other solar project sites in the area on the Reservation and nearby BLM-managed lands (as identified in the introduction to Chapter 3) are ephemeral drainages that flow only in response to precipitation events. Some project areas on the southwestern part and south of the Reservation are within a disconnected closed drainage basin (the Dry Lake Playa). The Yahthumb Project and other nearby projects and those to the north flow into California Wash and other larger ephemeral washes that in some cases connect to perennial streams. The combined acreage of the two watersheds is approximately 300,000 acres and the proposed Project plus the other identified approved and proposed projects together would impact about 32,000 acres within these watersheds. The cumulative acreage affected by the identified projects would represent about 11 percent of the two watersheds. The Yahthumb Project and other existing / foreseeable projects have been designed to avoid construction within floodplains and large washes and to allow all surface flows upstream of the sites to continue flowing to the ephemeral drainages downstream of the sites. Therefore, no cumulative change in flow volumes would be expected.

Construction of the Yahthumb Project and the other identified approved and foreseeable projects would contribute to short-term localized increases in sediment production during storm events. These would be mitigated by the implementation of BMPs incorporated into the stormwater management plans that would be required for each project.

Groundwater in the area is produced from an extensive carbonate aquifer including the Band's well that would provide the water supply for the Yahthumb Project. Many of the projects on the Reservation and surrounding federal lands would utilize groundwater with most use occurring during construction when each project or phase could use up to 300 AF of water over about two years (or approximately 150 AFY). The construction water consumption for each project would be temporary but together could

contribute to declining groundwater in the region. The timing of the construction of the various projects may or may not overlap for periods but most construction water use would be expected to occur sequentially as the various projects are ready for construction. Long-term operational use for each project is expected to use about 20 to 40 AFY of water. Together, the existing and proposed projects on the Reservation would use up to 250 AFY during the operational phases of the projects or about 10 percent of the Band's 2,500 AFY of groundwater rights. This could increase up to 20 percent for the duration of the relatively short construction period if construction of one or more projects would overlap the operational periods of the projects.

Previous testing of the wells and modeling has been conducted of groundwater withdrawals significantly greater than those cumulatively proposed in the area and on the Reservation. The modeling effort for the MSEC Project included withdrawals of up to 800 AFY on the Reservation and provided clear evidence that the groundwater use proposed for the Project and other foreseeable solar projects would not result in observable changes to groundwater levels or flows (BIA 2014).

3.10 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 Yahthumb Project. This section also includes a discussion of the irreversible and irretrievable commitments of resources associated with the Project.

The primary drainages on the solar site would not be affected but smaller drainages on the site and along the gen-tie line would be affected and erosion and sediment flow could be increased temporarily during and after construction. While these impacts would occur, due to the implementation of BMPs, the unavoidable adverse risk of flooding and sediment production would be negligible. The Yahthumb Project would also withdraw water for construction and O&M from an existing well or new well on the Reservation.

Contamination of surface water could occur from spills associated with the Project but implementation of BMPs outlined in the Spill Response and Emergency Response Plan would make the unavoidable adverse impact negligible.

The loss of 308 acres of habitat by implementing the Project would result in an unavoidable adverse impact to vegetation and wildlife habitat for the life of the project. The loss of this amount 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. Unavoidable impacts to desert tortoise would occur and would be mitigated by the terms of the take permit that would be issued for the Project.

Construction of the Yahthumb Project would not affect properties eligible for listing on the NRHP. All nine identified sites would be avoided. In the event that ground disturbance causes the inadvertent discovery of previously unidentified subsurface cultural resources, these would be managed based on

guidance from the appropriate agency and the Moapa Band. Therefore, no irreversible impacts or irretrievable impacts to cultural resources are anticipated.

The Project is expected to create an average of 200 and up to 400 construction jobs for a period of up to 14 months. After the Project is commissioned, up to five full time-equivalent positions would be required to operate and maintain the facilities and provide plant security. This employment would have a beneficial impact on the local economy. The Project would provide long-term lease and ROW revenues to the Moapa Band and increase local spending which would also be beneficial. Therefore, there would be no unavoidable adverse impacts or irreversible and irretrievable commitments of the economic resources.

As discussed above, it is anticipated that the Project would have a positive effect on the local population including members of the Moapa Band by creating both temporary and long-term jobs and revenues. No unavoidable adverse impacts or irreversible and irretrievable commitments of resources are expected.

The Project would limit future use of approximately 1,695 acres of the Reservation for other uses for their life. This would not irreversibly and irretrievably commit the land resource as the use could change after Project decommissioning.

The Project would be visible from I-15, Valley of Fire Highway, and the Old Spanish National Historic Trail. Construction of the Project would cause unavoidable, short-term and long-term, adverse impacts on visual resources by adding additional 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.

3.11 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment

Construction, operation, and maintenance of the Yahthumb Project would result in the loss of resources over the life of the Project. Impacts to water, biological, and visual resources would occur. 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 Yahthumb Project.

CHAPTER 4

List of Preparers and Consultation/Coordination

4.1 List of Preparers and Reviewers

Below is a list of the individuals who contributed to the development of this EIS.

Name	Title / Responsibility
Bureau of Indian Affairs, Western Regional Office	
Chip Lewis	BIA Project Lead / Regional Environmental Protection Officer
Garry J. Cantley	Regional Archeologist
Tamera Dawes	Realty Specialist
Christina Varela	Realty Specialist
BIA Southern Paiute Agency	
Clarence Begay	Acting Agency Superintendent
Department of the Interior, Office of the Solicitor	
Christopher Ruedas	DOI Solicitor
Moapa Band of Paiutes	
Laura Parry	Chairwoman
BLM Las Vegas Office	
Beth Ransel	Renewable Energy
Vivian Browning	Realty Specialist
Matt Klein	Planning and Environmental Coordinator
US Environmental Protection Agency	
Karen Vitulano	Environmental Review
US Fish and Wildlife Service	
Glen Knowles	Field Supervisor
Kelly Douglas	Threatened and Endangered Species
Roy Averill-Murray	Desert Tortoise Recovery Coordinator

Name	Responsibility
ENValue, EIS Consultant	
Randy Schroeder	Project Manager
Patrick Golden	APM, Biological Assessment
Scott Albrecht	Biological Resources
Will Van Vleet	Physical Resources, Biology
Mark Button	Visual Simulations
Jeud Perez	Biological Resources
Rachel Clark	GIS Mapping
AJ Thompson, Knight & Leavitt	Cultural Resources
OTHERS	
Patricia McCabe, Logan Simpson	Consultant to BIA – Environmental Planning
Lisa Young, Logan Simpson	Consultant to BIA –Biology
Mary Barger	Consultant to BIA – Cultural Resources

4.2 Consultation and Coordination

The BIA informed the public, landowners, Government agencies, tribes and interested stakeholders about the proposed Project and solicited their comments.

4.2.1 Public Scoping

The NOI to prepare an EIS was published in the Federal Register on April 23, 2021 and a correction to the NOI was published on April 29, 2021 correcting the comment deadline (May 24, 2021). Federal, state, and local agencies that could be interested or may be affected by the Proposed Project were contacted to request their participation.

In addition, over 70 scoping letters were sent by the BIA 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: <https://www.ChuckwallaSolarProjectsEIS.com/> was also available to the public and provided project information as well as an online comment form.

A legal notice/public notice announcing the public scoping meetings was published in two local newspapers on May 5, 9, and 12, 2021. The BIA hosted two virtual public information and scoping meetings on May 18 and 19, 2021.

Details about the public scoping process and the input received can be found in the Scoping Report included in **Appendix B** of this EIS.

4.2.2 Consultation with Others

In addition to the outreach to public stakeholders, the following federal, state, and local agencies were provided an opportunity to consult during preparation of the Draft EIS:

- Moapa Band of Paiute Indians (cooperating agency)
- Bureau of Land Management (cooperating agency)
- U.S. Fish and Wildlife Service (cooperating agency)
- US Environmental Protection Agency, Region 9 (cooperating agency)
- Nellis Air Force Base
- Nevada Department of Wildlife
- National Park Service
- Nevada Department of Conservation and Natural Resources
- Nevada Department of Air Quality and Environmental Management
- Nevada Division of Environmental Protection
- Nevada State Historic Preservation Office
- Nevada Department of Transportation
- Nevada Natural Heritage Program
- Conservation District of Southern Nevada
- Nevada Energy
- Natural Resources Conservation Service (Mojave Special Projects Office)
- Nevada Department of Transportation
- U.S. Army Corps of Engineers
- Federal Aviation Administration
- Clark County
- Clark County Flood Control District
- Clark County Department of Air Quality
- City of Mesquite
- Southern Nevada Water Authority
- The Honorable Jack Rosen, US Senate
- The Honorable Catherine Masto, US Senate
- The Honorable Dina Titus, US House of Representatives
- The Honorable Mark Amodei, US House of Representatives
- The Honorable Steve Horsford, US House of Representatives
- The Honorable Susie Lee, US House of Representatives

4.2.3 Non-Governmental Organizations

The following non-governmental organizations (NGOs) were provided an opportunity to comment during preparation of the EIS:

- The Nature Conservancy
- Lahontan Audubon Society
- Red Rock 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
- 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
- Sierra Nevada Alliance
- Friends of Gold Butte
- Union Pacific Railroad Company
- Kern River Pipeline
- Old Spanish Trail Association

NGOs, private citizens and state and federal agencies provided comments during the public scoping period. See **Appendix B** for details on the comments received during scoping.

4.2.4 Native American Tribes

Under consultation provisions of the NHPA, BIA approached the following Tribes asked if they attached religious or cultural significance to any historic properties in the APE:

- 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

CHAPTER 5

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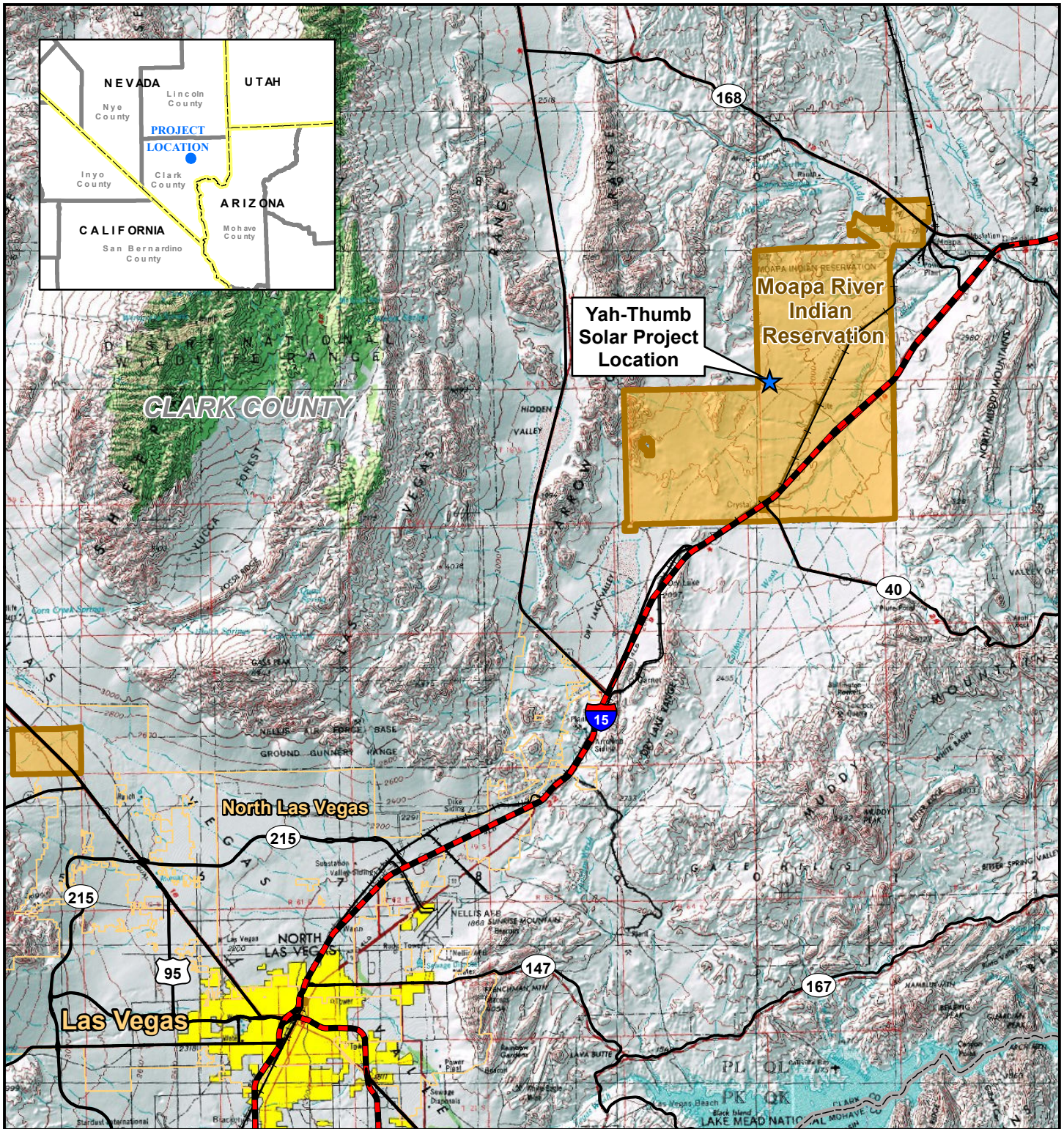
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

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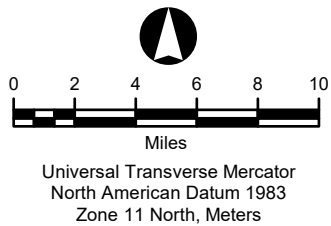
Appendix A

Figures



Legend

-  Solar Project Location
-  Interstate
-  US/ State Highway
-  Railroad
- Jurisdictional Land Ownership**
-  Indian Reservation

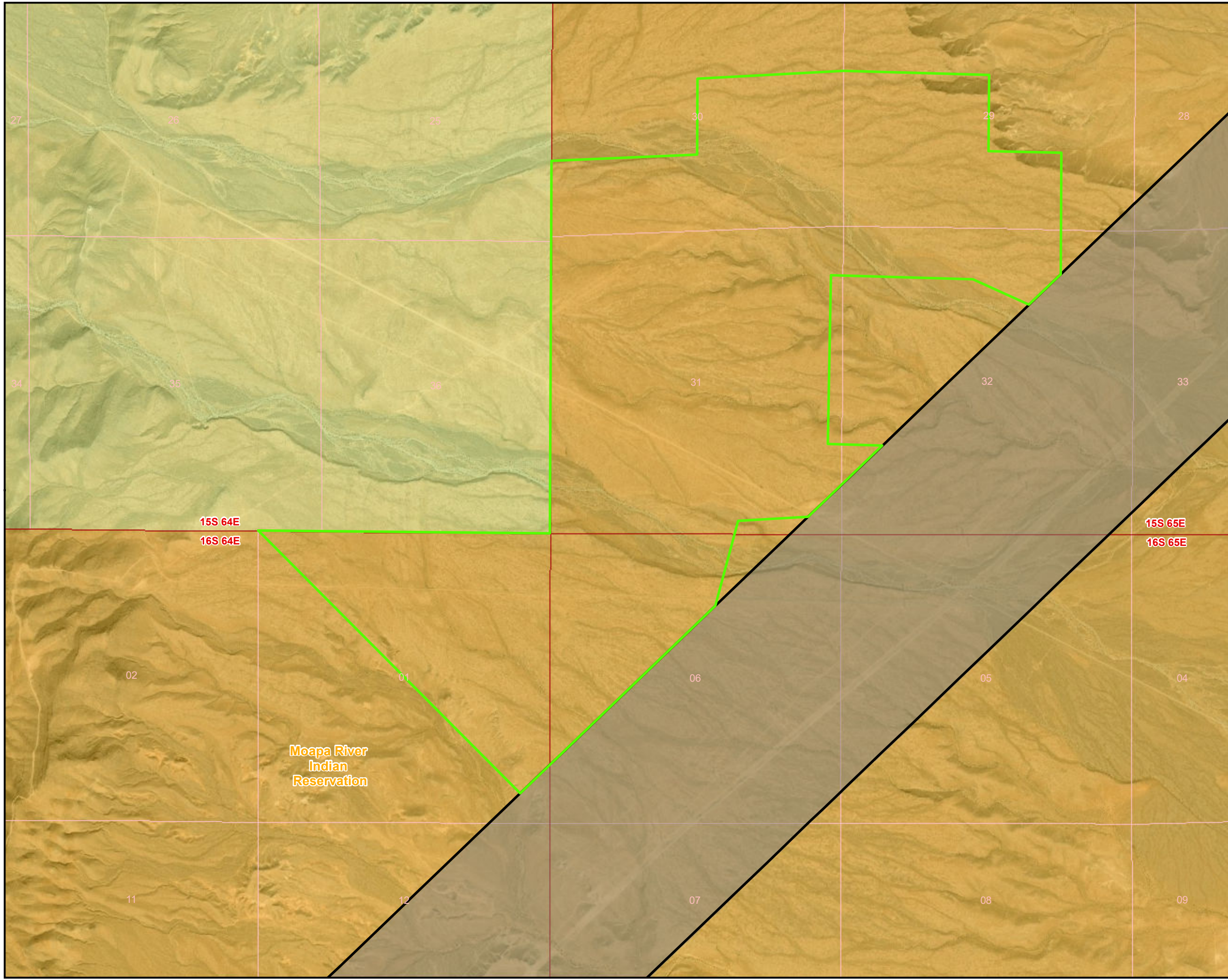


Yah-Thumb Solar Project

FIGURE 1-1
General Location

Map Extent: Clark County, Nevada

Date: 07-05-21		Author: mrc
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Legend

Project Components

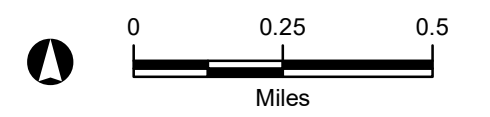
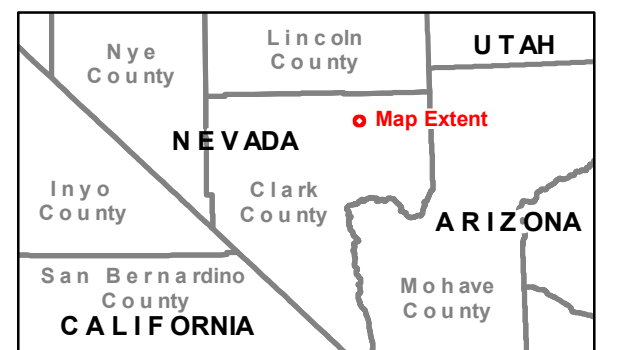
- Yah-Thumb Solar Site

General Features

- Designated Utility Corridor
- Township
- Section

Land Jurisdiction

- Bureau of Land Management Land
- Indian Land



Universal Transverse Mercator
 North American Datum 1983
 Zone 12 North, Meters

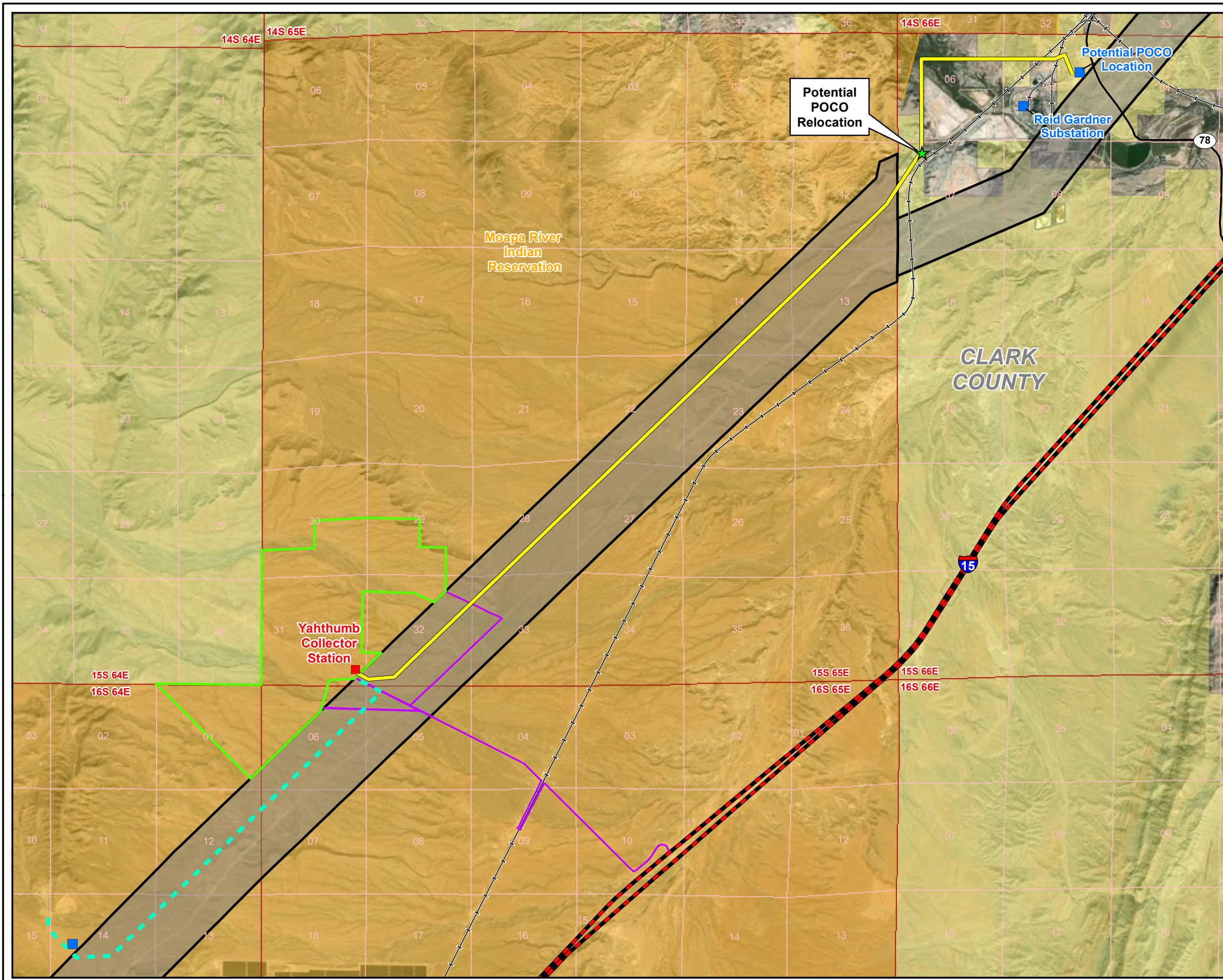
Yah-Thumb Solar Project

Figure 1-2
Project Lease Area Map

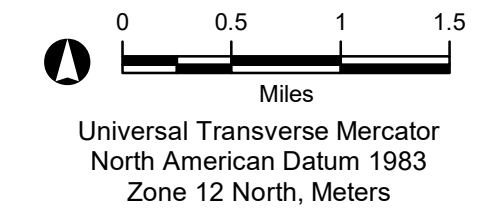
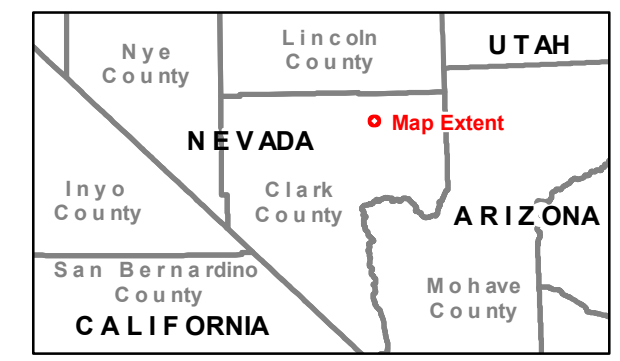
Map Extent: Clark County, Nevada

Date: 10-19-21	Author: sjw
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F:\MXDs\Fig 1-2 Project Lease Area 101921.mxd



- ### Legend
- Project Components**
- Substation
 - Yahthumb Collector Station
 - ★ Potential POCO Relocation
 - Proposed 230 kV Transmission Line
 - Access Road
 - - - Temporary Water Pipeline
 - Yah-Thumb Solar Site
- General Features**
- - - Interstate
 - Major Highway
 - + + + Railroad
 - Stream / River
 - Designated Utility Corridor
 - Township
 - Section
- Land Jurisdiction**
- Bureau of Land Management Land
 - Indian Land

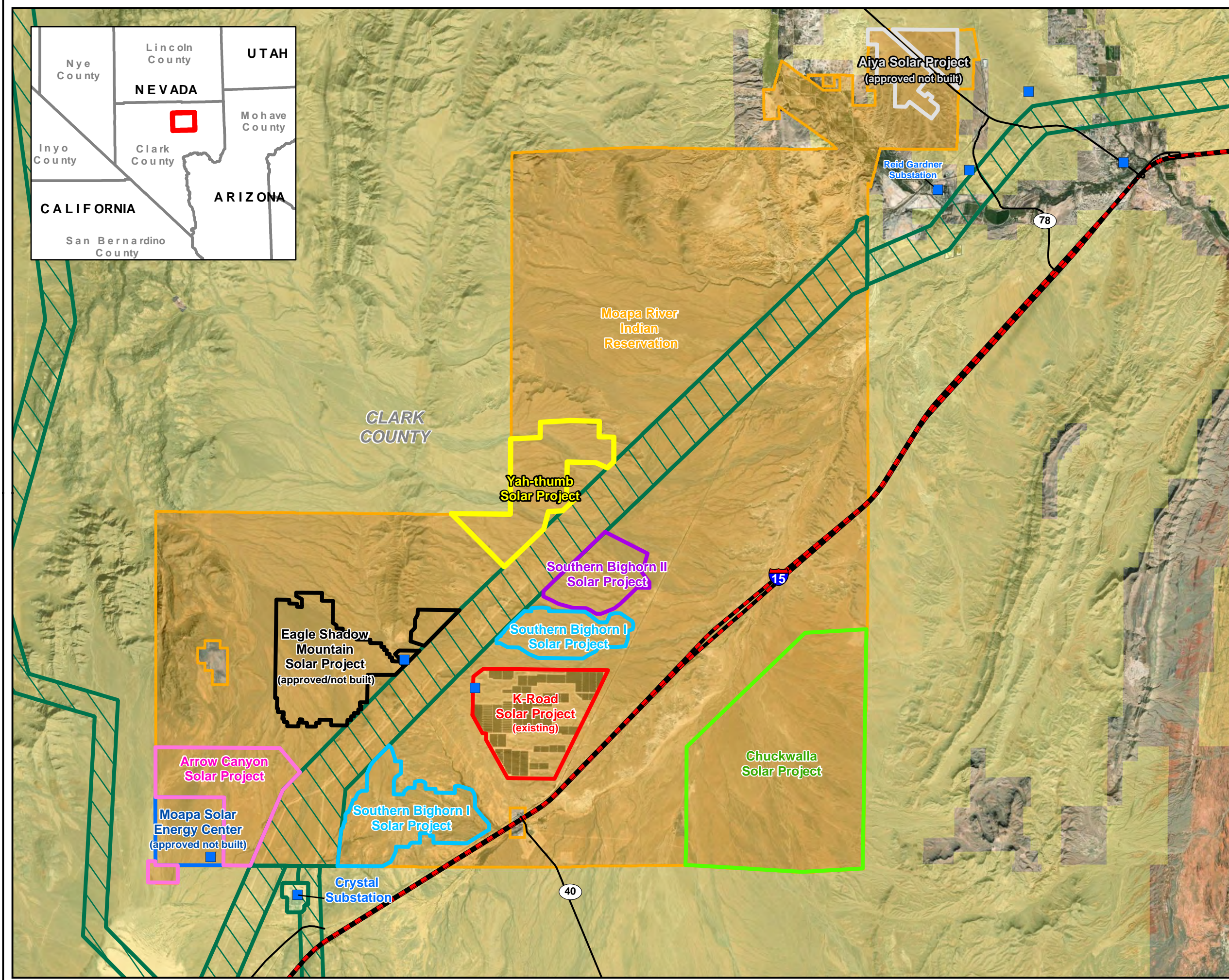


Yah-Thumb Solar Project

Figure 1-3
Project Overview Map

Map Extent: Clark County, Nevada

Date: 10-19-21	Author: sjw
G:\MXD's\Figure 3-1 Project Overview 101921.mxd	

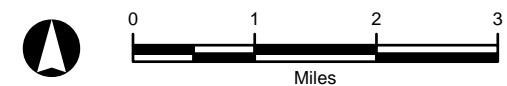


Legend

- Solar Projects**
- Yah-thumb Solar Project
 - Eagle Shadow Mountain Solar Project
 - Aiya Solar Project
 - K-Road Solar Project
 - Moapa Solar Energy Center
 - Arrow Canyon Solar Project
 - Southern Bighorn I Solar Project
 - Southern Bighorn II Solar Project
 - Chuckwalla Solar Project

- General Features**
- Existing Substation
 - Interstate
 - Major Highway
 - Railroad
 - Stream or River
 - Designated Utility Corridor
 - Municipal Boundary

- Jurisdictional Land Ownership**
- Bureau of Land Management Land
 - Indian Reservation
 - Private Lands

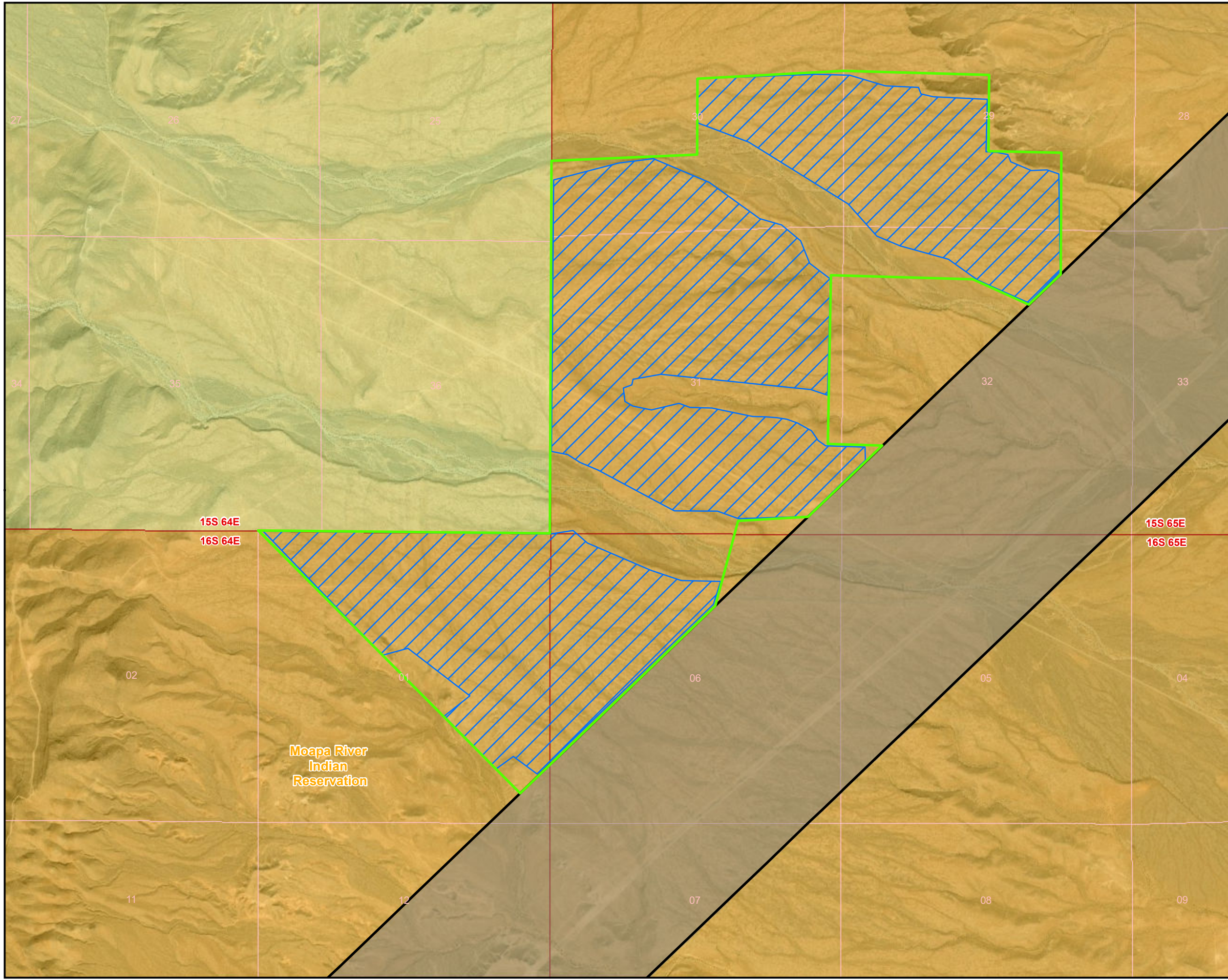


Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Yah-Thumb Solar Project

Figure 1-4
Solar Projects on the Moapa River Indian Reservation

Map Extent: Clark County, Nevada	
Date: 06-28-21	Author: mc
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Legend

Project Components

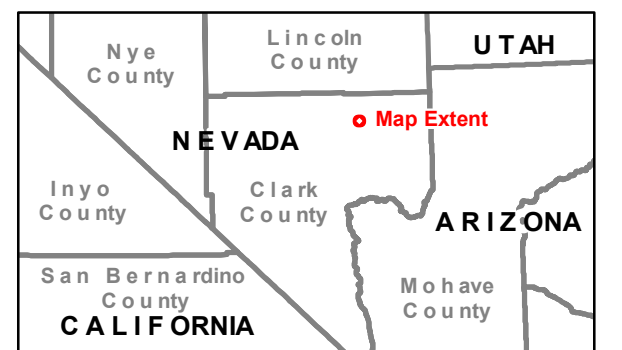
- Yah-Thumb Solar Site
- Solar Field Development Areas

General Features

- Designated Utility Corridor
- Township
- Section

Land Jurisdiction

- Bureau of Land Management Land
- Indian Land



Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

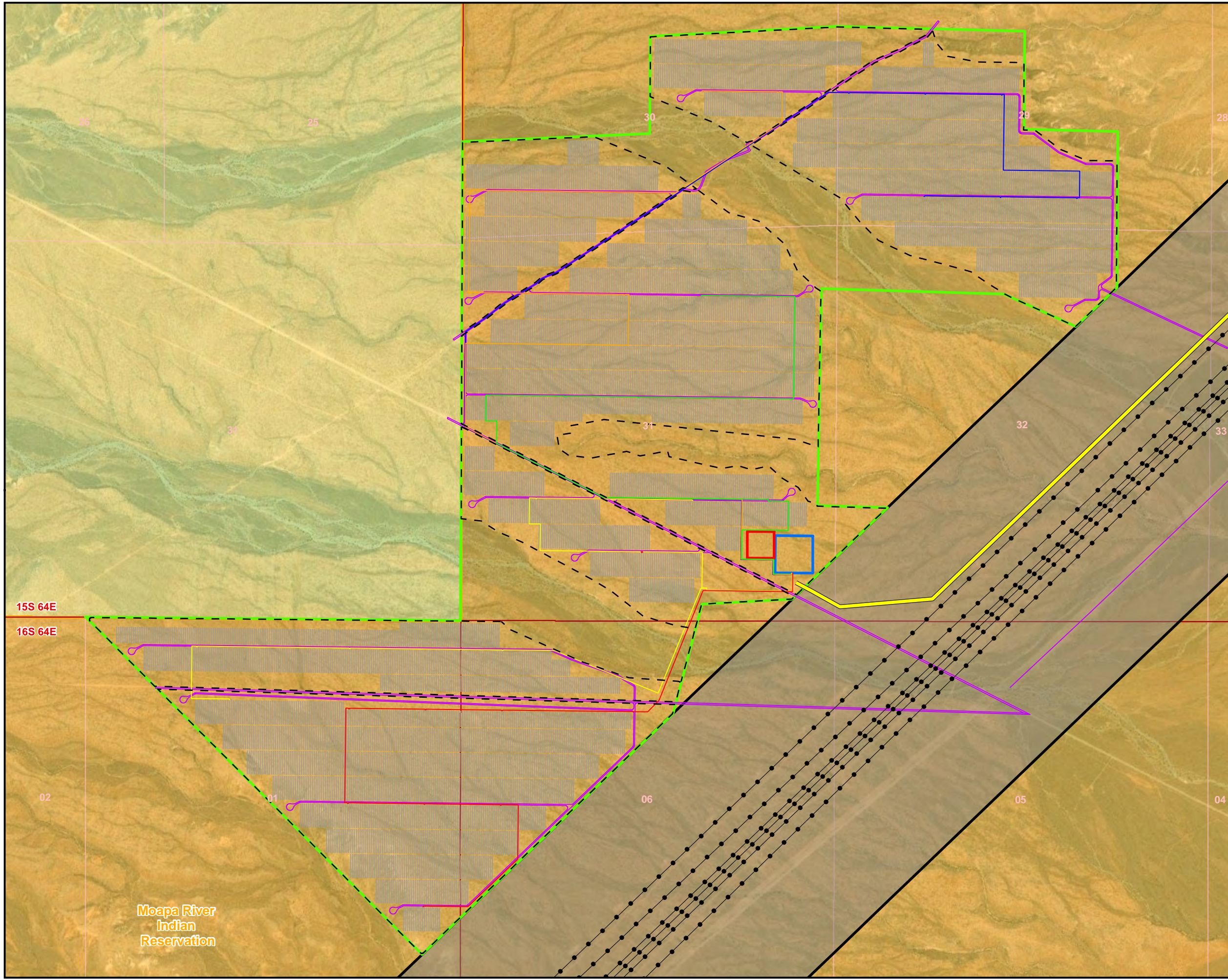
Yah-Thumb Solar Project

Figure 2-1
Proposed Solar Field Development Areas

Map Extent: Clark County, Nevada

Date: 10-19-21	Author: sjw
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F:\MXDs\Fig 2-2 Proposed Solar Field Development Areas 101921



Legend

Project Components

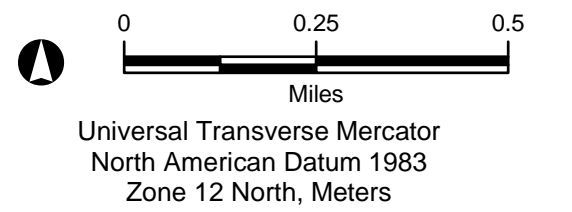
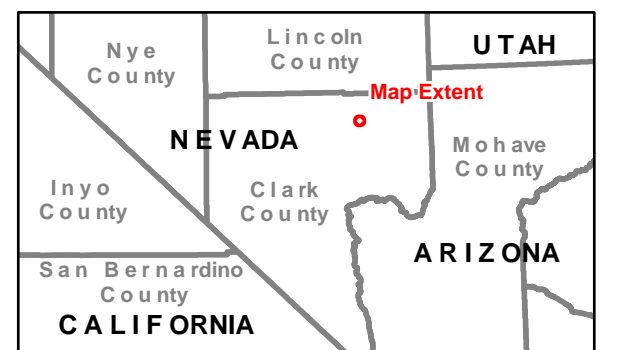
- Gen-Tie
- Access
- MV Circuit 1
- MV Circuit 2
- MV Circuit 3
- MV Circuit 4
- MV Circuit 5
- Yah-Thumb Project Boundary
- Site Fence
- BESS
- Substation
- Piles

General Features

- Transmission Lines
- Designated Utility Corridor
- Township
- Section

Land Jurisdiction

- Bureau of Land Management Land
- Indian Land



Yah-Thumb Solar Project

**Figure 2-2
Site Layout**

Map Extent: Clark County, Nevada

Date: 04-01-22	Author: mc
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Moapa River
Indian
Reservation

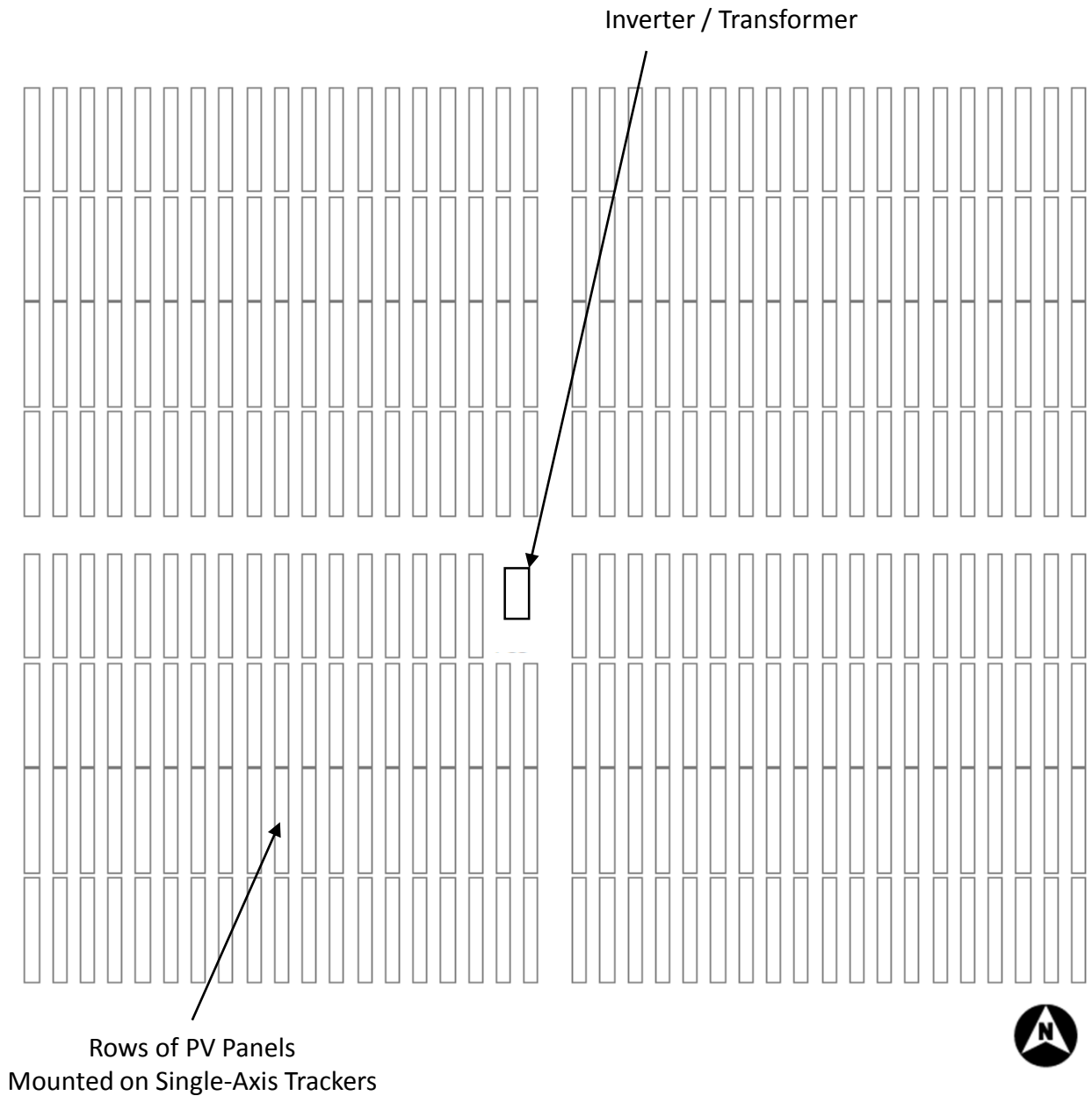


Figure 2-3
Typical Single-Axis Tracker Array Layout

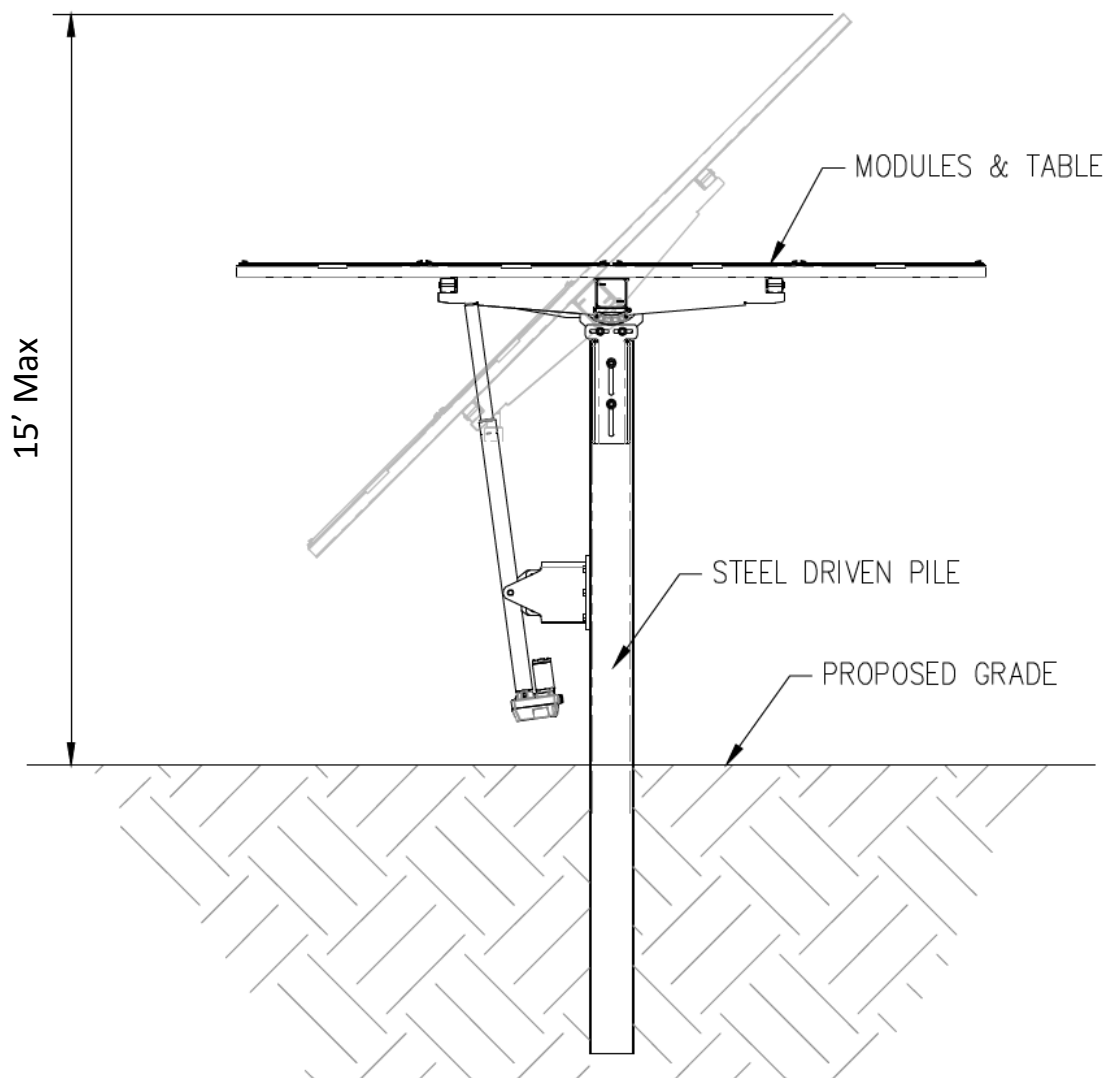
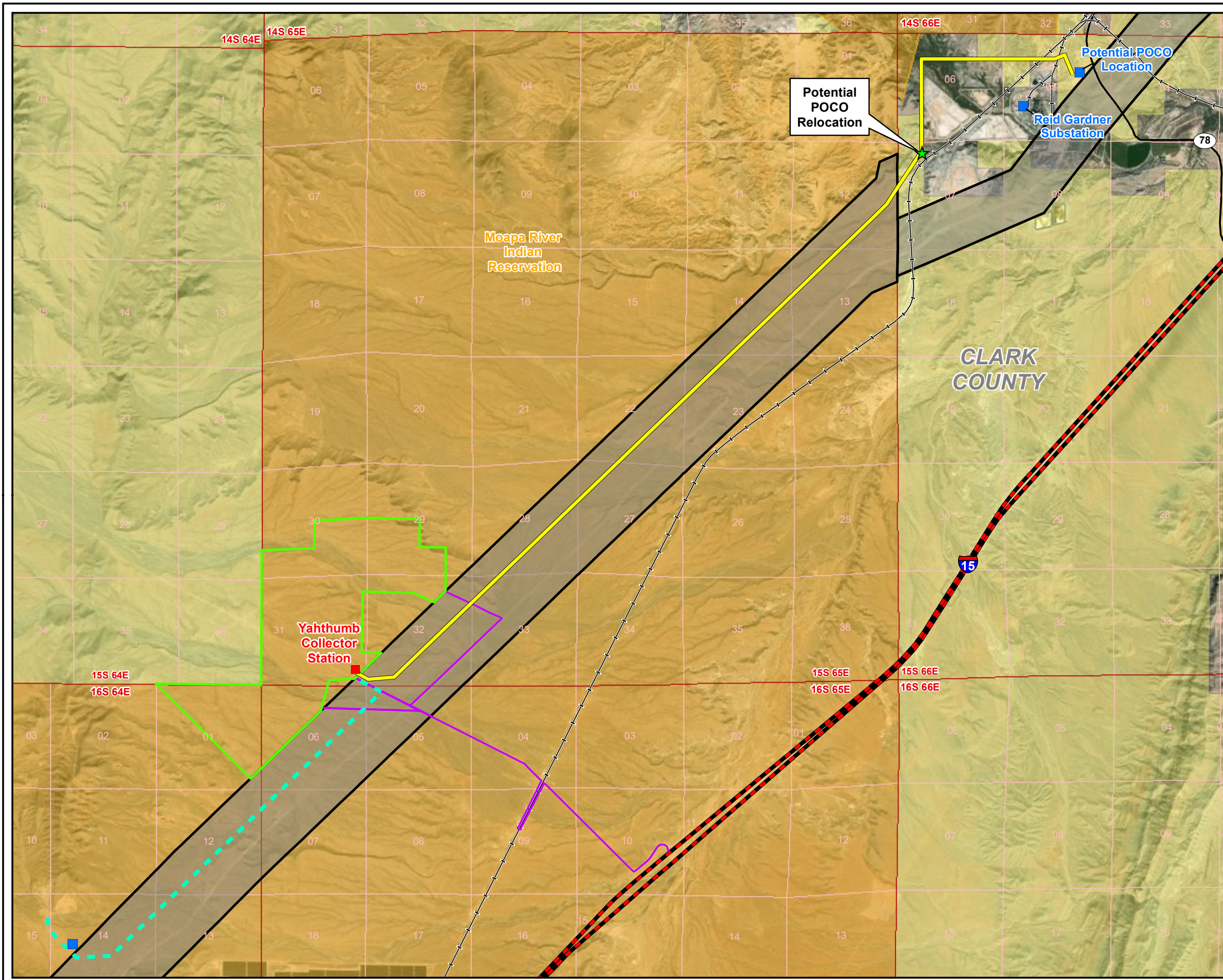
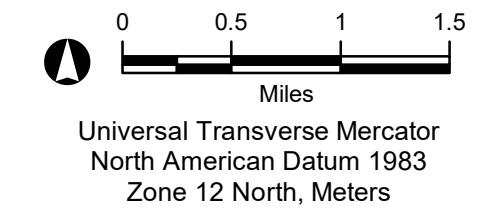
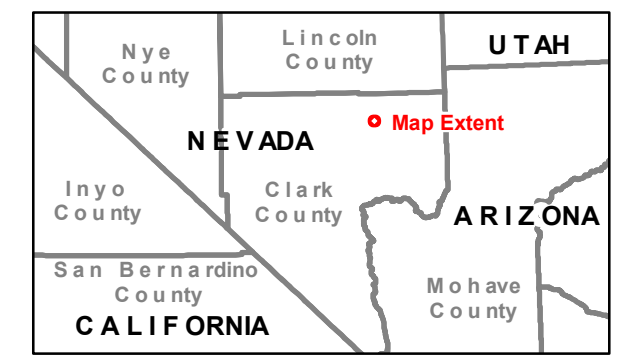


Figure 2-4
Typical Single-Axis Tracker Cross Sectional View



- ### Legend
- Project Components**
- Substation
 - Yahthumb Collector Station
 - ★ Potential POCO Relocation
 - Proposed 230 kV Transmission Line
 - Access Road
 - - - Temporary Water Pipeline
 - Yah-Thumb Solar Site
- General Features**
- - - Interstate
 - Major Highway
 - + + + Railroad
 - Stream / River
 - Designated Utility Corridor
 - Township
 - Section
- Land Jurisdiction**
- Bureau of Land Management Land
 - Indian Land



Yah-Thumb Solar Project

Figure 2-5
Project Gen-Tie Route

Map Extent: Clark County, Nevada

Date: 10-19-21	Author: sjw
G:\MXD's\Figure 3-1 Project Overview 101921.mxd	

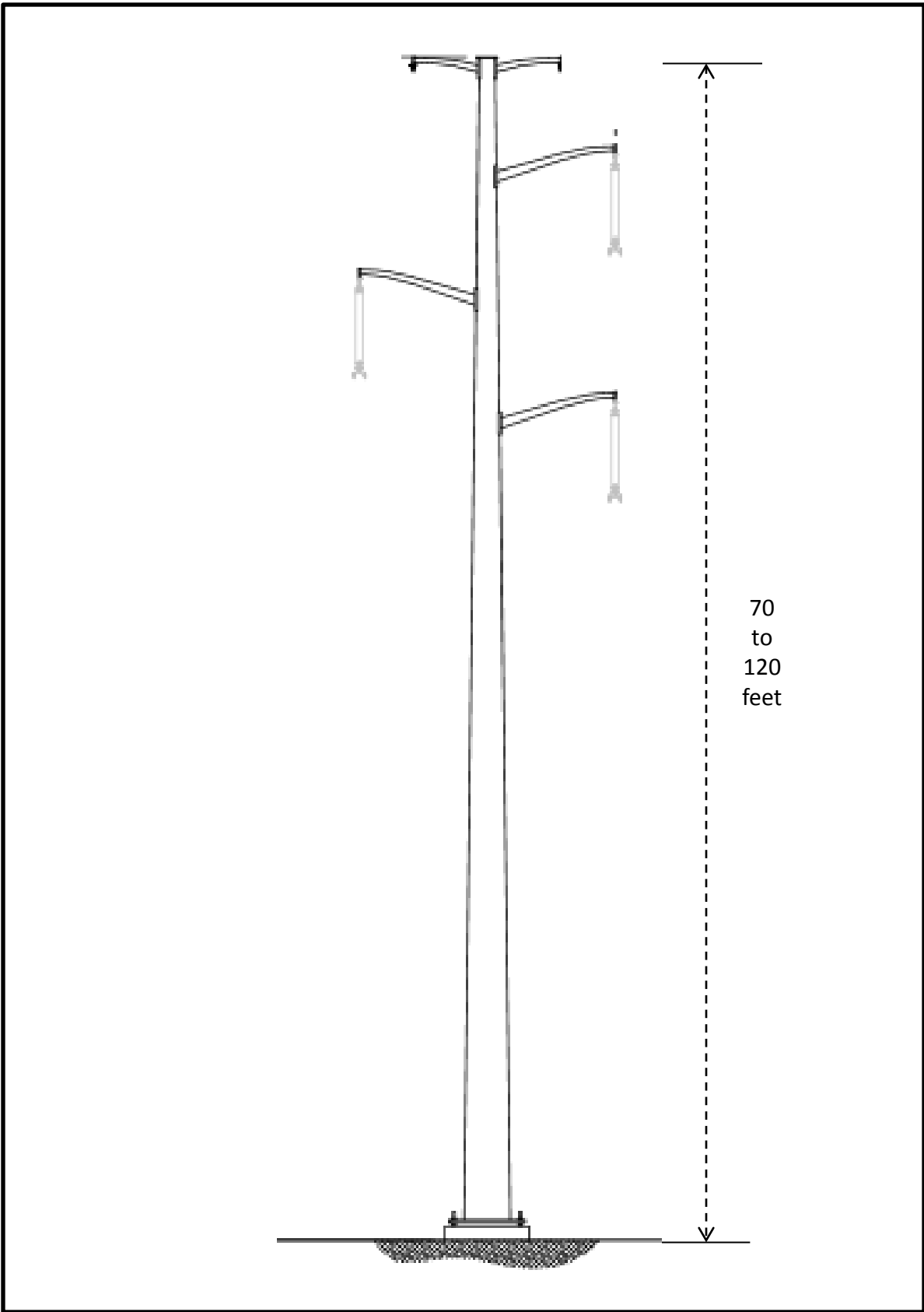
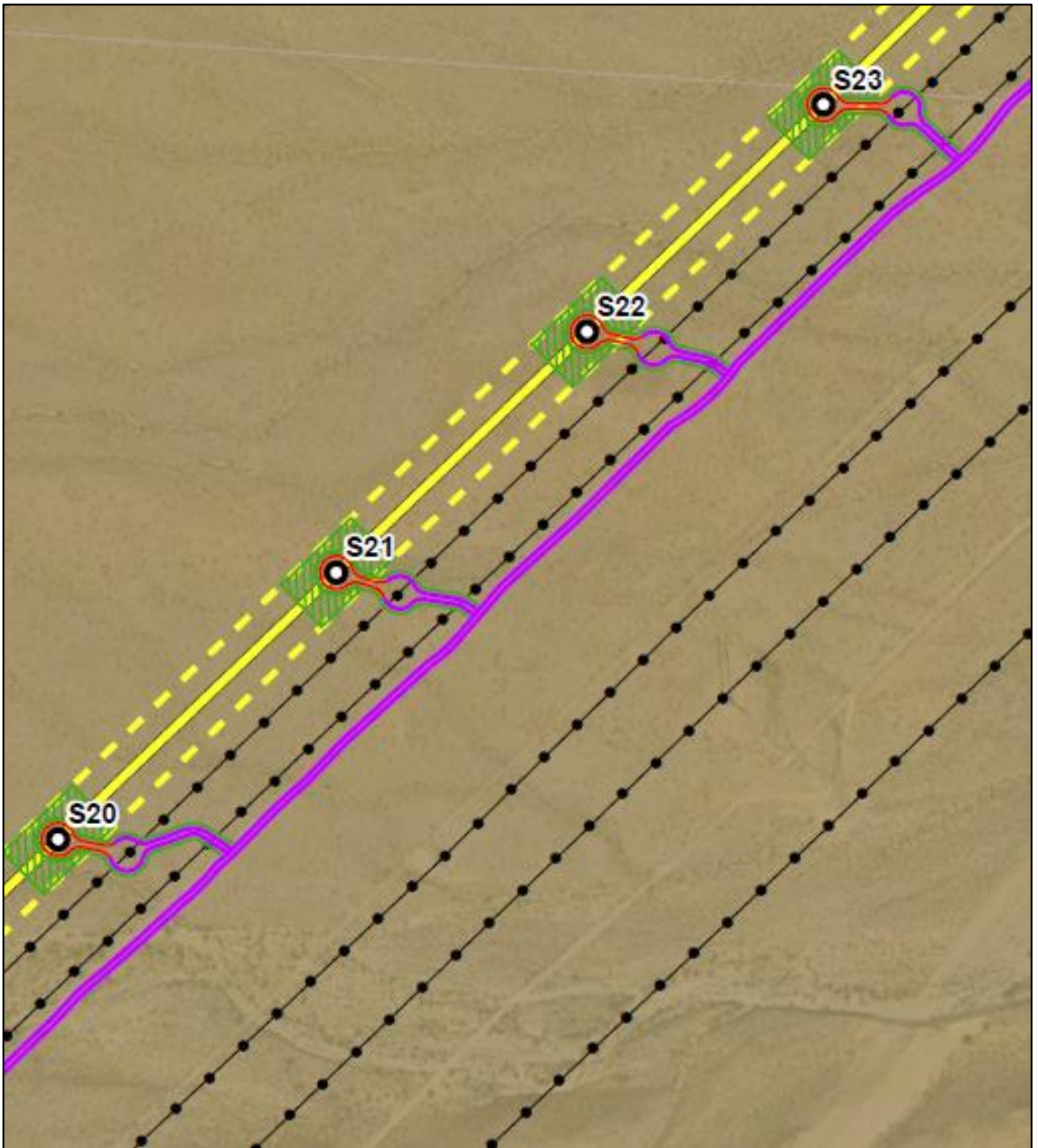


Figure 2-6

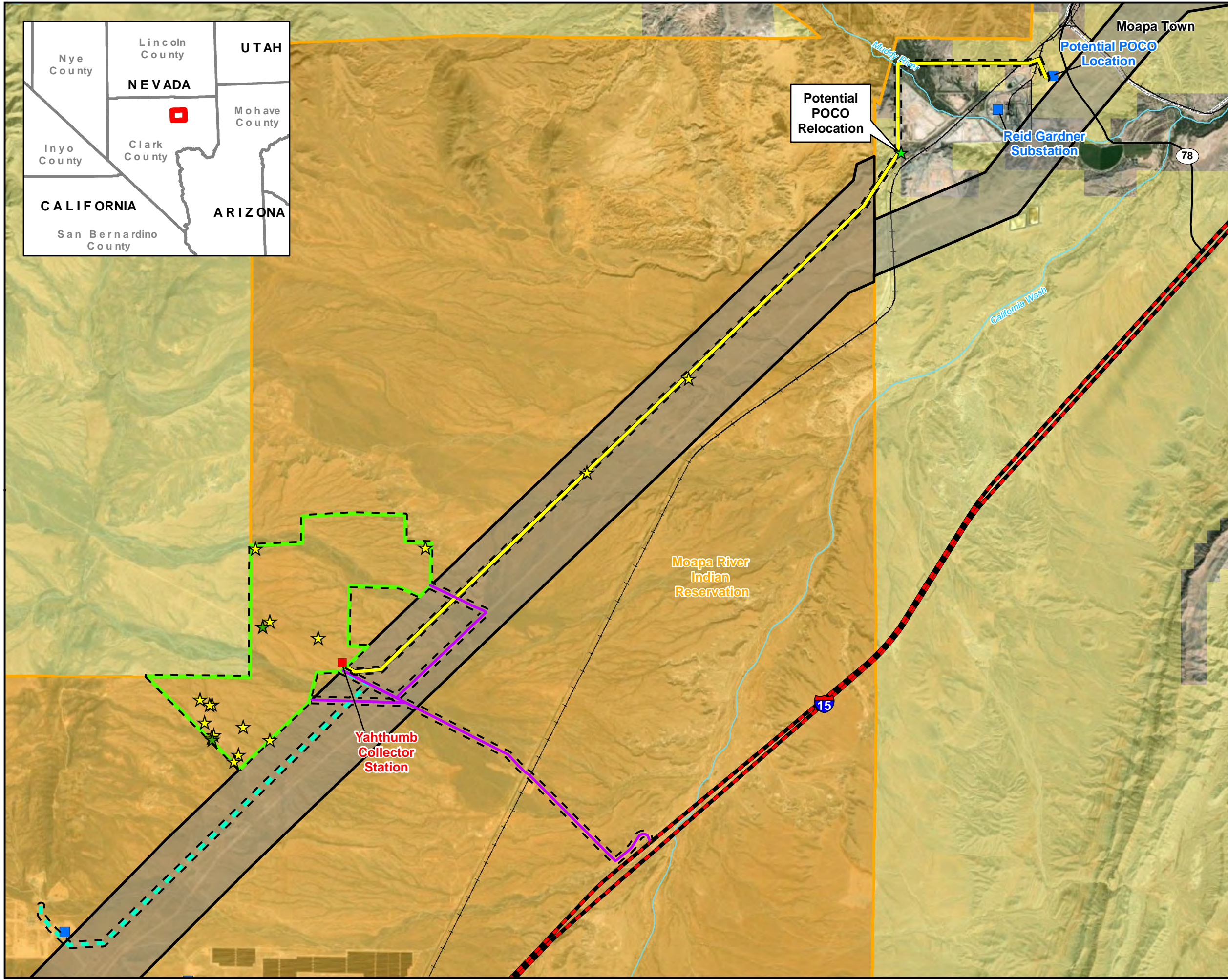
Typical 230 kV Single-Circuit Steel Pole Structure



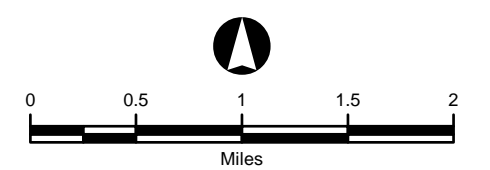
- Existing ESM Gen-Tie Access
- Proposed YSP Gen-Tie Access

Figure 2-7

Illustration
 Proposed Yahthumb Project Gen-Tie Access
 Utilizing Existing ESM Gen-Tie Access



- ### Project Components
- Yahthumb Collector Station
 - ★ Potential POCO Relocation
 - Proposed 230 kV Transmission Line
 - Access Road
 - ▭ Yah-Thumb Solar Site
 - - - Study Area
- ### General Features
- Existing Substation
 - - - Interstate
 - Major Road
 - - - Railroad
 - Stream or River
 - ▭ Designated Utility Corridor
- ### Jurisdictional Land Ownership
- ▭ Bureau of Land Management Land
 - ▭ Indian Land
- ### Survey Results
- ★ Live Desert Tortoise - Adult
 - ★ Live Desert Tortoise - Juvenile



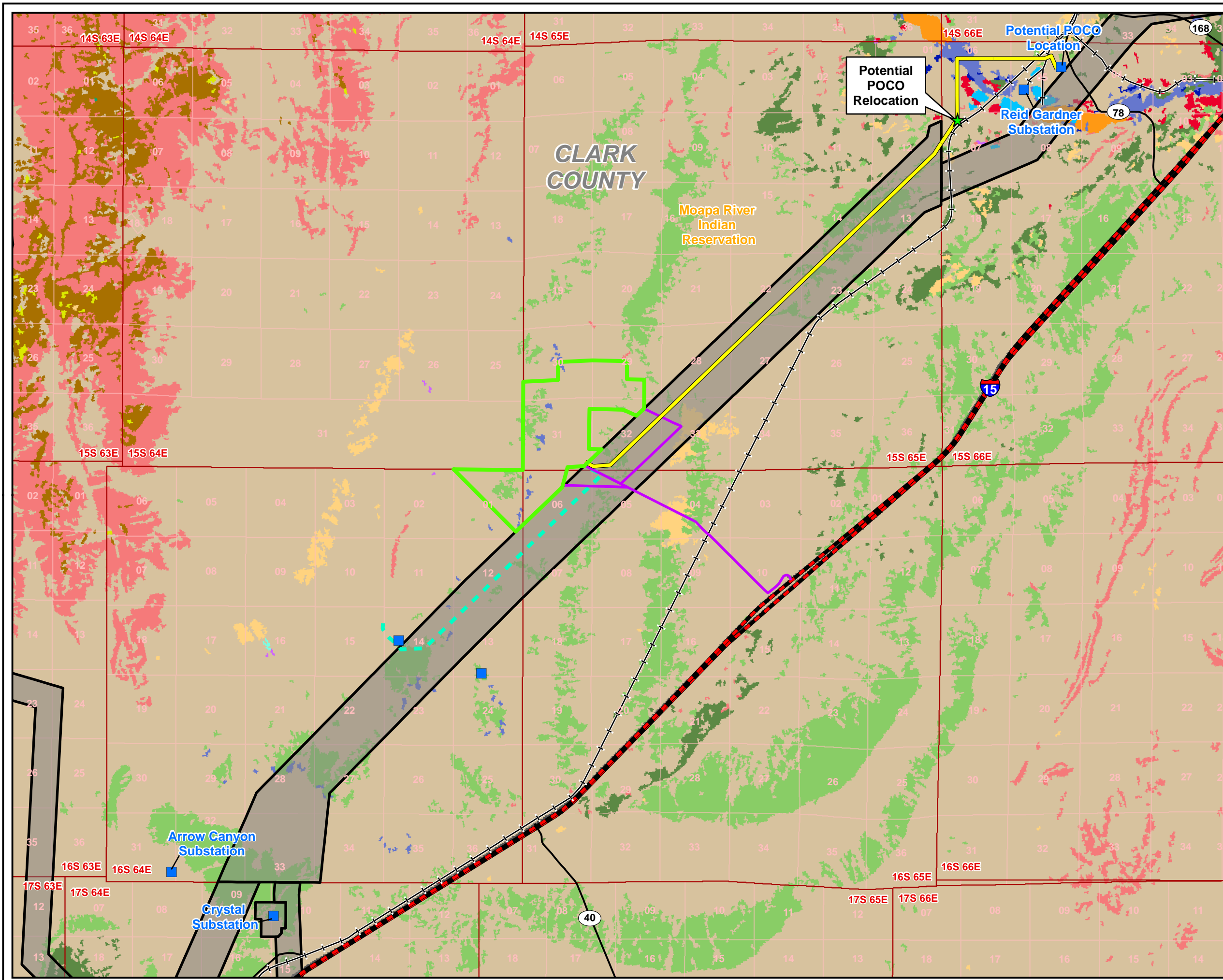
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Yah-Thumb Solar Project

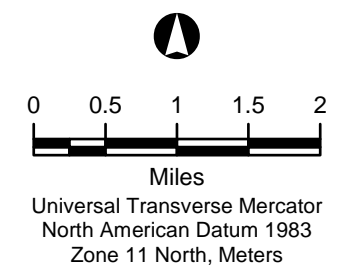
Figure 3-1
Desert Tortoise Observations

Map Extent: Clark County, Nevada

Date: 04-22-22	Author: mc
G:\MXD's\DT Observations_042222.mxd	



- ### Legend
- Project Components**
- Substation
 - ★ Potential POCO Relocation
 - Proposed 230 kV Transmission Line
 - Access Road
 - - - Temporary Water Pipeline
 - Yah-Thumb Solar Site
- General Features**
- Interstate
 - State Highway
 - Railroad
 - Designated Utility Corridor
 - Township
 - Section
- Vegetation Types**
- Agriculture
 - Developed, Medium - High Intensity
 - Inter-Mountain Basins Big Sagebrush Shrubland
 - Inter-Mountain Basins Semi-Desert Shrub Steppe
 - Invasive Southwest Riparian Woodland and Shrubland
 - Mojave Mid-Elevation Mixed Desert Scrub
 - North American Arid West Emergent Marsh
 - North American Warm Desert Badland
 - North American Warm Desert Bedrock Cliff and Outcrop
 - North American Warm Desert Pavement
 - North American Warm Desert Playa
 - North American Warm Desert Riparian Mesquite Bosque
 - North American Warm Desert Wash
 - Open Water
 - Sonora-Mojave Creosotebush-White Bursage Desert Scrub
 - Sonora-Mojave Mixed Salt Desert Scrub



Yah-Thumb Solar Project

Figure 3-2
Vegetation Communities

Map Extent: Clark County, Nevada

Date: 04-22-22	Author: mc
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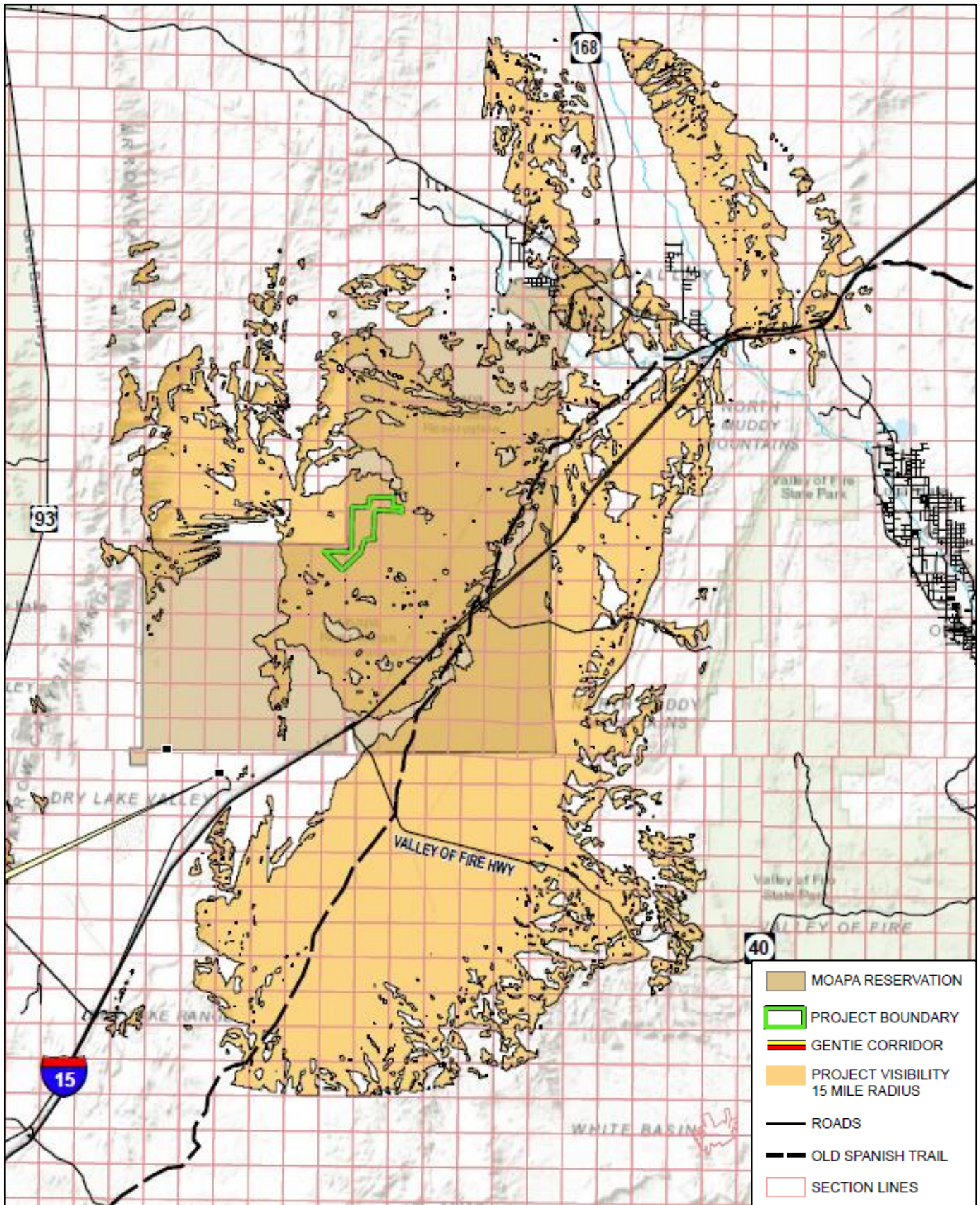


Figure 3-3 Yahthumb Solar Project Visibility Analysis

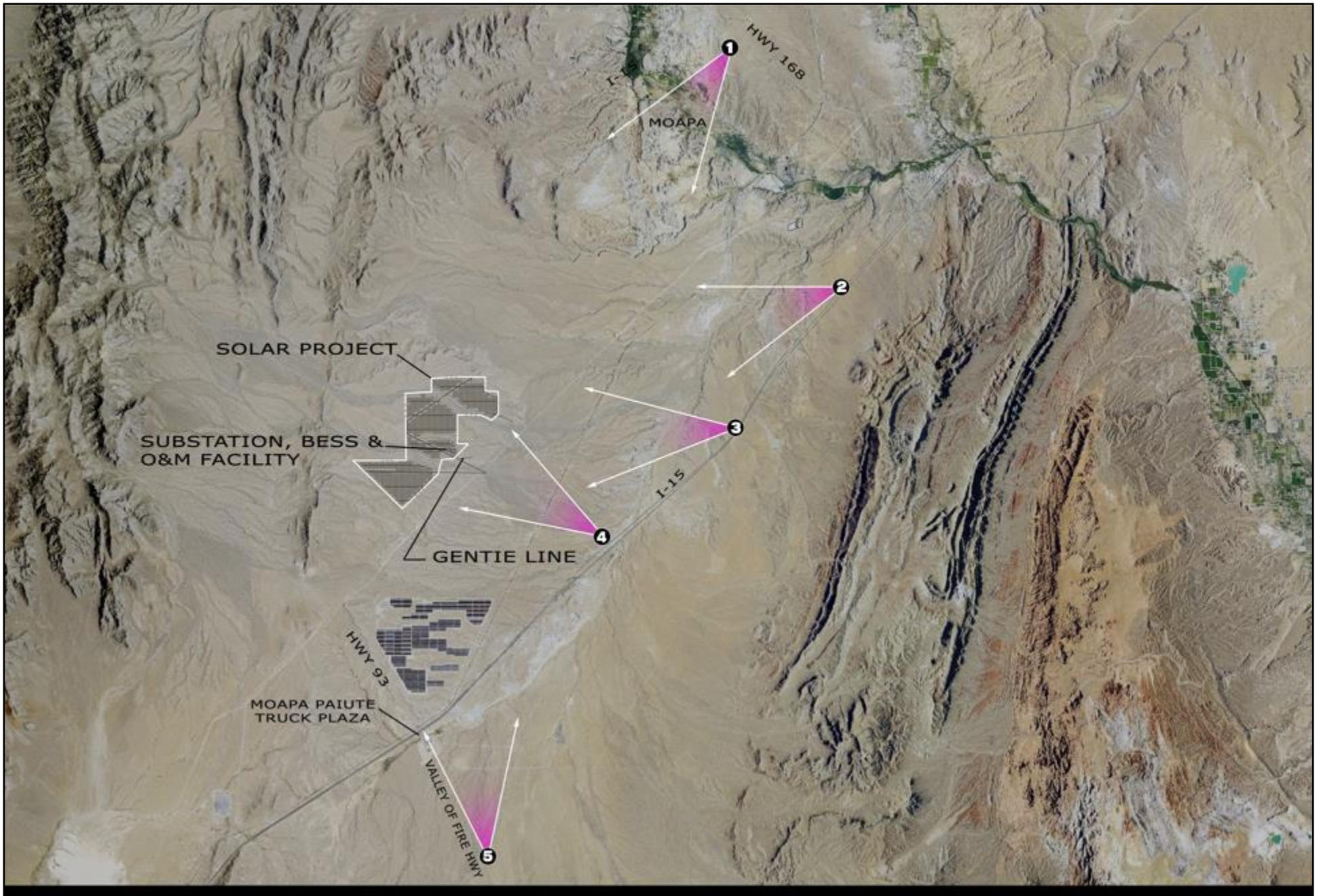


Figure 3-4 – Locations of Key Observation Points (KOPs)



Figure 3-5a – Existing View from KOP 1



Figure 3-5b – Visual Simulation from KOP 1



Figure 3-6a – Existing View from KOP 2



Figure 3-6b – Visual Simulation from KOP 2



Figure 3-7a – Existing View from KOP 3



Figure 3-7b – Visual Simulation from KOP 3



Figure 3-8a – Existing View from KOP 4



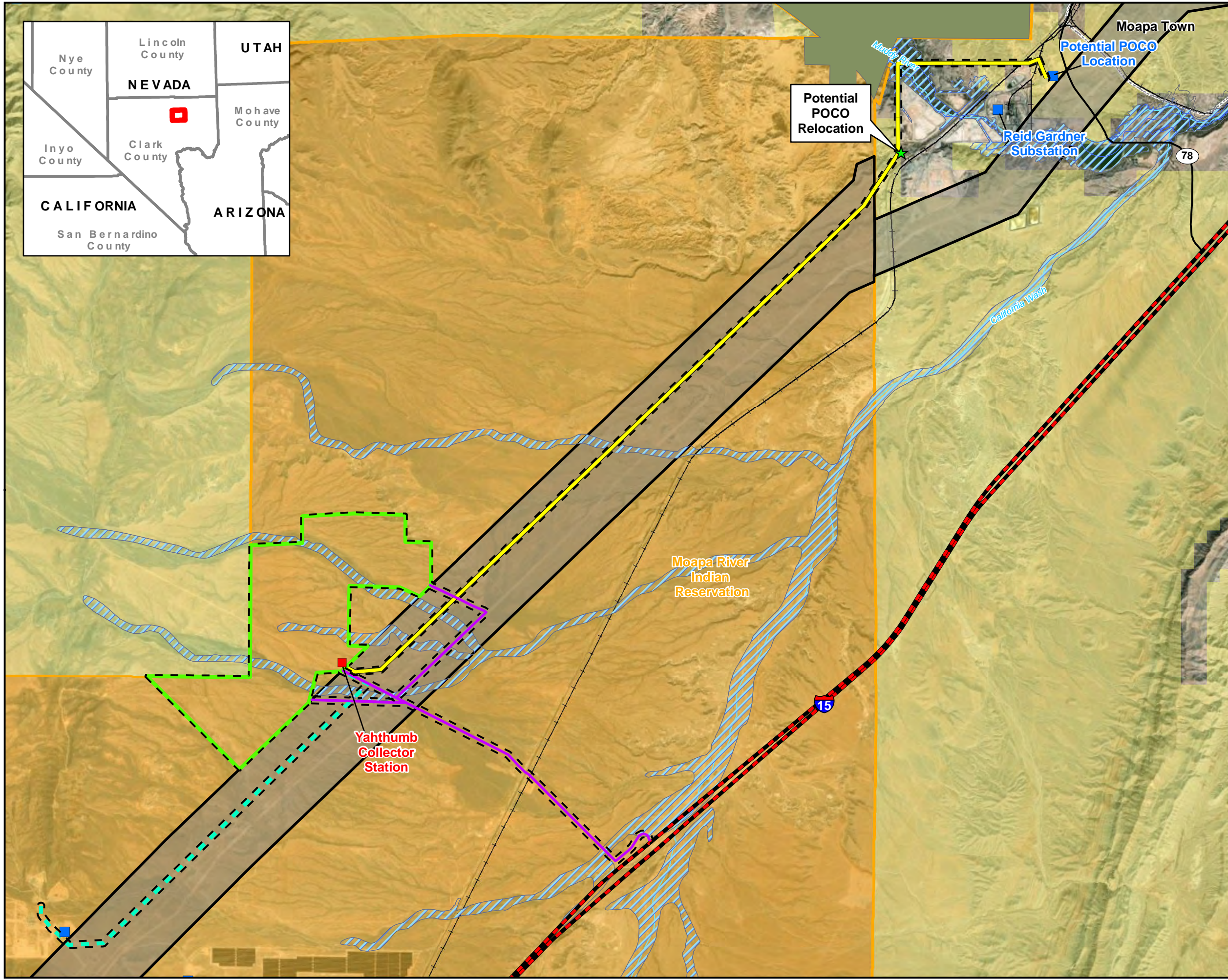
Figure 3-8b – Visual Simulation from KOP 4



Figure 3-9a – Existing View from KOP 5



Figure 3-9b – Visual Simulation from KOP 5



Project Components

- Yahthumb Collector Station
- ★ Potential POCO Relocation
- Proposed 230 kV Transmission Line
- Access Road
- Yah-Thumb Solar Site
- Study Area

General Features

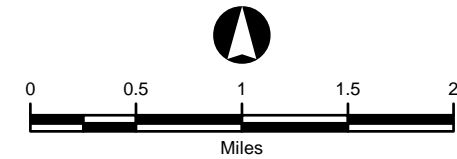
- Existing Substation
- Interstate
- Major Road
- Railroad
- Stream or River
- Designated Utility Corridor

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

FEMA Floodplain

- 100 Year Flood Plain
- Area of Minimal Flood Hazard (No Hatching)



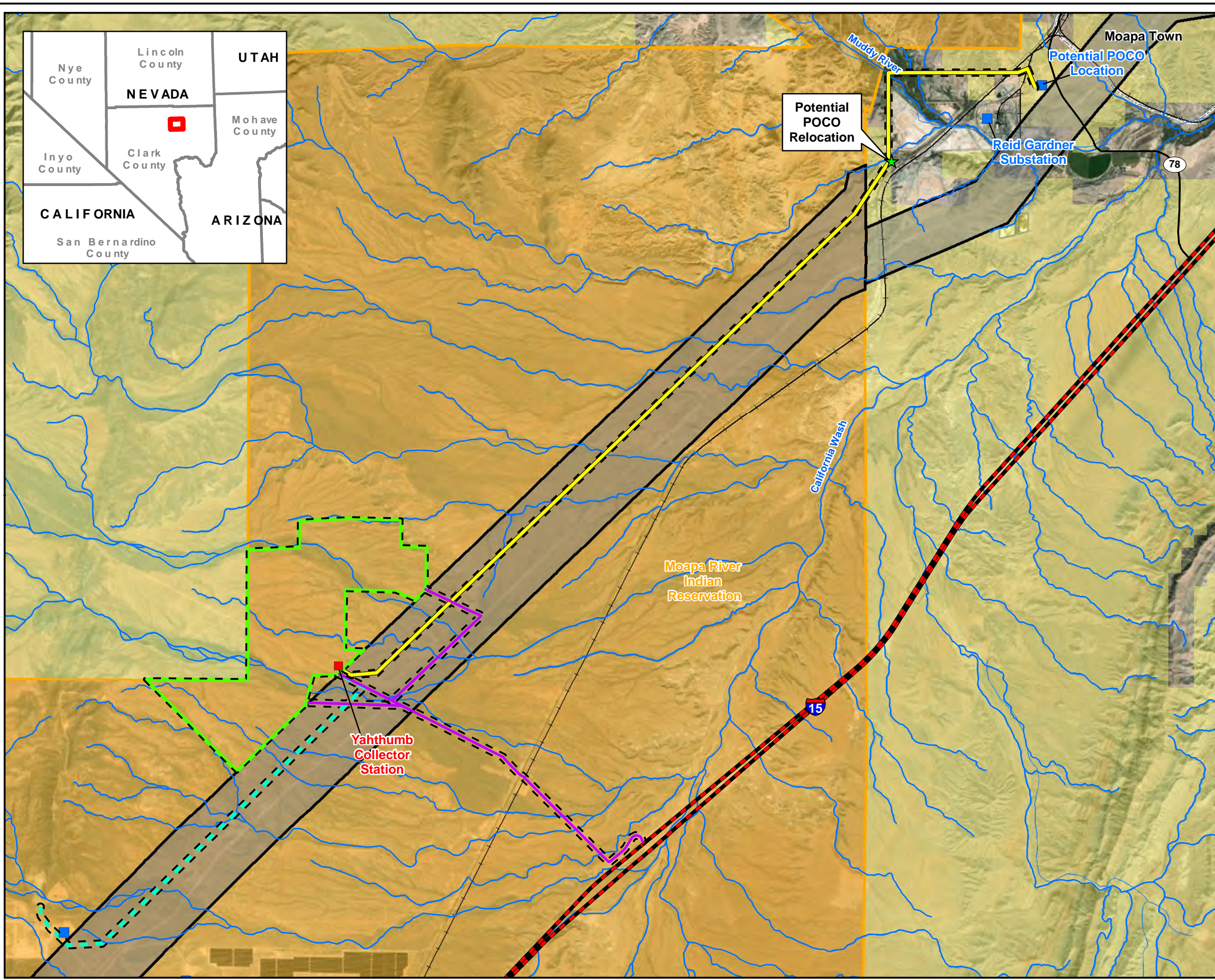
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Yah-Thumb Solar Project

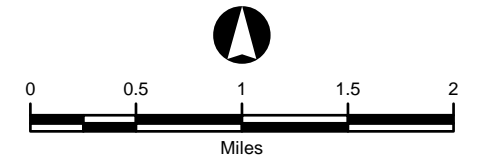
**Figure 3-10
FEMA Floodplain**

Map Extent: Clark County, Nevada

Date: 04-26-22	Author: mc
G:\MXD's\DT Observations_042622.mxd	



- Project Components**
- Yahthumb Collector Station
 - ★ Potential POCO Relocation
 - Proposed 230 kV Transmission Line
 - Access Road
 - Yah-Thumb Solar Site
 - Study Area
- General Features**
- Existing Substation
 - Interstate
 - Major Road
 - Railroad
 - Designated Utility Corridor
- Jurisdictional Land Ownership**
- Bureau of Land Management Land
 - Indian Land
- Hydrology**
- NHD Flowline
 - NWI Wetland



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

Yah-Thumb Solar Project

Figure 3-11
Jurisdictional Waters

Map Extent: Clark County, Nevada

Date: 04-26-22	Author: mc
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